



ARCC/EAAE 2010  
International Conference  
on Architectural Research

23 - 26 June 2010  
Washington DC USA

**THE PLACE OF RESEARCH  
THE RESEARCH OF PLACE**

CONFERENCE  
PROCEEDINGS



THE AMERICAN INSTITUTE  
OF ARCHITECTS

Proceedings of the 2010 International Conference on Architectural Research  
**THE PLACE OF RESEARCH / THE RESEARCH OF PLACE**  
Architectural Research Centers Consortium (ARCC) and  
European Association for Architectural Research (EAAE)

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Prof. Michael D. Kroelinger - ARCC President  
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Arizona State University



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## THE PLACE OF RESEARCH / THE RESEARCH OF PLACE

The Architectural Research Centers Consortium (ARCC) and the European Association for Architectural Education (EAEE) held their joint 2010 Architectural Research Conference in Washington DC, USA. The conference served as a forum for the dissemination and discussion of architectural research issues, findings, approaches, philosophies, and potentials. The Consortium welcomed the involvement of researchers, educators, practitioners, and scholars in architecture, landscape architecture, and planning from the USA, Europe, Asia, Middle East, and Africa. The final session themes of the conference reflected the diversity of the presenter's work and investigation.

The growing interest in performance-based architecture energizes our discipline to engage in rigorous research. Questions addressed during the conference included: What is the place of research in the discipline of architecture? Where does research enter into the practice and pedagogy of architecture? How do architecture schools teach research methods and engage students in meaningful investigations? How do practices conduct research and apply findings in design practice? How does society recognize the importance of research in architecture? What funding sources exist for architectural research? What is the place of pure research? ... applied research?

The conference focused on five modules that revealed the scope and diversity of the discipline. Cultural/Social Research studies place-making and the norms of the inhabitants of natural and built places past, present and future; and/or examines the people who inhabit and use the spaces of architecture. Technological Research studies the physical materials, methods, elements, systems, and science of architecture and the design and construction processes. Design Research considers the processes of shaping and making of places. Organizational Research examines the ways in which individuals and teams collaborate in the practice of architecture and in the client organizations. Educational Research examines the pedagogies of architecture and related fields.

Unifying our discipline is the underlying concern with the research of place. The mission of this international research conference was to consider significant and rigorous investigations that engage participants in dialogue about the place of research and the research of place in the disciplines of architecture, landscape architecture and related fields.



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Kate Wingert-Playdon	Temple University



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## CONFERENCE VENUE

**Howard University  
2400 Sixth Street, NW  
Washington DC 20059**

The District of Columbia, capital of the United States and home to a vibrant international community, was the venue for the Joint ARCC/EAAE 2010 International Conference on Architectural Research. The Conference capitalized on its location close to US government agencies and the embassies of the world in its consideration of the public nature and global context of research.

The host institution was Howard University, with assistance from The Catholic University of America, The University of Maryland, and The American Institute of Architects.



Louis Stokes Health Sciences Library by Icon 5 Architects

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The Louis Stokes Health Sciences Library (LSHSL) is a state-of-the-art academic health sciences library and learning resource center (LRC). Providing support to the teaching, research and clinical needs of the Colleges of Health Sciences and Howard University Hospital, the center is dedicated to delivering quality access to health information resources and services to the African-American community and other historically disenfranchised groups.

Howard University is one of only 48 U.S. private, Doctoral/Research-Extensive universities, comprising 12 schools and colleges with 10,500 students enjoying academic pursuits in more than 120 areas of study leading to undergraduate, graduate, and professional degrees. The University continues to attract the nation's top students and produces more on-campus African-American Ph.D.s than any other university in the world. Since 1998, the University has produced a Rhodes Scholar, a Truman Scholar, six Fulbright Scholars and nine Pickering Fellows.



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**ARCC-EAAE Conference Schedule of Events**  
**THE PLACE OF RESEARCH / THE RESEARCH OF PLACE**

June 23 – 26, 2010

Location	<b>Wednesday, June 23, 2010</b>	
<b>Embassy of Finland</b>	6:00 PM	Registration
	6:15	Opening Remarks
	6:30	Opening Keynote: Ashraf Ragheb
	7:00	Reception
	<b>Thursday, June 24, 2010</b>	
<b>Howard University</b> School of Architecture and Design Mackey Building 2366 Sixth Street, NW, Washington, DC 20059 P: 202-806-7424		Registration
	7:45 AM	Breakfast; Publishing Breakfast session
	9:00	Opening / Welcome Remarks [Ebbe Harder, EAAE] Keynote Address: Marvin J. Malecha, FAIA
	10:30	Break
	10:45	<b>Social/Cultural 01</b> <b>Technology 01</b>
	12:30 PM	Lunch - Keynote speaker: Jane Rendell
	2:15	<b>Social/Cultural 02</b> <b>Technology 02</b>
	3:45	Break
4:00	<b>Social/Cultural 03</b> <b>Design 01</b>	
<b>Howard University</b> School of Architecture and Design	5:30 PM	Reception

		<b>Friday, June 25, 2010</b>	
<b>Howard University</b> School of Architecture and Design Mackey Building 2366 Sixth Street, NW, Washington, DC 20059 P: 202-806-7424		Registration	
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	3:45	Break	
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## **BREAKFAST SESSIONS**

### ***ARCC Journal: The Role of Online Publications in Architectural Research***

Focused on publishing the research conducted by the ARCC, the *ARCC Journal* is a biannual publication collecting the best papers delivered at the yearly conference in conjunction with the EAAE and the yearly theme issue headed by a selected guest editor. The journal is dedicated both to the publication of established researchers and providing a platform for research in its infancy. While a peer reviewed structure insures credibility, its online presence provides an accessible and open venue for publication. This panel discusses the role of the ARCC and the *ARCC Journal* as well as the format of online peer reviewed journals both within and outside the discipline of architecture. The panel is hosted by Kate Wingert-Playdon (Temple University), Franca Trubiano (University of Pennsylvania), and Jeremy Voorhees (Temple University).

### **The Women's Leadership in Architectural Education Networking Breakfast**

This session is an informal opportunity to focus on leadership issues and mentoring of junior faculty in architectural education. This meeting is inspired by the Women's Leadership Council of the Association of Collegiate Schools of Architecture. This spirited discussion provides an overview of the issues on the international scene. The breakfast is hosted by Michelle A. Rinehart, Ed.D. (The Catholic University of America) and Madlen G. Simon, AIA (University of Maryland).



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**Students Aspire**  
By Elizabeth Catlett  
Located at Howard University  
Washington DC, USA

## KEYNOTE PRESENTATION

# **The Teaching and Making of African Architecture in Ghana**

**George Instiful**

Faculty of Architecture

Kwame Nkrumah University of Science and Technology (KNUST)

Kumasi, Ghana

Professor George Instiful is a practicing architect and lecturer at Kwame Nkrumah University of Science and Technology in Kumasi (KUNST), Ghana. In 1976 Professor Instiful graduated from KUNST with a Bachelor of Science degree, the same university from which he would receive a Post Graduate Diploma of Architecture in 1978. He also earned a Masters degree in Architecture from McGill University and a Degree in Architecture at University of Michigan in 1984 and 1989, respectively. Mr. Instiful has taught courses in architecture in numerous universities in Ghana, Liberia, Zimbabwe and the U.S. He has published over ten papers in reputable journals across the globe, including Ghana, Switzerland, and the U.K. He also provided the Chapter on Architecture and Planning Standards in the National Tourism Development Plan for Ghana 1996-2010. Some of his professional works can be seen on the campuses of Kwame Nkrumah University of Science and Technology and Christian Service University College, both located in Kumasi, Ghana.

# THE TEACHING AND MAKING OF AFRICAN ARCHITECTURE IN GHANA

George Intsiful

## Abstract

Architecture has been defined simply as the art and science of building. The various peoples of the different cultures that make up the world have provided different buildings for different activities since the beginning of time. Evidence of such development can be found in what today, many architects, historians, anthropologists, archaeologists etc. refer to as indigenous settlements or building forms.

Today, to many people, “globalization” is a very recent phenomenon. However, virtually all the developing countries which were colonized by various European powers for more than a century could arguably be described as having experienced globalization from the fifteenth century when the first Europeans arrived on the West African coast in modern day Ghana. Since that day, architecture in Ghana has not been the same. Slowly but surely, through what has come to be known as colonization, the local people literally abandoned their practices, including architectural practice, and adopted everything that the Europeans introduced.

Perhaps, if such a new lifestyle were sustainable, there probably would be no complaints whatsoever. Unfortunately, to this day, even the annual budget statements of many developing countries, including Ghana’s, can only be balanced with huge external donations. In architecture, for example, many office blocks in Ghana’s urban centres are designed with central cooling and ventilation systems in a hot, humid climate where the availability of continuous electrical power cannot be guaranteed.

This paper seeks to discuss the teaching and making of African architecture in Ghana. It will discuss briefly the different types of architecture found in the three broad climatic zones of Ghana and demonstrate how “modern architecture”, introduced through colonization and globalization, has found its way to the remotest corner of Ghana. It will further discuss how to this day, it is very difficult to find architecture which could be described as “reflexive modernization” and/or “reflected indigenusness” in Ghana.

Additionally, the paper will discuss the cultural identity crisis in architecture in Ghana through mechanisms such as building regulations and code of practice and education of architects and other specialists in the building industry – which were all introduced by the British - during the colonial days. The paper concludes that there is the need to redouble efforts aimed at making Ghanaians appreciate their traditions and inculcate them into various activities including their architecture.

## INTRODUCTION

The teaching and making of African architecture in Ghana is full of contradictions and complexity. Architecture as a profession and practice is, relatively speaking, very young and recent in Ghana. The first School of Architecture, Town Planning and Building in the then Gold Coast, was established at the then Kumasi College of Technology in 1957.<sup>1</sup> The Kumasi College of Technology was transformed into the Kwame Nkrumah University of Science and Technology (KNUST) in 1961. In 2007, a second Department of Architecture was established by the privately-owned Central University College (CUC) in Accra. However, with its affiliation to the KNUST, CUC’s degrees will initially be awarded by the

KNUST. Hence, the role of the KNUST in the teaching and making of architecture – African or otherwise - in Ghana and the sub-region cannot be underestimated.

Globalization has been defined differently by various people. Held and McGrew, for example, state that it can be conceived as a process (or set of processes) which embodies a transformation in the spatial organization of social relations and transactions, expressed in transcontinental or interregional flows and networks of activity, interaction and power.<sup>2</sup> They claim that it is characterized by four types of change. First, it involves a stretching of social, political and economic activities across frontiers, regions and continents. Second, it is marked by the intensification, or the growing magnitude, of interconnectedness and flows of trade, investment, finance, migration, culture, etc. Third, it can be linked to a speeding up of global interactions and processes, as the development of world-wide systems of transport and communication increases the velocity of the diffusion of ideas, goods, information, capital and people. And, fourth, the growing extensity, intensity, of global interactions can be associated with their deepening impact such that the effects of distant events can be highly significant elsewhere and specific local developments can come to have considerable global consequences. Continuing, they state that globalization, in short, can be thought of as the widening, intensifying, speeding up, and growing impact of world-wide interconnectedness. The International Monetary Fund (IMF) also states that the term “globalization” has acquired considerable emotive force which some view as a process that is beneficial – a key to future world economic development – and also inevitable and irreversible.<sup>3</sup> The world body also believes that others regard it with hostility, even fear, believing that it increases inequality within and between nations, threatens employment and living standards and thwarts social progress. The document further goes on to state that the term has come into common usage since the 1980s, reflecting technological advances that have made it easier and quicker to complete international transactions – both trade and financial flows and that it refers to an extension beyond national borders of the same market forces that have operated for centuries at all levels of human economic activity – village markets, urban industries, or financial centres.

The word has become very ubiquitous in recent times and features prominently at various international meetings. To many people, globalization only affects trade, industry and commerce and is a very recent phenomenon. However, virtually all the developing countries which were colonized by various European powers for more than a century could arguably be described as having experienced “globalization” from the fifteenth century when the first Europeans arrived on the West African coast, precisely at modern day Elmina in Ghana. Since that day, architecture in Ghana has not been the same. Slowly but surely, through what has come to be known as colonization, the local people have abandoned their practices, including architecture, and adopted everything that the Europeans introduced. Perhaps if such a new lifestyle were sustainable, there probably would be no complaints from any quarters. Unfortunately, to this day, even the annual budget statements of many developing countries, including Ghana, can only be balanced with huge external donations. For example, many office blocks in Ghana’s urban centres are designed with central cooling and ventilation systems in a hot, humid climate when the availability of continuous electrical power cannot be guaranteed. Thus many developers and clients have been literally forced to buy diesel-fuelled generators and have them stand by twenty four hours a day. Add that to the fact that most of the materials and finishes utilized for buildings in Ghana’s urban centres are also imported from overseas. This is a clear manifestation of globalization.

In the general scheme of things, whereas advocates of globalization point out the virtues of the new “wonder”, opponents, particularly from the developing world, are also quick to demonstrate how the phenomenon is retarding the progress and development of the developing world. This paper seeks to show that globalization has made and continues to make a very strong impact on the teaching and making of architecture in Ghana. This impact is filled with conceptual and methodological controversies, complexities and contradictions. Such controversies, complexities and contradictions are inherent in the duality of tradition and modern which is associated with the teaching and making of architecture in Ghana. Consequently, two striking contrasting sets of communities have been created across Ghana and these can be described as the traditional (“Third World”) and the modern (“First World”).

Arguably, there is no nation on earth that has not been influenced by others. Such influences have come in various forms and shades and many developing countries that were colonized – globalized – by European countries exemplify such influences in their daily lives. Human settlements in the developing countries, for example, are spaces of organized human activity and have been historically the basic and necessary precondition for all social and economic development.<sup>4</sup> For example, many housing units in such countries are also utilized for economic activities both in the rural and urban areas. Many women in Ghanaian human settlements engage in some kind of economic activity – including cooking and selling food and retailing various items – to support the family. Such activities tend to contradict the zoning requirements that form part of the building regulations and code of practice put in place by the colonial government. Not surprisingly, timber kiosks and other structures that are used for such trading activities are often painted in red ink with signs such as “REMOVE BY (date). BY ORDER (DISTRICT/URBAN/METROPOLITAN AUTHORITY)” by the planning authorities. Traditional dwellings and settlements in these countries, that have been “independent” for less than fifty years – and still need donor support to balance their budgets every year – particularly demonstrate evidence of duality and coincidence in First World/Third World situations. This is reflected by the existence of traditional mud buildings without toilets and running water existing side by side with huge reinforced concrete structures with imported tinted glazing and the latest technological gadgets as well as all the modern services.

This paper seeks to discuss the teaching and making of African architecture in Ghana. It will discuss briefly the different types of architecture found in the three broad climatic zones of Ghana and demonstrate how “modern architecture”, introduced through colonization, has found its way to the remotest corner of Ghana. It will further discuss how to this day, it is very difficult to find architecture which could be described as “reflexive modernization” and/or “reflected indigenesness” in Ghana.

Additionally, the paper will discuss the cultural identity crisis in architecture in Ghana through mechanisms such as building regulations and code of practice and education of architects and other specialists in the building industry – which were all introduced by the British during the colonial days. The paper concludes that there is the need to redouble efforts aimed at making Ghanaians appreciate their traditions and inculcate them into various activities including their architecture.

Architecture has been defined simply as the arts and science of building. The various peoples of the different cultures that make up the world have provided different buildings for different activities since the beginning of time. Evidence of such development can be found in what

many architects, historians, anthropologists, archaeologists etc. refer to today as indigenous settlements or building forms.

#### AFRICAN ARCHITECTURE IN GHANA

Ghana is located in West Africa. It has a very unique position because it is one of the few countries through which the Greenwich Meridian passes. Specifically, the meridian passes through Tema which is a twin-city with the capital, Accra. Arguably, Ghana has been described as being at the geographical centre of the world. Broadly, Ghana, covering a land area of 92,000 square miles, can be divided into three climatic zones. These are the Coastal Savannah, the Tropical Rain Forest Region and the Northern Savannah which borders the arid Sahelian region of Burkina Fasso to the north.

It is important, however, to ask what African architecture of Ghana is. Is it architecture produced with indigenous or local materials? Is it architecture that is completely “home brewed?” Since trading has been going on for centuries between the various peoples of the sub-region, can anyone honestly claim that no group of individuals has been influenced in one way or the other in their building activity? More importantly, is there anything called African architecture in Ghana? Yes, there is something called African architecture in Ghana. Simply put, it is the local or indigenous architecture of the country. It is expressed clearly through the concept of the total environment.

The total environment of the three broad divisions cited above, made up collectively of cultural and physical attributes, have produced interesting indigenous architecture in the three regions. In the Coastal Savannah for example, African architecture is in local materials such as mud or adobe walls, coconut or palm fronde walls with thatched, bamboo and in a few rare cases such as at Biriwa in the Central Region, with flat mud roofs. The Tropical Rain Forest Region also has mud or adobe walls, wattle-and-daub walls and roofs in bamboo or thatch. In both regions, settlement patterns are of the nucleated type and the house forms are rectilinear. Additionally, indigenous buildings in these two southern regions have fairly generous windows. The Northern Savannah Region also has African architecture in mud walls and roofs in either mud or thatch and the dispersed settlement type is pervasive. Mud walls in this region are generally thicker – nearly twice the size of the walls in the other two regions – to counter the effects of the extreme solar radiation during the afternoon. Such thick walls are necessary due to the large temperature difference between day and night. Thus, whereas the same thick mud walls prevent the direct intrusion of solar radiation during the day, they also control internal nightly temperatures by slowly dissipating stored heat indoors. In all three regions, however, the courtyard generates the house plan and is used for various activities such as cooking, sleeping, washing and story-telling among others. Multistorey structures are non-existent in the African architecture in all three climatic regions.

Over the years, however, the situation has changed. People from the remotest parts of the country travel several hundreds of kilometers to the urban centres in search of jobs and better livelihood. Many of such people are willing to accept menial jobs and do manual labour to save some money for some development back home in the future. On their return home after some years, many of such “returnees” as well as highly educated natives with well paying jobs in the urban centres, are ever so willing to demonstrate that they have lived in the urban centres. This demonstration is carried out through copying the building forms, materials and styles. This has resulted in several transformations and additions to existing buildings. Thus

in many indigenous areas, housing units have grown by accretion and the more recent additions reveal the influence of the urban centres. For example, there are now additions or transformations using sandcrete blocks and corrugated metal roofing to houses in mud walls and thatched roofs. Particularly in the Northern Savanna region, the intense reflection of solar rays from the metal roofing sheets especially during the afternoons is very uncomfortable. The advantages of the thick mud walls in the transmission of heat and sound are also lost on the occupants of the new “modern” additions. Across the length and breadth of Ghana therefore, it is now very difficult to come across settlements without recent buildings in modern materials such as concrete, sandcrete block walls, corrugated metal roofing sheets etc. More importantly, the returnees and the highly educated natives are convinced that these new building materials are more durable than the traditional ones and additionally give them a certain new status in society. This obviously, is an impact from globalization and/or colonization.

### COLONIALISM AND ARCHITECTURE IN GHANA

As mentioned above, during the fifteenth century, European adventurers landed at Edina, a settlement now known as Elmina – the mine, in Ghana. This paper will not discuss how and why the adventurers found themselves on the beach of Elmina but surely when they arrived, the natives had some form of shelter. The visitors decided to stay and trade with the indigenes and introduced three building forms. Developed between 1482 and 1787, these fortified stations are designated as lodge, fort and castle. Anquandah distinguishes between these three as follows.<sup>5</sup> The lodge is described as “a sort of miniature fort” and an “indefensible trading post” and was small-sized, built often of earthen material or wood but sometimes of local wood. The fort took the form of a permanent, durable structure built in brick and stone and contained several structures for use by commandant, officers, garrison and servants and it had up to fifty guns installed in it. The castle, however, covered a wider area than a fort, was larger in size and had a more complex network of buildings in addition to up to one hundred guns and more logistics. Some of the materials utilized for the construction of these buildings were imported from Europe. Slowly but surely, the natives became fascinated with not only the lifestyle of the visitors but also their buildings. Some of the natives who benefited from the resulting trading activities built their houses by copying from the Europeans. This was reflected not only in the materials used but the styles in which the buildings were developed as well. The natives had decided that the buildings by the visitors were superior to their own.

After several battles and wars, Great Britain succeeded in driving out the other Europeans who had attempted to stay in the Gold Coast and made Cape Coast the national capital of the new colony after they had defeated the Ashantis in the Sagrenti War of 1874. Consequently, British ideas of construction, including a code of practice and building regulations were introduced to the Gold Coast. On 6<sup>th</sup> March, 1957, the Gold Coast became independent and took the name Ghana. By then, the British had ruled their former colony for nearly one hundred years and introduced various institutions such as the Town and Country Planning Department (TCPD) and the Public Works Department (PWD). This is how several new building forms such as court houses, hospitals, police stations, post offices, shopping centres, offices and bungalows among others, were introduced to the Ghanaian landscape. All such buildings were developed in the then prevalent architectural styles in Great Britain. In 1957, The School of Architecture, Town Planning and Building was inaugurated and the first students admitted for professional courses in architecture, town planning and building in

1958. The School was the first of its kind in English-speaking sub-Saharan African. Europeans headed the School till the 1970s when the first Ghanaian assumed the leadership position. Naturally, the curriculum for the six-year programme was based on the British model with graduates receiving the B. Sc. (Design) degree after the fourth year and the M. Sc. Degree at the end of the sixth year. (The M. Sc. Programme was renamed the Post Graduate Diploma in Architecture in 1969). After one year of professional practice, graduates of the School could sit for the Royal Institute of British Architects (RIBA) registration examinations. The Ghana Institute of Architects (GIA) professional practice examinations were instituted in the late 1960s to replace the RIBA examinations. A graduate from the Department, however, could still opt to sit for the RIBA examinations if he/she so desired, after a few years practice in the United Kingdom.

The Department is a member of the (British) Commonwealth Board of Architectural Education (CBAE) institution and has to conform to the Board's standards. Thus every five years, a team from the Board visits the Department to assess its work for accreditation purposes. Over the years, the programme's curriculum has followed a global approach but the second year studio programme is very unique and based on a rural settlement in Ghana. This is intended to introduce the students to how the other half – the rural folk in Ghana – lives. Interestingly, visiting members of the CBAE have found the rural study very unique, special and different. Through the years, however, most of the students – from middle- and upper-class homes in the urban centres – have had great difficulty in staying in the rural areas for only about two to three weeks! Their demeanour, facial expressions and utterances prove this point. Additionally, students' recommended architectural solutions to rural environmental problems have also not always been relevant. Students are always very keen to demonstrate their awareness of global – read that as Western – approaches towards architectural problems and this is reflected in their architectural design works.

Over the years, there have been several award-winning schemes that rely solely on mechanical ventilation and imported and expensive building materials from students. Sometimes, unique and drastically different forms and shapes have held sway over common sense, availability and affordability. Yes, at crits or juries, students have been asked about natural ventilation, sun-shading devices and overhangs but many students have also got away with several unresolved and inappropriate schemes. It is imperative for the leadership of the Department to ensure that students offer relevant, appropriate and sustainable solutions to architectural problems. Perhaps, more rural studies and field trips need to be introduced after the second year. After all, the rural population in Ghana outnumbers the urban one over four times over. Furthermore, the present local administration system calls for professional architects in the district assemblies most of which are in the rural areas.

The dearth of books, journals and magazines produced by African authors who emphasize regionalism or unique, appropriate and sustainable African architectural solutions further compounds the problem. For example, it is worth mentioning that the revised eighteenth edition of Fletcher's *A History of Architecture*, in discussing architecture in Ghana only cites works by expatriate Western architects some of whom practiced tropical architecture from Europe!<sup>6</sup> For example, the University of Ghana campus at Legon, was designed by a British architectural firm based in Cyprus; hence the Mediterranean look of the campus. Perhaps to architectural historians, since all such buildings are located in Ghana, they qualify to be described as Ghanaian architecture. If this theory is accepted, then the lodges, forts and

castles developed by various European powers along the Ghanaian coast are all local architecture. To the Ghanaian architecture student therefore – and even with many practicing Ghanaian architects, precedents for architectural design solutions can only be found across the Atlantic Ocean and beyond. Thus the complexities, contradictions and controversies in the education of the architect at the Department of Architecture at the KNUST, Kumasi, Ghana, persist. And so does the making of African architecture in Ghana. Globalization expressed through colonialism, therefore, has surely had a major impact on the teaching and making of African architecture in Ghana.

#### TOWARDS A NEW APPROACH TO THE TEACHING AND MAKING OF AFRICAN ARCHITECTURE IN GHANA

In the light of the above discussion, is there a need for a revision in the teaching and making of African architecture in Ghana considering the fact that globalization has introduced new building forms and needs in the country? Yes, there is the need for a “new local architecture” in Ghana. Admittedly, globalization has impacted immensely on Ghanaian culture and this is expressed through dressing, building and eating habits for example. However, the difference between the First World and the Third World in the teaching and making of African architecture in Ghana cannot be bridged overnight. As noted above, the nation’s economy cannot currently support the artificial First World in the urban centres. The filth, squalor and diseases of the Third World also excessively drain both the economic and human resources of the country. A solution seems to lie in a fusion of the positive elements of the traditions of the country with modern day building requirements. For example, instead of building office blocks with extensive glazing on all four facades and then specifying imported and expensive heating, ventilation and air conditioning systems, natural ventilation could be part of the solution. Courtyards could therefore be used for such buildings to achieve through natural ventilation. This is what Intsiful (1996) refers to as using traditions in architectural development.<sup>7</sup> This is similar to Lash’s “. . . aesthetics modernization” or aesthetics and the interpretation of culture.<sup>8</sup> Others simply refer to this as regionalism or critical regionalism. The approach being suggested by the author is similar to “reflexive modernism” as developed by Beck/Giddens/Lash.<sup>9</sup> In other words, the teaching and making of Ghana’s new African architecture must interpret and reinterpret modern society by including ignored traditions which may still be relevant to the development of the country. Whatever this new local architecture may be called, improved, appropriate and affordable technology - expressed through architecture - can go a long way towards improving the lifestyles of Ghanaians and hence the economy. Such new local architecture is more than embossing a few traditional forms and symbols on walls. It should be seen to be an integral part of the design process.

#### RECOMMENDATIONS AND CONCLUSIONS

This paper set out to discuss the teaching and making of African architecture in Ghana. The discussion has pointed out that there is something called indigenous or traditional architecture in Ghana and that this can be found in all three broad climatic divisions of Ghana. The discussion briefly described the different local architecture found in these regions and went on to discuss the impact of colonization or globalization on local architecture. Furthermore, the paper traced the origins of architectural training in Ghana and pointed out the contradictions, complexities and controversies inherent therein.

The paper then proceeds to make a case for a new approach towards the teaching and making of African architecture in Ghana. Such a new local architecture, the paper argues, must be appropriate, meaningful, sustainable and affordable. This, the paper concludes, can be

achieved through introducing relevant and appropriate traditions to the teaching and making of African architecture in Ghana.

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5. *ibid.*,



E.C.D.C. – VIEW SHOWING CLASSROOM AND PLAY HOUSE



CHRISTIAN SERVICE COLLEGE – ANOTHER VIEW OF ADMIN. BUILDING.



ENGINEERING GUEST HOUSE, KNUST – VIEW OF ENTRANCE FOYER.



THE K.N.U.S.T. CAMPUS – INTERIOR VIEW OF THE NEW ENGINEERING AUDITORIUM BUILDING



UNIVERSITY OF CAPE COAST – NEW COMPLEX FOR THE CENTRE FOR CONTINUING EDUCATION.



SHAMA BEACH RESORT – VIEW OF TEMPORARY CLUB HOUSE AT NIGHT.



SHAMA BEACH RESORT – VIEW OF THE TEMPORARY CLUB HOUSE.



**Students Aspire**  
By Elizabeth Catlett  
Located at Howard University  
Washington DC, USA

## KEYNOTE PRESENTATION

# Knowledge Transfer between Research, Education and Practice

**Marvin J. Malecha, FAIA**  
North Carolina State University  
United States

Marvin J. Malecha, FAIA, serves as Dean of the College of Design at NC State University. He also holds the position Professor of Architecture. Prior to this appointment in 1994, he served as the Dean of the College of Environmental Design at California State Polytechnic University, Pomona (1982-1994). He fostered the development of an NC State branch campus in Prague and has championed new academic programs and partnerships during his tenure.

Dean Malecha served as the 2009 national president of the American Institute of Architects (AIA), a professional organization serving 80,000 members. He presently serves as a member of the Board of Regents of the American Architectural Foundation. He was named a Fellow of the AIA in 1992. He served as President of the Association of Collegiate Schools of Architecture (ACSA) in 1989-1990. Dean Malecha is the only American architectural educator to be named an Honorary Member of the European Association for Architectural Education (1998). Dean Malecha was presented the Alumni Distinguished Achievement Award by the University of Minnesota, College of Architecture and Landscape Architecture (1999); and named ACSA Distinguished Professor (2002) the AIA/ACSA Topaz Laureate (2003) for excellence in architectural education; and received the Architecture Research Centers Consortium Haecker Award Recipient (2008) for leadership in architectural research.

A discussion of trends must begin by establishing the bias that will shape our vision – we begin by knowing how to see!

**In the design professions education and practice are**

**mutually dependent,**

**each are the conscience of the other,**

**they lie along the same continuum,**

**yet**

**there is a question of culture.**

**Are there shared imperatives? Absolutely!**

Evidence Based Design is a growing core of professional practice

The search for new knowledge is a fundamental premise of scholarship that is the guiding bias joining education and practice

leading to understanding that

we cannot operate with the mind of a beginner every time we act,  
it just is not so, we learn from experience,

it is a mixture of strategies that inspires the move to unexplored ground,

and the relevance of the design actions to establish their importance,

exploiting the design thinking as a pedagogy beyond to nurture exploration,

thereby

defining design thought as the third domain of knowledge where scholarship is the foundation of practice.

This is a time

defined by transformation in a World Context

Determined Will High Modernist

A Structured Frame of Reference  
Technical and Scientific Progress

Critical Choice, Regionalism

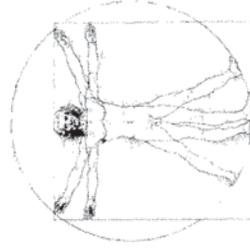
Ideology

Economy

Governance

Internationalism / Global  
Predestined Order

Sustainable and Regenerative Practices  
Predominance of Nature  
The Capacity to Resist



Sketch, Leonardo da Vinci

This new context  
demands of us

Twitter App Mania | World's Top Lock-Picker | Cell Phone Riot!

# WIRED

**NEW**  
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More Startups. Fewer Giants. Infinite Opportunity.  
BY CHRIS ANDERSON

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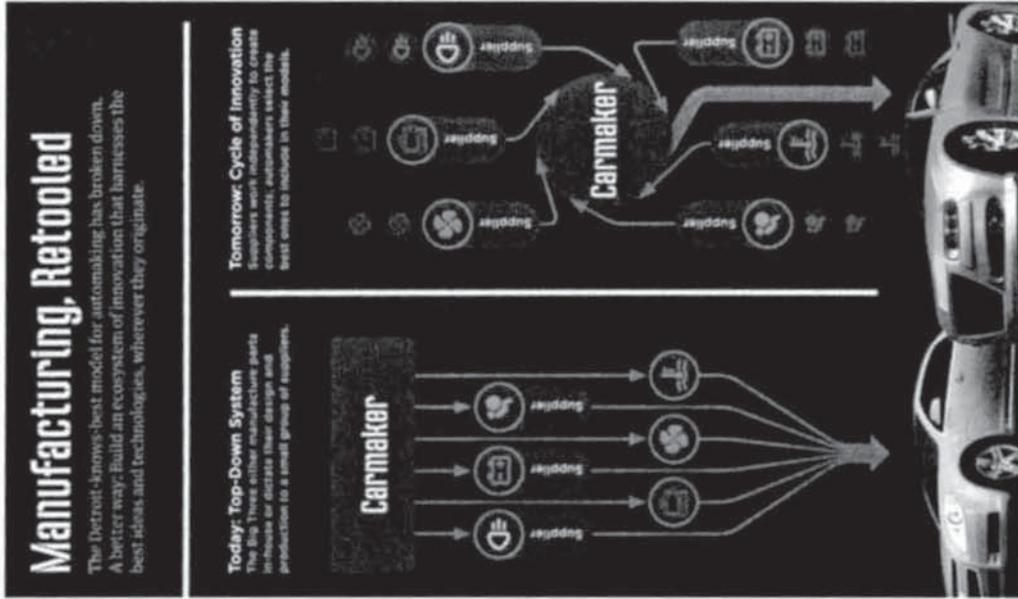
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A New  
Understanding

# New ways of understanding constitute



 <b>The Old Socialism</b>	 <b>The New Socialism</b>
Authority centralized among elite officials	Power distributed among ad hoc participants
Limited resources dispensed by the state	Unlimited, free cloud computing
Forced labor in government factories	Volunteer group work à la Wikipedia
Property owned in common	Sharing protected by Creative Commons
Government-controlled information	Real-time Twitter and RSS feeds
Harsh penalties for criticizing leaders	Passionate opinions on the Huffington Post

## Reconfigured Understanding

From: Wired Magazine

Therefore the connection between learning and practice cannot be denied.

To connect learning to practice

Is to understand that

the way we teach is relevant to the way we understand architecture,

the way we understand architecture is relevant  
to how we understand societal values,

and when the values in society change,  
than how we understand architecture changes,  
and the way we teach architecture changes.

and it is therefore

it is critical that we become fully open  
to the continual questioning of our learning context.

Constantine Spiridonidis, Professor of Architecture University of Thessoloniki, Head, European Network of Schools of Architecture, speaking to the ACSA Administrators Meeting in Minneapolis, October 2007

The connection between learning and practice  
is a matter of culture

that requires

the way we understand that architectural education is a comprehensive  
experience as much exploration as preparation,

yet

societal transformation operating at a historical pace demanding changes in the  
manner of practice widens the gulf between the academy and  
practice,

we must therefore recognize this growing cultural gulf because it does reflect how  
we understand architecture and the way we teach architectural  
practice,

and

it is the resolution of this growing distance that will determine if we  
understand our discipline/profession as a commodity or as a culture  
of knowledge.

The connection between learning and practice reveals the challenge of relevancy to the design experience

This is to understand that there are five imperatives we must address

the demonstrated value to societal need,

The Cooper-Hewitt, Design for the Other 90%

the public health imperative and environmental well-being,

The Centers for Disease Control, Atlanta

The World Health Organization

The US Department of Health and Human Services, Healthy People 2010

The Joint Center for Political and Economic Health Studies Institute

the human capital investment,

The Learning Culture

Diversity in Opposition to Isolationism

Best Practices

the socialization of information,

Integrated Project Development

Networks of Relationships

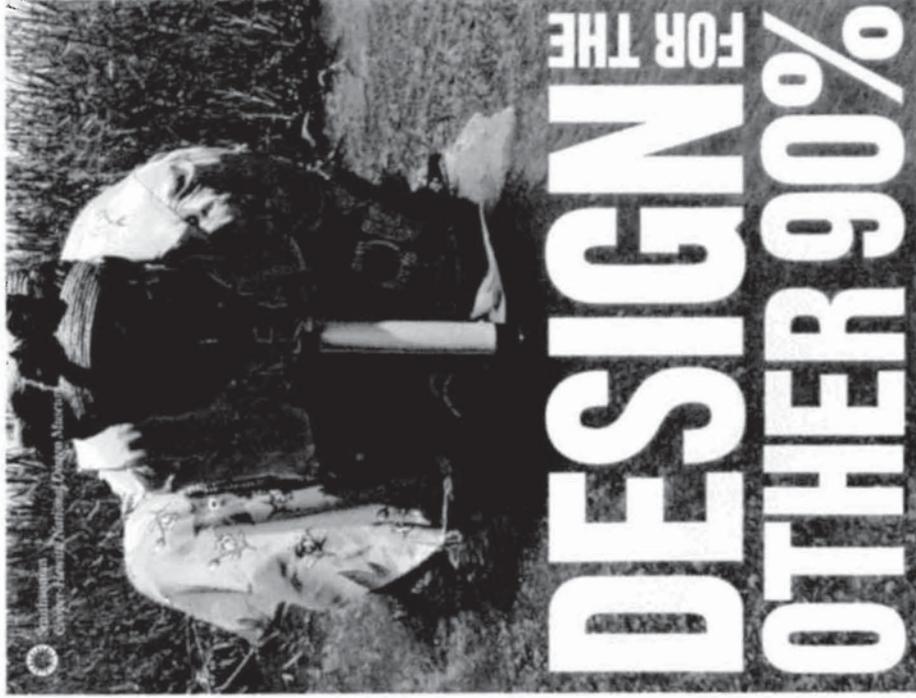
Productive Interaction of Technology

the global networks of work and life,

and it is therefore

critical that we become fully open to possibility.

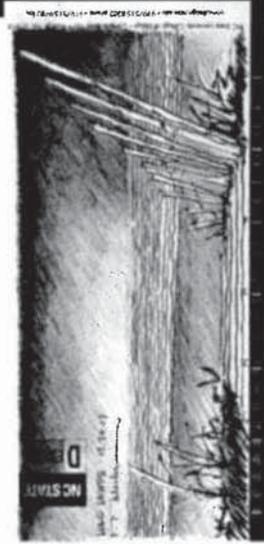
Design must be firmly fixed on societal need



From the cover to the Cooper-Hewitt catalogue for the exhibition "Design for the Other 90%"

Do we even attempt to understand their needs?

Design is challenged by the human health and environmental well-being imperative that will significantly enhance the possibilities of leadership.



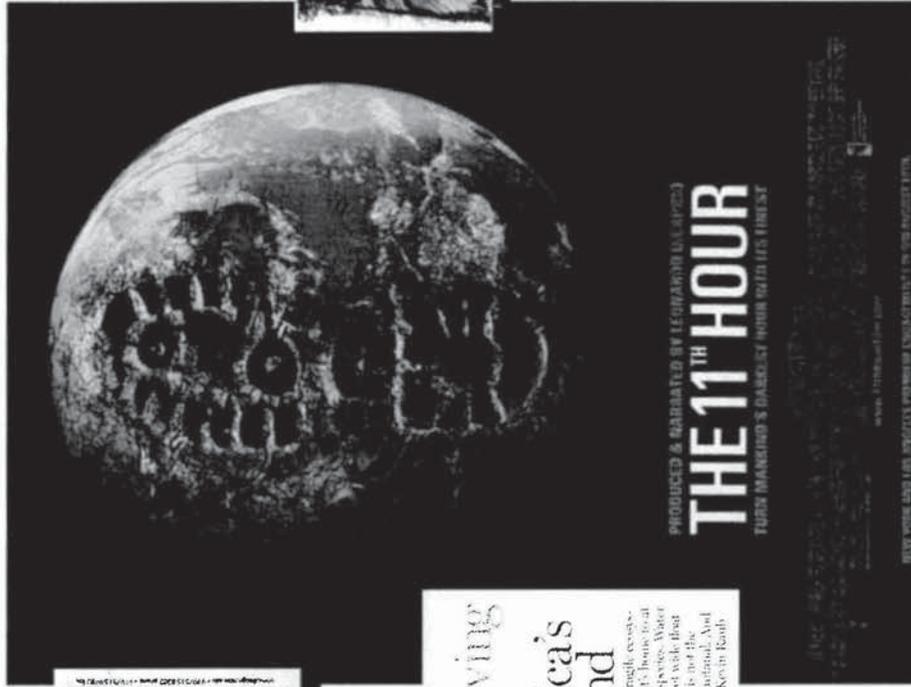
Sketch, Marvin J. Malecha



### Preserving South America's Wetland

It's one of the most fragile ecosystems on the planet. It's home to at least 15 endangered species. Water flows over a half foot wide strip on its lakes. No, this is not the Amazon — it's the Tardinal. And it's under threat. By Kevin Raab

American Airlines Magazine, October 2007



Sketch, Marvin J. Malecha



Advertisement from Good Magazine, September 2007

defining design thinkers as the “ultimate health care professionals”.

Dr. Richard Jackson



Photographs Source Unknown

Nature can be unforgiving  
our actions have repercussions and we will be accountable.



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Human Capital Investment

Project Consultants  
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The Design Team

Community Covenants  
Regulatory Agencies

Critical Context

Collaborative Intelligence

A Network of Capabilities

Practice as a Network of Interactions

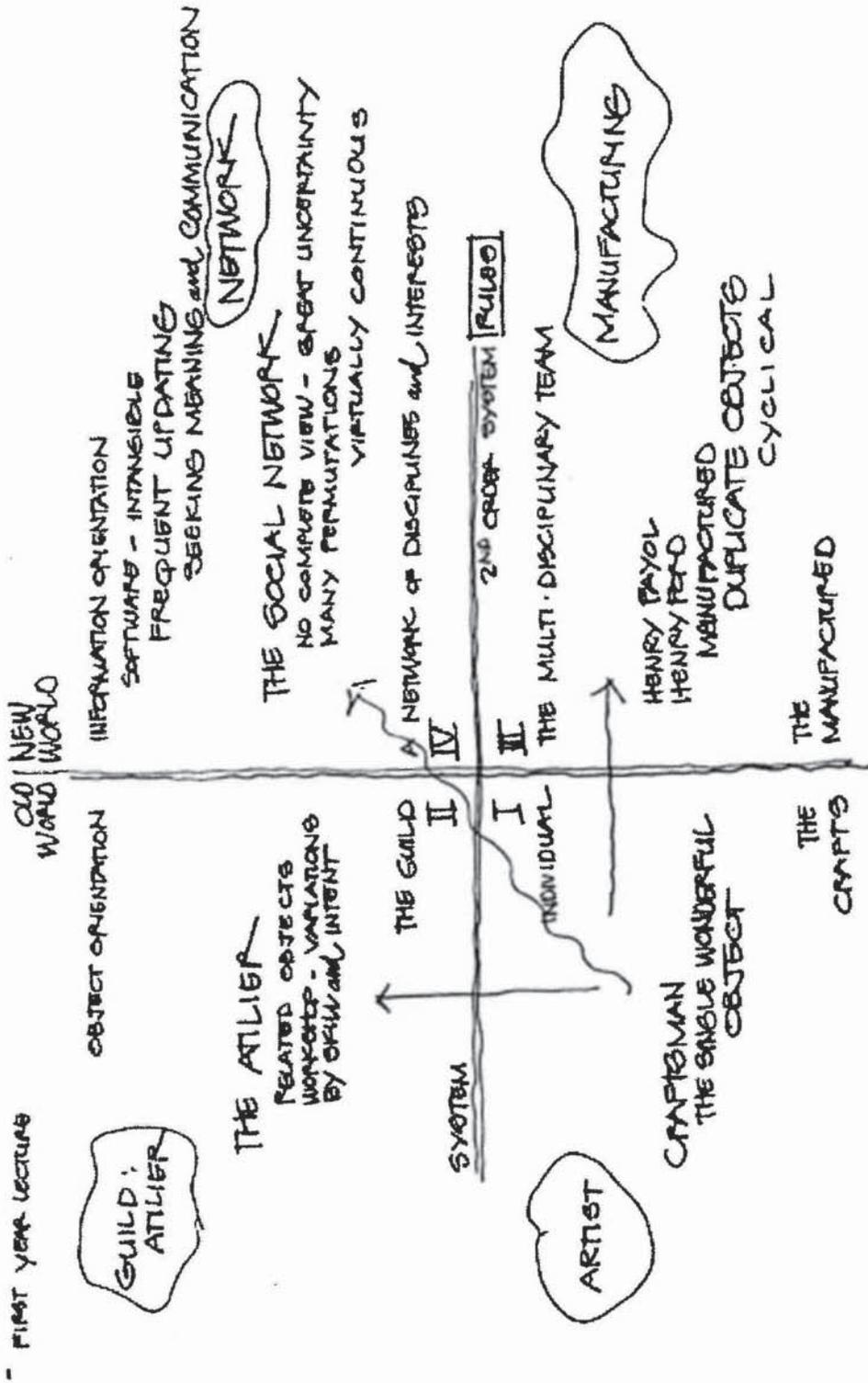
Special Individual and Societal Needs

Swarming Behavior

Clients and Owners / Patrons  
Funding Agencies

Predominance of Users  
Neighbors  
Community Identity

Free Agents

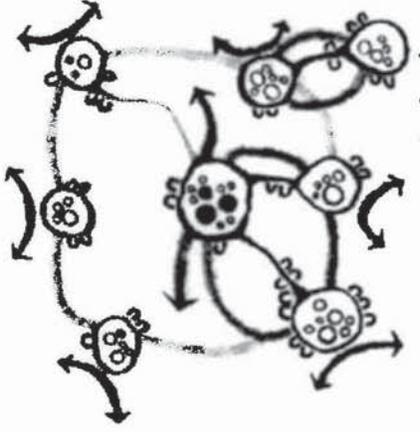
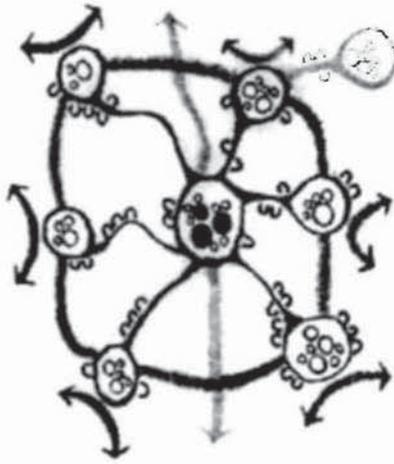


We have entered a new age  
Dependent on

# Networks and Design Thought

The professional design office  
is a  
living, collective and collaborative evolving organization

The Networked Organization



The Evolving Organization

Requires "great" roleplay in the  
 SENIOR STUDENT and TEACHER  
 MENTOR and MENTEE

requires "great" ~~mentor~~  
 and teacher,  
 mentor and mentee

and sources of  
 general sources of information  
 to supplement architecture education

Greater Cultural Context  
 Culture of Archi

4-Dimensional Model  
 4 DIMENSIONAL MODEL  
 "PULSATING"

Students move from the core to the  
 most self-determined positions

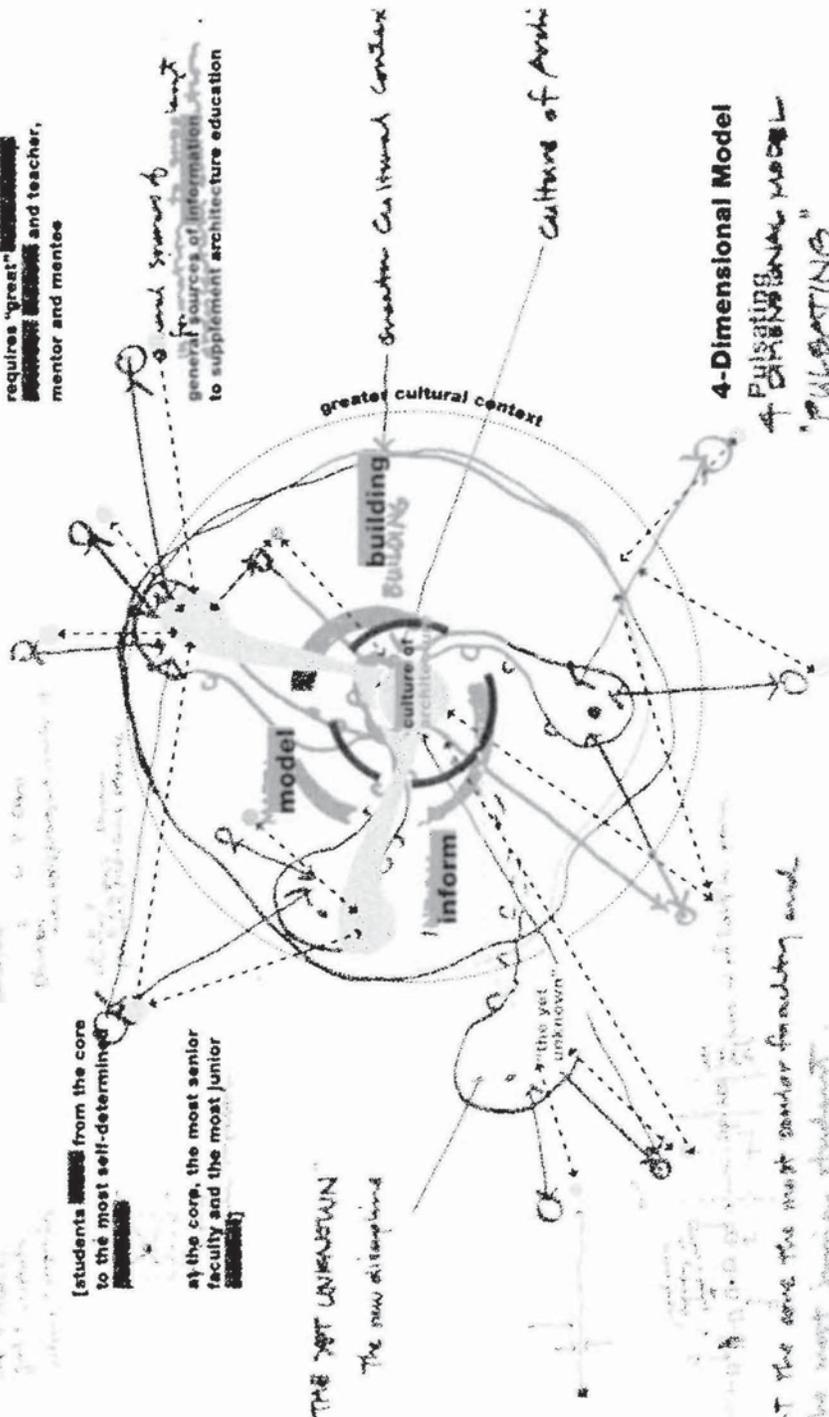
4-Dimensional Model

[students ~~move~~ from the core  
 to the most self-determined  
 positions]  
 at the core, the most senior  
 faculty and the most junior

THE NOT UNRAVELING  
 The new discipline

the yet  
 unknown

AT THE CORE THE MOST SENIOR FACULTY AND  
 THE MOST JUNIOR STUDENT



The Evolving Education Experience  
 Developed as one of four discussion options at the Forum on Integrated Practice, Chicago 2006

The professional design office  
is a  
place of people, its most important capital investment.

## The Harvard Business Review

cites the following

A six year study of Toyota, reported in the June 2008 HBR, reveals a company that is stable and paranoid, systematic and experimental, formal and frank revealing the ability to embrace contradictions. At the core of this complex behavior of seeing employees not just as a pair of hands, but as knowledge workers. It is the wisdom experience that is reported on s the company's front lines. **It is a culture of core values that is remarkably tolerant of failure and therefore innovative in its result.**

and it is therefore

critical that we understand the question of  
human capital as an investment in the future.

It is equally important to understand how fragile this value is to the  
future of the enterprise.

# Design encompasses the Socialization of Information:

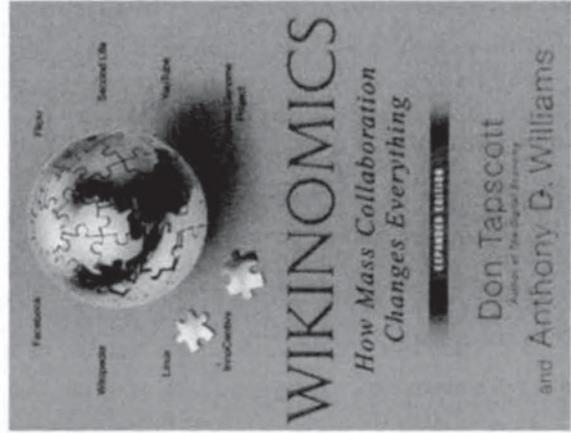
mass collaboration, even machine to machine collaboration, changes everything.



Paris — New York en 2 minutes ?



From Air France Magazine July 2008



Is it too slow?





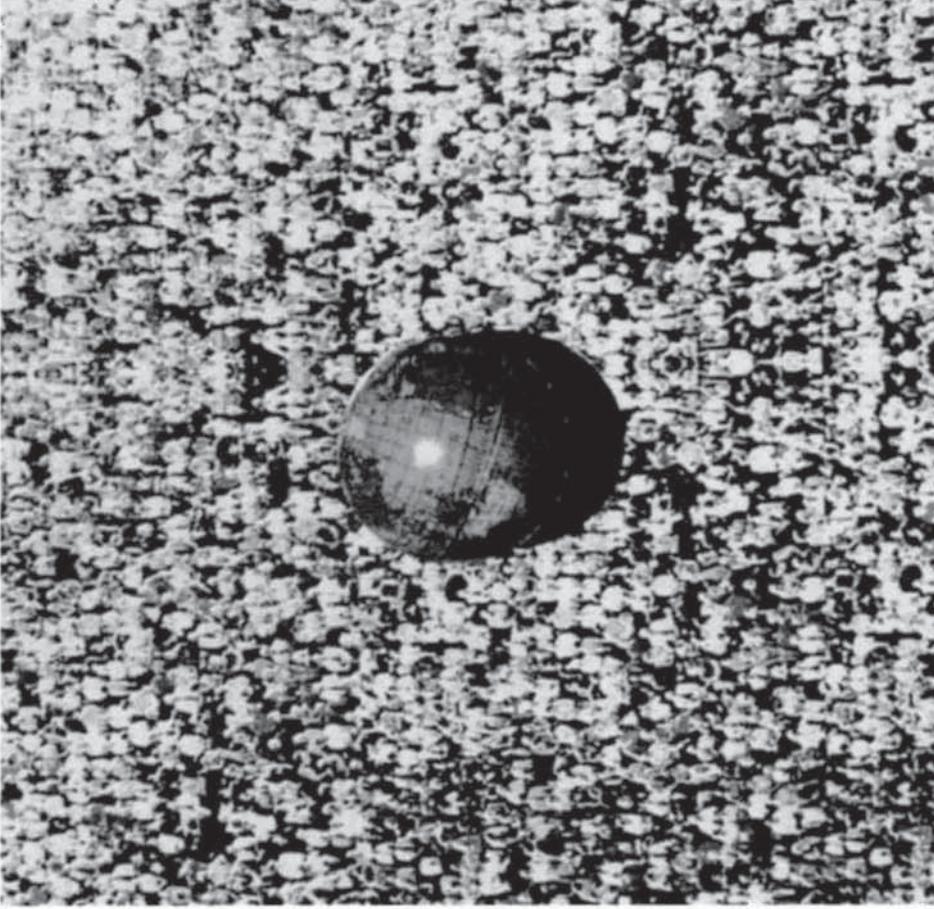
MOTHER GOOSE AND GRIMM



There is a growing technological divide between have and have-not, between native and non-native adaptation.

Design is influenced by Global Networks of Work and Life

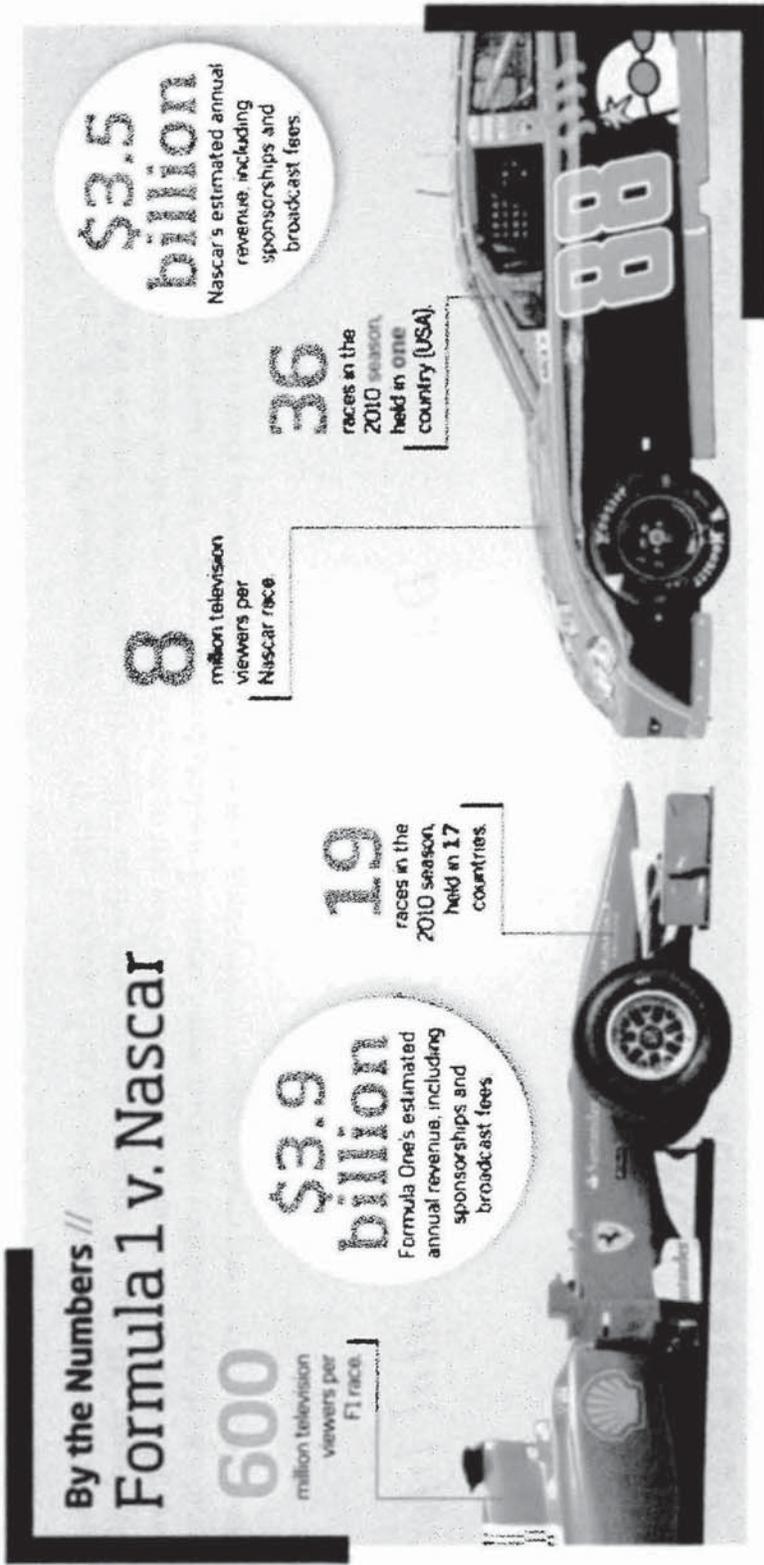
on a scale that would have been inconceivable even a generation ago.



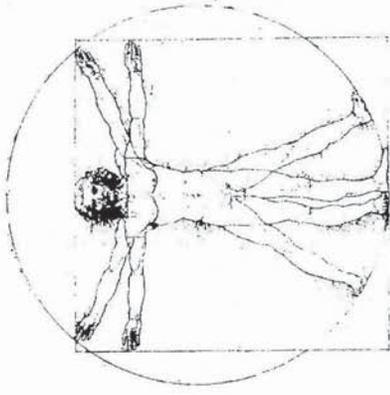
From Air France Magazine July 2008

“You can hear the sound of geography falling.”

How do we recognize the implications of a global culture?



# Remember the student



Sketch, Leonardo da Vinci

## A Learning Culture begins with the Individual

Ways of learning shape the experience ;

- The Creative
- The Street Wise
- The Skillful

## How and When will we Learn?

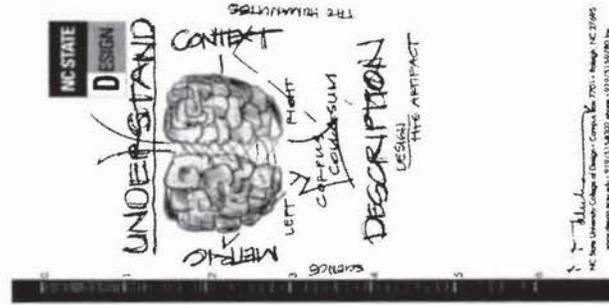


Image Source: Sketch by Marvin J. Malecha

What are the models that promote learning?

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# Ubiquitous Learning

Learning aided by the uses of technologies including devices with computing and networking capability that are now a pervasive part of every day life including laptops, games, cell phones, digital players, digital assistants and cameras.

The possibilities are before us to use these devices not only in the classroom, but also in the broader application of professional practice.

What is new? What are the challenges? Is this addressing questions of access? What is not so new?

Third International Conference on Ubiquitous Learning, University of British Columbia, Vancouver, Canada

We must consider what measures can be embraced to test the effectiveness of an individual learning experience.

From "What Can Arts Education Do?" The New York Times Magazine, April 2008

mature persistence,

observational acuity,

expressive clarity,

reflective capacity,

envision alternatives,

these are matched by

metrics,

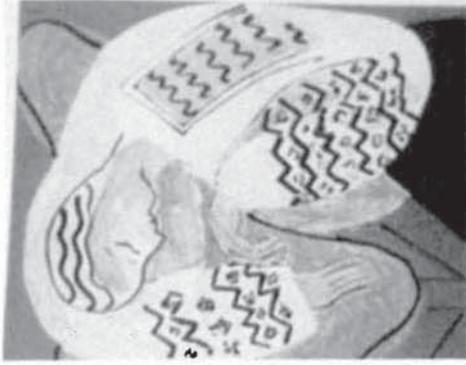
replicable performance,

knowledge dissemination

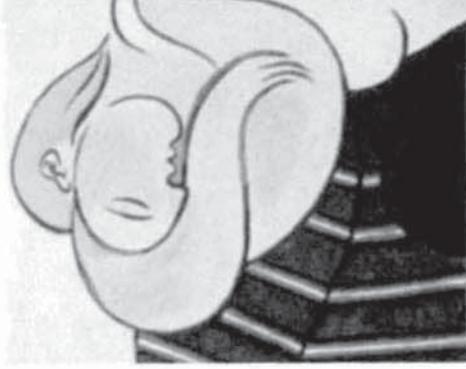
## Learning Measures

exhibiting the importance of a structured approach that is first about developing the means to successfully navigate the investigation.

Design Inquiry operates in the context of the Influence of Others



Matisse and Picasso



Cezanne and Kelly

Are we willing to accept and then admit to the people, places and events that influence us?

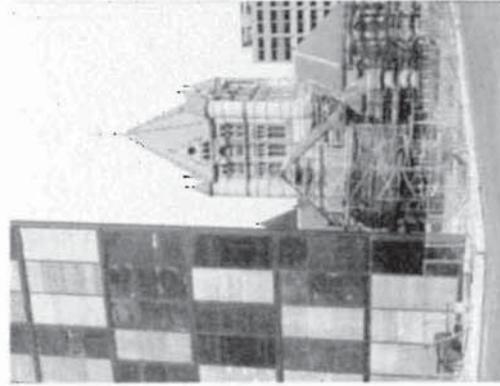
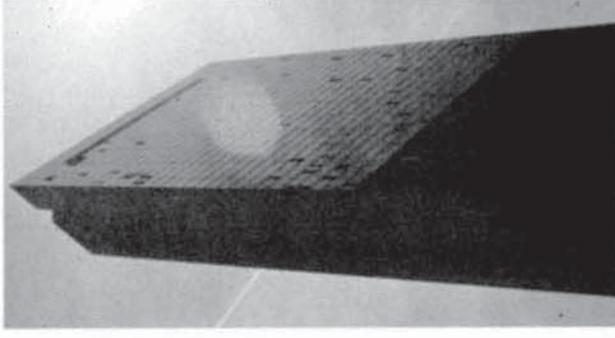
**Design** is made **rich with experiences** that will significantly enhance organizational and individual learning.

Are we willing to venture?

Do we build knowledge from experience?



Wright Brothers Experiment, From: Into the Wind an article in the Raleigh News and Observer



Hancock Building, Boston, Photographs by Marvin J. Malecha

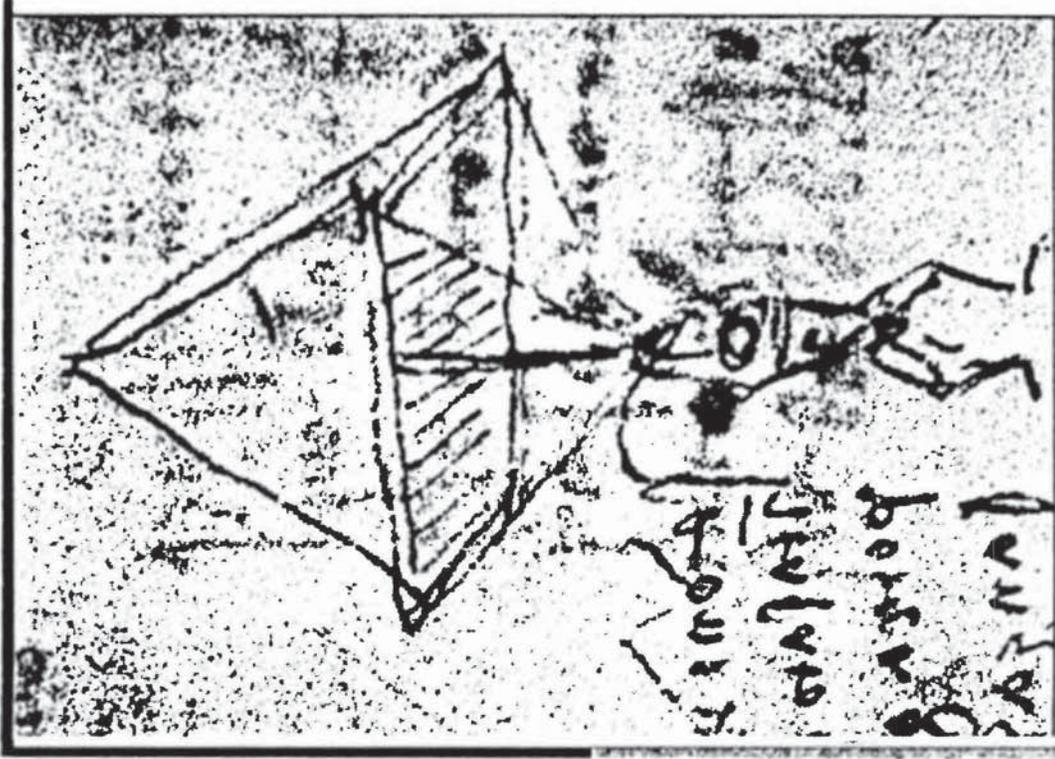
Do we learn from failure?

Do we test rival belief systems?

Do we know how to see?

What is Sight?

Klee: The Thinking Eye

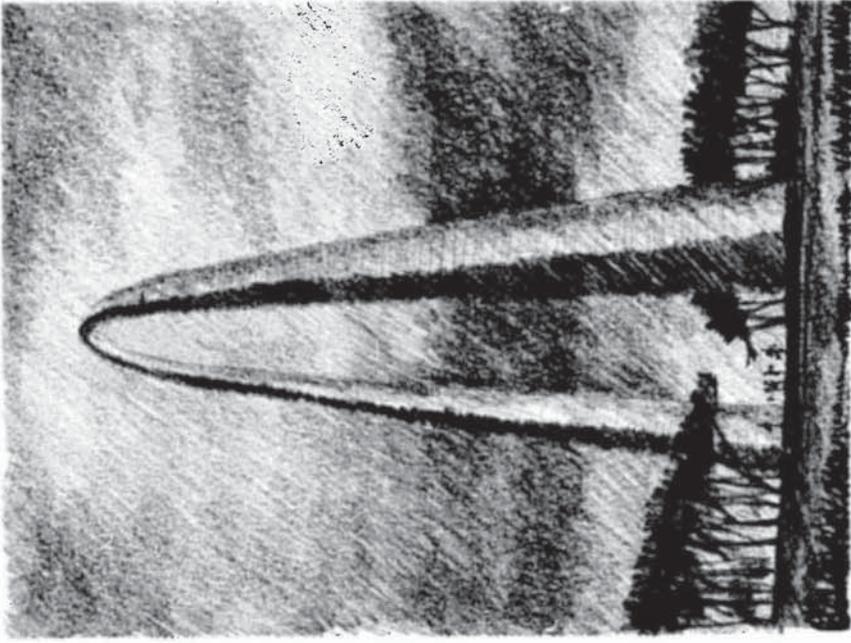


Sketch, Leonardo da Vinci

Saper Vedere

Knowing how to See

Do we know how to inspire?

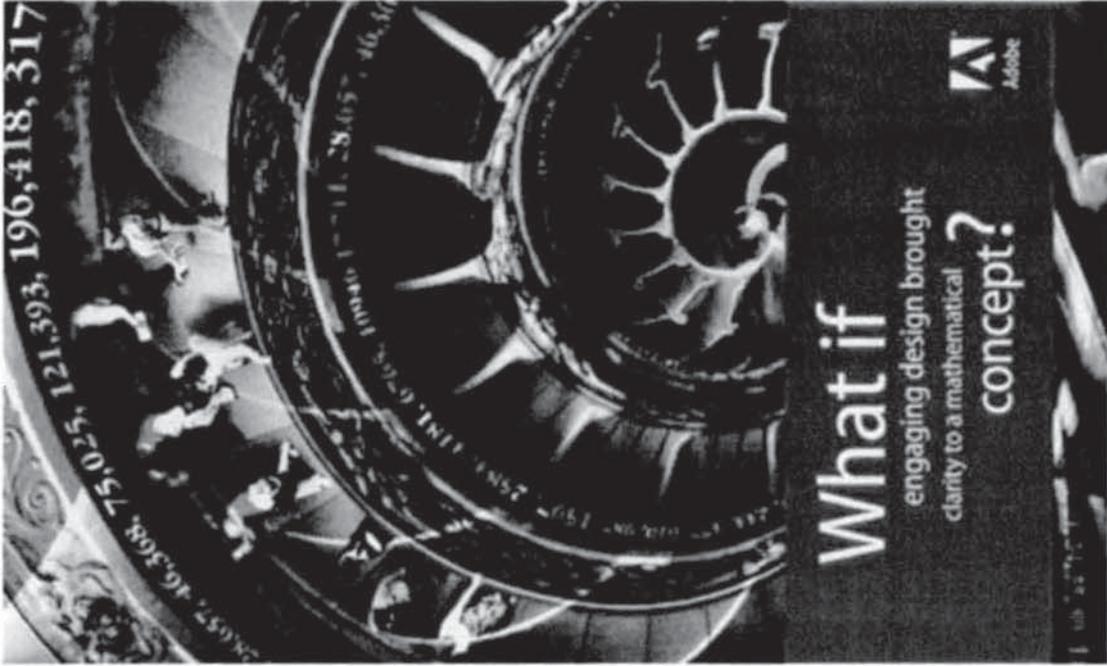


Sketch, Marvin J. Malecha

ST. LOUIS MO. JEFFERSON MEMORIAL ARCH  
M. J. Malecha 04.16.08

Do we position ourselves to venture into the unknown?

Do we know how to assert clarity of thought?



Of course it does!

Image from an Adobe Photoshop Advertisement, 2007

Are we satisfied with this  
impression of our value?



From Air France Magazine  
July 2008



Image Source: American Benefactor Magazine, Fall 1998

Have we come to a time of architects without architecture?

What is the fundamental value of our work?

Are we satisfied with this situation?

If we are not, then we must seek

## Design Inquiry as an Ethical Framework

including the

the interaction of the cultures of thought and making,

seeking a greater consensus,

and

matching the rigorous knowledge search with societal imperatives

raising the fundamental awareness that

ultimately our commitment to the research and scholarship imperatives of our time will be our fingerprints for future generations to study and it is by the results of our work that we will be judged.

## Design Inquiry as the Culture of Practice

When we address the fundamental questions before society and before the profession, it is we who will determine the patterns of action that define the profession. Theory and action interwoven will determine a new culture of practice.

In theory there is no difference  
between theory and practice.

In practice there is.

Yogi Berra

# What is Operating in the Culture of Practice Domain of Knowledge?

Guided by

- Rigor**
  - Identification, Definition, Definition, Assessment of the Knowledge Base Measured, Critically Assessed Precedent
  - The Right Opinion of Socrates
- Relevancy**
  - Relevant to the Issues Confronting Humanity
  - Rejection of Affected Detachment
- Clarity**
  - Clarity rather than Obfuscation of Pseudo-Theoretical Discourse
  - Bridge Among Scholars, Practitioners and Users
- Performance**
  - Accountability of Measured Performance
- Erudition**
  - The Ability to Articulate and Educate
  - and it is therefore

critical that we become fully open to the continual questioning of our Culture of Practice.

Are we prepared to address the myriad of ideas and issues confronting us through the special lens of design thinking?

The American Place in the World

Remapping the World,

Bandwidth is the New Black Gold,

The Dropout Economy,

China and the U.S.: The Indispensable Axis,

In Defense of Failure,

The White Anxiety Crisis,

TV Will Save The World,

The Twilight of the Elites,

The Boring Age.

On the question of  
**Trends**

exhibiting the importance of ideas to guide our actions.

Abstracted From: Time Magazine, March 22, 2010

# What are the issues we must address?

From Metropolis Magazine, March 2010



Martin C. Pedersen

The design directors of five leading contract-furniture companies state in a crystal ball made fuzzy by a deep recession and fundamental shifts in the way we work.

## On the question of Trends

### WHERE DO WE GO FROM HERE?



In the contract furniture industry, today's recessionary days in the U.S. and China are a double-edged sword. Contract furniture demand is down, but so are the prices. Many contract furniture manufacturers are cutting prices to stay afloat. At the same time, and here's the interesting part, technology continues to transform the workplace, changing not only how we work, but how we think about work. Do you see it? Are you still in the office? Do you have more meetings and conferences? Do you have more mobile devices? Do you have more...? The experts here to take on the varied problems and share an abundance of their "right now" says Steve Goeman, CEO of Global Workforce Solutions, a provider of HR and IT solutions for the state of the industry. The future of work plans, the way we work, and the role of research in a fresh century.

**ON MOBILITY**  
 The way we work has changed. We're spending more time on mobile devices, and we're working more flexibly. The way we work has changed. We're spending more time on mobile devices, and we're working more flexibly. The way we work has changed. We're spending more time on mobile devices, and we're working more flexibly.

**Workday recession, AKA slow-growth in the workplace**  
 You end up with a lot of people who are looking for a job. You end up with a lot of people who are looking for a job. You end up with a lot of people who are looking for a job.

**COMPANY ICONS**  
 Many companies are using icons to represent their brand. Many companies are using icons to represent their brand. Many companies are using icons to represent their brand.

**Traditionally forward**  
 Many companies are using icons to represent their brand. Many companies are using icons to represent their brand. Many companies are using icons to represent their brand.

**Has the recession changed and development efforts?**  
 Many companies are using icons to represent their brand. Many companies are using icons to represent their brand. Many companies are using icons to represent their brand.

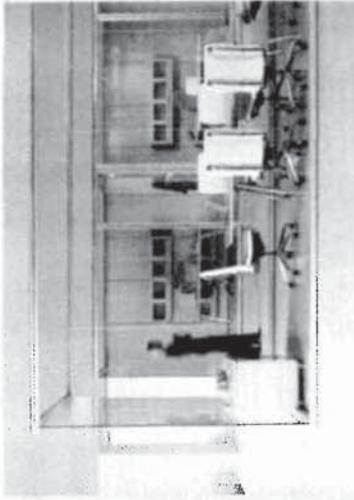
**What's ahead?**  
 Many companies are using icons to represent their brand. Many companies are using icons to represent their brand. Many companies are using icons to represent their brand.

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**What's ahead?**  
 Many companies are using icons to represent their brand. Many companies are using icons to represent their brand. Many companies are using icons to represent their brand.

## Mobility

# Customization



Specialty furniture pieces will continue to be a key element in office design. They will be used to create more personalized workspaces that reflect the unique needs of individual employees. This will be achieved through the use of modular furniture and flexible workstations that can be reconfigured to suit the needs of each user.

**ON CUSTOMIZATION**  
 We want to emphasize the importance of customization in office design. It's not just about the furniture, but about the overall environment. Customization allows us to create workspaces that are tailored to the needs of our employees, which in turn leads to increased productivity and satisfaction.

Businesses that invest in customized office furniture are more likely to attract and retain top talent. This is because a personalized workspace shows that the company values its employees and is committed to their well-being. Customization also allows for greater flexibility in the office layout, which is essential for adapting to changing business needs.

**What are your employees doing today?**  
 In today's fast-paced business environment, employees are constantly on the move. They need workspaces that can adapt to their changing needs. Customized office furniture provides the flexibility and functionality required to support a dynamic workforce.

**REPRODUCTION**  
 The J200 series is a high-quality reproduction of a classic office chair. It features a comfortable seat, adjustable height, and a sleek, modern design. This chair is perfect for those who value both style and functionality in their office furniture.



# On the question of Trends

As we move forward, the office environment will continue to evolve. One of the key trends is the shift towards more collaborative and flexible workspaces. This is driven by the need for companies to attract and retain talent in a competitive market. Customized office furniture is a key component of this trend, as it allows for the creation of workspaces that are tailored to the needs of the modern workforce.

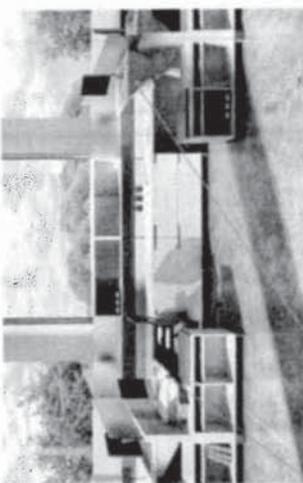
**The unique components of this design and play system**  
 The J200 series is a unique design and play system that offers a range of benefits. It is designed to be both functional and aesthetically pleasing, making it a perfect choice for those who want to create a modern and sophisticated office environment.



92

# Collaboration

# Retrofitting



When it comes to retrofitting an office, there are several key considerations. First, it's important to assess the current state of the office and identify any areas that need to be updated. This could include anything from the furniture to the lighting. Once the areas to be retrofitted have been identified, the next step is to choose the right products for the job. This is where a professional office furniture retailer can be of great help.

**ON RETROFITTING**  
 Retrofitting an office can be a complex task, but it's one that is well worth the effort. By updating the office furniture and other key elements, you can create a more modern and functional workspace that will help your employees work more effectively and efficiently.

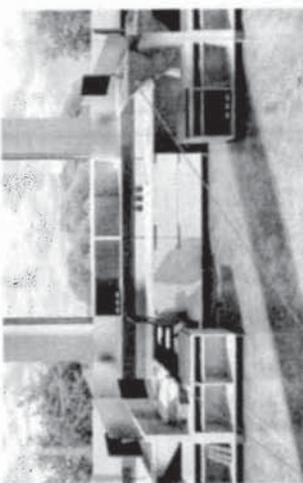
Businesses that invest in retrofitting their office are more likely to attract and retain top talent. This is because a modern and functional workspace shows that the company is committed to its employees and is willing to invest in their well-being. Retrofitting also allows for greater flexibility in the office layout, which is essential for adapting to changing business needs.

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# Density



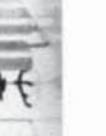
When it comes to density in the office, there are several key considerations. First, it's important to assess the current state of the office and identify any areas that need to be updated. This could include anything from the furniture to the lighting. Once the areas to be retrofitted have been identified, the next step is to choose the right products for the job. This is where a professional office furniture retailer can be of great help.

**ON DENSITY**  
 Creating a dense office environment can be a challenge, but it's one that is well worth the effort. By updating the office furniture and other key elements, you can create a more modern and functional workspace that will help your employees work more effectively and efficiently.

Businesses that invest in density in their office are more likely to attract and retain top talent. This is because a modern and functional workspace shows that the company is committed to its employees and is willing to invest in their well-being. Density also allows for greater flexibility in the office layout, which is essential for adapting to changing business needs.

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Can we sort through issues and ideas to find the essence of the forces that will shape our most important moves?

Collaborative Learning and Knowledge Production,

Reach Many, Many More People,

Engage the Wicked Problems,

Technology,

Thinking,

Intense Personalization,

Balancing Cost and Value,

Reinvention or Atrophy,

Holding as Treasure the Essence,

On the question of  
**Trends**

We must exhibit the agility that will be necessary for survival!

- Increasing Pressure for **Design**
- Expectation For a **Diverse Community**
- Priorities toward **Human Health and Environmental Sustainability**
- Growing Influence of **International Culture**
- Increasing Expectations for an **Interdisciplinary Culture**
- Greater Focus on **Research and Sponsored Project Activity**
- Imperative to Lead Rather than Follow **Evolving Technology**

## Trends Metrics and Measures

Observations  
on the  
**Emerging  
Picture**

**A new social compact** with society and the design is blurring the boundaries between those who control the curricular paths with those who depend upon such preparation

The design professions are embracing the move away **from an anecdotal to an evidence-based process** changing the expected standard of care for the design professions.

The University setting for learning must become the environment for **addressing the most difficult** questions facing society – the wicked problems.

Observations  
on the  
**Emerging  
Picture**

**Hybridized learning** is fostering many forms of teaching and technology to reconfigure all courses in the curriculum from learning at a distance to hands-on projects from off-site centers to web-based learning.

Learners will become increasingly involved in determining the path of courses they take to expand on a version of a **self-determined curricula**.

**Integrated learning and practice** will reinforce the evolution of the design office as a learning organization.

# Instrumentalism

19<sup>th</sup> Century, John Dewy

The **demands** of engagement,  
evolving technology, research

and teaching and the facility to collaborate  
as a fundamental proficiency are

**transforming academic programs.**

Reading The

## Context

Defined by **collaboration** and characterized as 360 degree thinking

Able to **adjust** to societal context and **anticipate** dramatic change

Balances continual **action** – **reflection** posture by the act of making.

Convener of the **best minds**.

Valued as a **multiplier of human capability** and societal opportunity.

Accountable to **address** the most **pressing issues** of our time.

Willing to **leap in new directions**, enable new talent, and cherish free thought.

Committed to **deep reflection** and the passion for the generation of knowledge.

## A Centers of Influence Action Plan

On the Matter of  
**Resiliency**

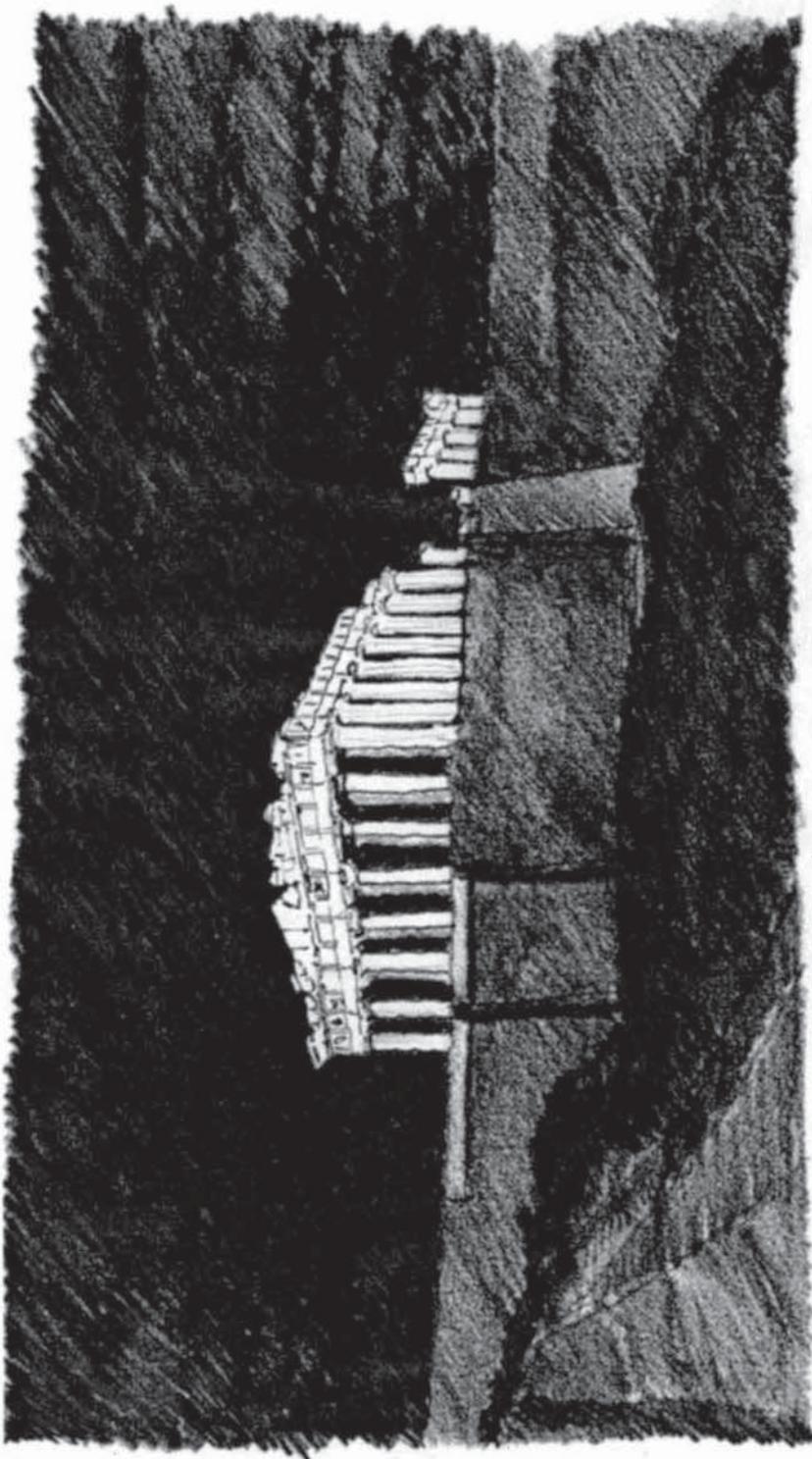
**FOOD**  
**Has the Hamburger Gone Stagnant?**  
At this year's Burger Bash and beyond,  
the best sandwich ever built hits a wall



Image Source: Time Magazine, March 22, 2010

On the Matter of  
**Resiliency**

Resiliency signifies the ability to retain or recover shape even after considerable stress. It is an appropriate description for the necessity that **the most ancient principles of design education be understood and respected** even as transformative forces inflict their influence.



Acropolis, Athens  
11.09.09

Listen to the wind blowing past the columns; it has been doing so through the millennia, it is the sound of Nature calling for human creativity.

An old Greek expression

Primary Colors: The Story of Sister Corita is the story of the joy of teaching.

Teaching as a Subversive Activity, by Neil Postman and Charles Weingartner is an assault on outdated teaching methods that is tragically current more than 40 years after it was published.

Universities and the Future of America, by Derek Bok, Are American universities doing all they can?

The Monster Under the Bed, by Stan Davis and Jim Botkin, assesses change as to how and when people learn and from whom they learn.

Einstein's Dreams, by Alan Lightman, explores the connections between science and art and the process of creativity that provokes "new eyes."

Re-imagine, by Tom Peters, is a dramatic call to accept the responsibility to re-imagine our enterprises.

The Big Moo: The Group of 33, edited by Seth Godin, is a statement that old solutions no longer serve us.

Who Moved My Cheese, by Spenser Johnson, is a fable of a changed condition for the source of resources.

The American University as a Free and Ordered Space, by A. Bartlett Giamatti, articulates the necessity of each.

Shop Class as Soul Craft, by Matthew B. Crawford looks deeply into the reality of practical activity and the necessary reflection that accompanies it.

## References

## Design for(in) Life

### Crossover Artists

I'm not focused on the next big thing but rather on the thing that will help us get there: **a way of thinking and seeing** that extends far beyond the design world. Call it the art of **crossing boundaries**. The next 10 years will require people to think and work across boundaries into new zones that are totally different from their area of expertise. They will also have to identify **opportunities** and make **connections** between them. **Crossover artists** are experts in a particular subject, but they have the ability to work in multiple modes and disciplines. They see problems through a multilayered lens. To appreciate the complexity of the networked economy, people have to push themselves not only to know what they don't know but also to get to know it. If you're a designer take an economics course. If you're an engineer, take up painting. If you're a consultant, sign up for an improvisation class. Get to **know that new thing** to a point where you can understand the tension between your own way of thinking and this completely different perspective.

Clement Mok, President, American Institute of Graphic Arts, (*American Way*, 02.15.03) p.59

This is a time

that is

defined by transformation.

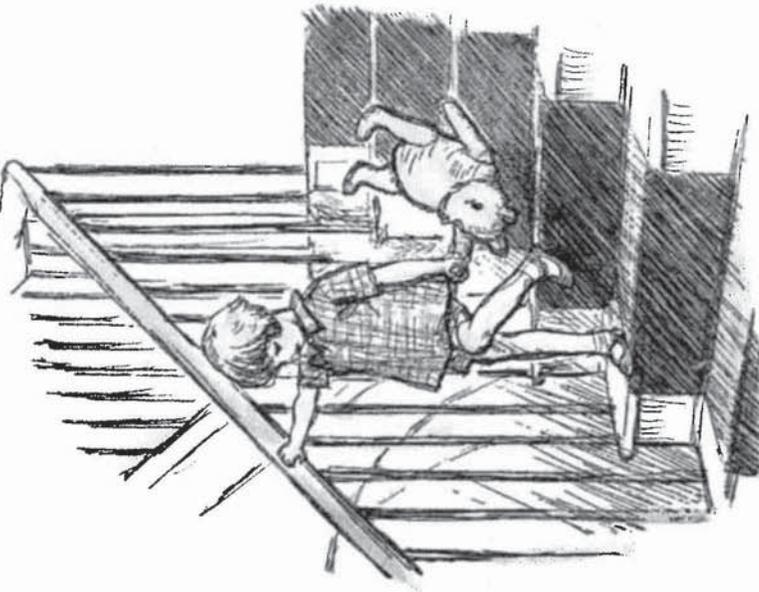
It is a time when

the cutting edge rapidly becomes the lagging edge.



Photograph Source Unknown

The Architecture Profession  
is



hampered by a non-reflective learning style:

**Bump, Bump, Bump.**

Here is Edward Bear, coming downstairs now, bump,bump,bump, on the back of his head, behind Christopher Robin. It is as far as he knows, the only way of coming downstairs, but sometimes he feels that there really is another way, if he could only stop bumping for a moment and think of it. And then he feels that perhaps there isn't. Anyhow here he is at the bottom, and ready to be introduced to you.

A.A. Milne, Winnie the Pooh

It will be important to remember:

It is not about technology, or politics or new materials or one particular research approach or another. It is not about a particular cultural or business practice. It is not about right or wrong answers in the approach to the search for knowledge or the conduct of practice. It is not about the evolution of artifacts or particular languages of style. It is not about profits or losses. Yet, of course it is,

But,

The Main Thing is to keep

the Main Thing

the Main Thing



**Students Aspire**  
By Elizabeth Catlett  
Located at Howard University  
Washington DC, USA

## KEYNOTE PRESENTATION

### **Cradle to Grave**

### Case Studies of Buildings' Environmental Footprint

**Ashraf Ragheb, Ph.D., Assoc. AIA, R.A.**

College of Architecture & Design  
Lawrence Tech University  
United States

Ashraf Ragheb is an Assistant Professor and coordinator of the Building Systems curriculum at the College of Architecture and Design, at Lawrence Technological University, Michigan. Professor Ragheb holds a B.Arch from Ain Shams University, Cairo, and M.Arch from University of Michigan, Ann Arbor, where he is currently finishing his Ph.D. in Life Cycle Analysis (LCA) for Buildings. He has 15 years teaching experience as a professor teaching architectural design, building construction and manager, and sustainable/renewable building systems at additional universities such as University of Wisconsin-Milwaukee and the American University in Cairo. He is an active member of the USGBC and Society of building Science Educators. Professor Ragheb has also practiced as a professional architect for 10 years, managing large projects in coordination with U.S. consultants such as Perkins & Will, Chicago. Professor Ragheb has published and presented papers and seminars in the areas of sustainable building materials, energy efficiency, and life cycle analysis with respect to buildings. Professor Ragheb received the prestigious AIA Upjohn Grant in 2008 for his proposal, "Cradle to Grave: Case Studies of Buildings' Environmental Footprint". He is an active member of the USGBC and Society of building Science Educator and is an Assistant Professor and is the coordinator of Building Systems curriculum at the College of Architecture and Design, at Lawrence Technological University, Michigan.

# **Cradle to Grave: Case Studies of Buildings' Environmental Footprint**

**Ashraf Ragheb, Ph.D. Assoc. AIA**

**Center for Sustainability, Lawrence Technological University  
Southfield, MI 48075**

Keywords: Environmental profiling, sustainability, quantitative methodology, Life Cycle Assessment, environmental research.

## **ABSTRACT**

As sustainability becomes a central figure in the design process in both architectural education and practice, conducting such environmental research is gaining high momentum in architectural education and practice worldwide. Although many architects claim their buildings to be sustainable, unless a comprehensive Life Cycle Assessment (LCA) study is conducted, it is difficult to *calculate* and *evaluate* the total burden that a particular building has on its surrounding and global environment. This study demonstrates how Cradle to Grave or Life Cycle Assessment (LCA) could be applied from a single building material or consumer product to a complex system such as an entire building throughout its life cycle. It highlights the difficulties in modeling the whole building over a long service life (60 years) and its implications on the construction process. Studying the whole life cycle of a building also shows to what extent each life cycle phase contributes to the total burdens, where some environmental strategies could be applied to reduce the total burden. The study also examines the significance of these impacts that occur during the life cycle through 3 cases study of office buildings in Michigan. Cases include one recent LEED certified vs. conventional construction to highlight the difference of choosing sustainable alternatives over others. The study aims also to provide a comprehensive assessment to which building assembly component (foundations, structure, walls, floors, roofs) contribute the most to the total impacts to inform architects' design decisions regarding the building components that could reduce the total environmental burdens.

## **1. INTRODUCTION**

In recent years, building-related environmental issues have become increasingly important. The construction and building sector has been found to be responsible for a large part of the environmental impacts on human activities. For example, in the United States, the construction and building sector has been estimated to be responsible for roughly 40% of the overall environmental burden (U.S.DOE 2002). Building-related environmental issues are also important for companies. There are already more than 40,000 companies in the world that have been certified to the ISO 14001 Environmental Management System EMS (ISO 2002b).

## **1.1 Background: Life Cycle Assessment Perspective**

LCA represents a quantitative tool for calculating the environmental burdens (impacts) of products at all stages in their life cycle from cradle to grave. Throughout the life cycle of a building, various natural resources are consumed, including energy resources, water, land, and several pollutants are released back to the global/regional environment. These environmental burdens result in global warming, acidification, air pollution, etc., which impose damage on human health, primarily natural resources and biodiversity. The building sector, constitutes 30-40% of the society's total energy demand and approximately 44% of the total material use as well as roughly 1/3 of the total CO<sub>2</sub> emission, has been identified as one of the main factors of greenhouse gas emissions. There is no doubt that reducing the environmental burden of the construction industry is crucial to a sustainable world.

Most research on the environmental impacts of buildings examine the issues at a relatively broad level though extensive descriptions. For example, Finnveden and Palm (2002) stated that the use phase accounts for the majority of the environmental impacts of buildings. Klunder (2001) gave a description of environmental issues of dwellings, noting that assessments should focus primarily on components that involve large quantities of materials (e.g., foundation, floors, and walls), but there are also dangerous materials that should be avoided regardless of quantity (e.g., lead). Energy consumption in space heating, hot water, lighting, and ventilation should be studied along with the energy carrier (electricity or gas). Some of the building-related environmental studies present detailed quantitative data about the life cycle of a building (Scheuer et al., 2003). However, most studies only utilize one or two indicators of environmental impacts. Treloar et al. (2001) have used a hybrid input-output model to estimate the primary energy consumption of building materials to study the relative importance of different life-cycle phases. Seo and Hwang (2001) evaluated the life-cycle primary energy usage and CO<sub>2</sub> emissions of residential buildings in Korea. The results are presented by building materials and life-cycle phases, including materials manufacturing, operational energy, and demolition.

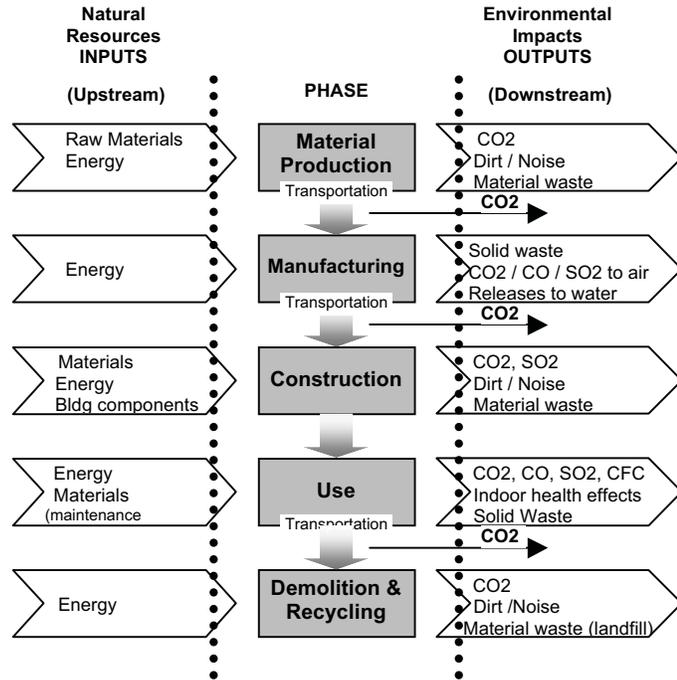
Other quantitative studies have used a wider set of environmental impact indicators in their analyses, but have only included certain life-cycle elements. Junnila and Saari (1998) have used life-cycle inventory analysis to estimate the primary energy consumption and environmental emissions of CO<sub>2</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, volatile organic compounds (VOCs), and particulates from a residential building. The life-cycle phases studied included manufacturing of structural materials, construction, operational energy, maintenance, and demolition. Trusty and Meil (2000) have assessed the environmental impacts of an office building, including the structural and envelope elements, which were compared against the annual operational energy. Junnila and Horvath (2003) took the same path to quantify the most significant impact of a high-end office in Europe.

Despite the studies about the environmental impacts of buildings, it is still very difficult to find comprehensive information about the life-cycle impact of office buildings. Most of the previous studies have concentrated on either a limited set of life-cycle phases, or only one or two environmental impact indicators. Building assembly systems (structural,

envelope, floors, and roofs) are rarely included, despite the fact that in practice most of the buildings are designed by such building systems or design disciplines. Thus, such information and data indicating the significant aspects by building systems would be of great use in design management.

## 2. APPROACH, METHOD, AND ASSUMPTIONS

Figure 1 summarizes the method and the scope of this study. A life-cycle assessment (LCA) framework is selected to analyze the environmental impacts of a new office building in Southeast Michigan. Sixty years of use was assumed to be the basic life cycle. LCA is the most appropriate framework for the identification, quantification, and evaluation of the inputs, outputs, and the potential environmental impacts of a product, process, or service throughout its life cycle, from cradle to grave i.e., from raw material acquisition through production and use to disposal [as defined in ISO 14040, 1997]. The LCA had three main phases; inventory analysis for quantifying emissions and wastes, impact assessment for evaluating the potential environmental impacts of the inventory of emissions and wastes, and interpretation for defining the most significant aspects.



**Fig. 1:** Inputs/Outputs of a Building through its Life Cycle Phases

LCA is defined as a systematic, holistic, objective process to evaluate the environmental burdens associated with a product or process. The process identifies and quantifies energy and material usage and environmental releases of the studied system, and evaluates the corresponding impacts on the environment. Although LCA is widely used to assess environmental impacts of products and processes, it has its limitations, which are important to recognize while interpreting the results of an LCA study. For example, ISO 14040 (ISO 1997) has listed the following limitations. There are subjective choices (e.g., system boundaries, selection of data sources, and impact categories), the models used in inventory and impact assessment are limited (e.g., linear instead of nonlinear), the local conditions may not be adequately represented by regional or global conditions, the accuracy of the study may be limited by the accessibility or availability of relevant data, and the lack of spatial and temporal dimensions introduces uncertainty in impact assessment. Identification and quantification of material and energy flows (inputs and outputs) of the case study office buildings were conducted during the design and

construction of the building in 2008. The material and energy flows of the building's life cycle were primarily obtained from the floor plans and specifications of the buildings.

Some emissions data related to different energy and material flows were collected mainly from the actual manufacturers in Michigan. The quality of the data used in the life-cycle inventory was evaluated with the help of a six-dimensional estimation framework recommended by the data quality guidelines from (Lindfors et al. 1995, Weidema, 1998). The quality target for the LCA was set to be at the level of "good," which means reliability of most recent documented and measured data from drawings, specs sheets, and contractor rep on-site. In life-cycle impact assessment, the magnitude and significance of the energy and material flows (inputs and outputs) were evaluated. The impact categories included were those identified by EPA (2006) as 'Commonly Used Life Cycle Impact Categories'. Among the 10 listed categories, the impact categories in this paper include:

- Fossil Fuel (Primary Energy) Consumption FFC,
- Resources Use RU,
- Global Warming Potential GWP (Climate Change),
- Acidification Potential AP,
- Eutrophication Potential EP,
- Photochemical Ozone Creation Potential POCP or Summer Smog,
- HH Respiratory Effect Potential REP, and
- Ozone Depletion Potential ODP,

The chosen impact categories are also on the short list of environmental themes that most environmental experts agree to be of high importance in all regions of the world and for all corporate functions (Schmidt and Sullivan 2002). Furthermore, the used impact categories are consistent with the air and water emissions that the World Bank (1998) has recommended to be targeted in environmental assessments of industrial enterprises. The classification, or assigning of inventory data to impact categories, and the characterization, or modeling of inventory data within the impact categories (ISO 1997), were performed using the ATHENA 4.1 life-cycle calculation program (2010) which is used to model the building. The significance of different life-cycle aspects is evaluated by comparing the environmental impacts of different building elements in every impact category so that the significant environmental impact could be ranked in order of importance. In the life-cycle interpretation section, the results are also examined from the building assembly (foundation, walls, floors, etc.) so that the environmental impact of each system's life cycle can be quantified.

In the study, the life cycle of the building was divided into 5 main phases; building materials manufacturing, construction processes, operation phase, maintenance, and demolition. Transportation of materials was included in each life-cycle phase. The building materials phase included all of the transportation to the wholesaler warehouse. The construction phase included the transportation from the warehouse to the site. The environmental profiles of impacts in each life cycle stage, and energy and material flows used in the LCA are presented in Tables 1-3 for the 3 cases.

## **2.1 Description of the Case Buildings**

The method used in this research is multiple case studies consist of 3 office buildings located in South East Michigan, USA. Each floor plan represents a typical office building in the Midwestern area. Choosing a typical office also helps in generalizing the research findings to bigger sample of the same type. Description of cases is as follow:

### **2.1.1 Case 1: Brookside Office Building**

Brookside is a newly built office building in Southeast Michigan in the U.S. Its construction ended in 2007. It is occupied by an insurance company with administrative employees. The building has 40,000 sq ft (3716 m<sup>2</sup>) of gross floor area, and a volume of 600,000 cu ft (16990 m<sup>3</sup>). The building consists of 2 floors (20,000 sq ft each, 15 ft floor height each) with no basement. The structural frame is Hollow Structural Steel HSS columns and broad flange (W sections) beams. Floors are metal decking with 2” concrete topping. The exterior walls are brick veneer with steel studs backing. Interior walls are galvanized steel studs with gypsum board facing to receive paints or wall paper. Foundations are cast-in-place concrete. The annual energy consumption is calculated using eQuest 3.64 (2010), a DOE interface for energy simulation. The estimated natural gas consumption (mainly for water heating) of the building is 69.81 Million Btu/year (1745 Btu/sq ft/year) and this is equivalent to 0.51 kWh/sq ft/year. The estimated electricity consumption is 425,000 kWh/year (10.6 kWh/sq ft/year).

### **2.1.2 Case 2: Southfield Office Building**

Southfield is a new office building in Southeast Michigan in the U.S. Its construction ended in 2009. The targeted use of the building is mainly medical offices. The building has 29,000 sq ft (2690 m<sup>2</sup>) of gross floor area, and a volume of 423,000 cu ft (11978 m<sup>3</sup>). The building consists of 3 floors (9700 sq ft each, 14.6 ft average height) plus a partial basement. The structural frame is broad flange (W sections) columns and W sections beams. Floors are metal decking with 2” concrete topping. The exterior walls are brick veneer with steel studs backing. Interior walls are galvanized steel studs with gypsum board facing to receive paints or wall paper. Foundations are cast-in-place concrete. The annual energy consumption is calculated using eQuest 3.64 (2010). The estimated natural gas consumption (mainly for water heating) of the building is 45.97 MBtu (1585 Btu/sq ft/year) and this is equivalent to 0.46 kWh/sq ft/year. The estimated electricity consumption is 412,860 kWh/year (14.2 kWh/sq ft/year).

### **2.1.3 Case 3: Huron Office Building**

Huron is a new office building in Southeast Michigan in the U.S. Its construction ended in 2008. The targeted use of the building is mainly medical offices. The building has 21,290 sq ft (1978 m<sup>2</sup>) of gross floor area, and a volume of 351,285 cu ft (9947 m<sup>3</sup>). The building consists of 1 main floor (16.5 ft high) with no basement. The structural frame is Hollow Structural Steel HSS columns and open web steel joist for roof support. Floors are light reinforced concrete of 1 floor. The exterior walls are brick veneer with steel studs backing. Interior walls are galvanized steel studs with gypsum board facing to receive paints or wall paper. Foundations are cast-in-place concrete. The annual energy

consumption is calculated using eQuest 3.64 (2010). The estimated natural gas consumption (mainly for water heating) of the building is 34.42 MBtu (1616 Btu/sq ft/year) and this is equivalent to 0.47 kWh/sq ft/year. The estimated electricity consumption is 183,870 kWh/year (8.6 kWh/sq ft/year). One important factor for Huron is that it is a LEED certified building and that might interpret its slightly lower use of electricity because it uses geothermal ground loops in heating and cooling.

## **2.2 Description of the Environmental Impacts Categories**

### **2.2.1 Fossil Fuel Consumption FFC**

FFC is also referred to as *primary energy consumption* or *fuel depletion*. It is usually given in mega-joule. This impact category is the total energy used to transform and transport raw materials into products during the manufacturing and construction phases. This includes inherent energy contained in raw materials in addition to indirect energy use associated with processing, converting, and delivering energy. This impact essentially characterizes the gain from the energy sources such as natural gas, crude oil, lignite, coal and uranium. Natural gas and crude oil will be used both for energy production and as material constituents e.g. in plastics. Coal will primarily be used for energy production. Uranium will only be used for electricity production in nuclear power stations. It is important that the end energy use (e.g. 1 kWh of electricity) and the primary energy used are not miscalculated with each other; otherwise the efficiency for production or supply of the end energy will not be accounted for.

### **2.2.2 Global Warming Potential GWP**

GWP is also called Greenhouse Effect or Carbon Footprint. This effect represents an average increase in earth temperature due to the burning of fossil fuels and other forms of energy resulting in higher atmospheric concentrations of gases such as carbon dioxide, methane, and nitrous oxide. The occurring short-wave radiation from the sun comes into contact with the earth's surface and is partly absorbed and partly reflected as infrared radiation. The reflected part is absorbed by greenhouse gases in the troposphere and is re-radiated in all directions, including back to earth. Hence, the quantity of heat the earth can give away to the space is accordingly reduced and the (mean) temperature of the layers of the atmospheric envelope (that are close to the ground) tends to increase accordingly. Greenhouse gases that are considered to be caused or increased are carbon dioxide, methane and CFCs. An analysis of the greenhouse effect should consider the possible long term global effects. For other gases than CO<sub>2</sub>, GWP is calculated in carbon dioxide equivalents (kg CO<sub>2</sub>-eq.). This means that the greenhouse potential of an emission is given in relation to CO<sub>2</sub>. Since the residence time of the gases in the atmosphere is incorporated into the calculation; a time range for the assessment must also be specified. A period of 100 years is customary for GWP.

### **2.2.3 Acidification Potential AP**

Acidification, also named as "acid rain", comprises processes that increase the acidity (hydrogen ion concentration, H<sup>+</sup>) of water, air, and soil systems. Acid rain generally reduces the alkalinity of lakes. Acid deposition also has deleterious (corrosive) effects on buildings, monuments, and historical artifacts.

The acidification of soils and waters occurs through the transformation of air pollutants into acids. This leads to a decrease in the pH-value of rainwater and fog from 5.6 to 4 and even below forming “acid rain” that can pollute forests, lakes and rivers, as well as buildings. The most important substances contributing to AP is SO<sub>2</sub> (sulfur dioxide) and NO<sub>x</sub> (nitrogen oxides) and their respective acids (H<sub>2</sub>SO<sub>4</sub> und HNO<sub>3</sub>) produce relevant contributions. These are released into the atmosphere when fossil fuels such as oil and coal are combusted. This damages ecosystems, whereby forest dieback is the most well-known impact. Acid rain generally reduces the alkalinity of lakes. Acidification has direct and indirect damaging effects (such as nutrients being washed out of soils or an increased solubility of metals into soils). But even buildings and building materials can be damaged. Examples include metals and natural stones which are corroded or disintegrated at an increased rate. The resulting acidification characterization factors are expressed in hydrogen (H<sup>+</sup>) mole equivalent deposition per kilogram of emission.

#### **2.2.4 Eutrophication Potential EP**

EP is also called “Over-fertilization”. The term “eutrophic” means well-nourished, thus, “eutrophication” refers to natural or artificial addition of nutrients to bodies of water and to the effects of the added nutrients. When the effects are undesirable, eutrophication is considered a form of pollution.” (National Academy of Sciences, 1969). The process happens when a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish. Eutrophication is a natural, slow-aging process for a water body, but human activity greatly speeds up the process. The calculated result of EP is expressed on an equivalent mass in kg of nitrogen (N<sup>+</sup>) ion basis.

#### **2.2.5 Photochemical Ozone Creation Potential POCP (Smog)**

POCP always referred to as “Summer Smog” which is the production of ground level ozone. It is the result of reactions that take place between nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) exposed to UV radiation. Under certain climatic conditions, air emissions from industry and transportation can be trapped at ground level where, in the presence of sunlight, they produce photochemical smog. While ozone is not emitted directly, it is a product of interactions of volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>). The smog potential is expressed on a mass of equivalent NO<sub>x</sub> basis that represents these air emissions from industry and transportation that are trapped at ground level.

#### **2.2.6 Human Health (HH) Respiratory Effect**

Particulate Matter (PM) of various sizes PM<sub>10</sub> and PM<sub>2.5</sub> (with aerodynamic diameters of 10 or 2.5 microns or less, respectively) have a considerable impact on human health. The US EPA (2002) has identified “particulates” (from diesel fuel combustion) as the number one cause of human health deterioration due to its impact on the human respiratory system: asthma, bronchitis, acute pulmonary disease, etc. These include PM<sub>10</sub> (inhalable particles) and its fractions PM<sub>2.5</sub> (fine particles). It should be mentioned that particulates

are an important environmental output of construction products production and need to be traced and addressed. The equivalent PM<sub>2.5</sub> basis is the measure of this impact indicator.

### **2.2.7 Ozone Depletion Potential ODP**

ODP is also called “Ozone Hole”, which is the depletion of the stratospheric ozone layer. The ozone of the stratosphere absorbs a large portion of the hard UV sun rays. Depending on climatic conditions, the catalytic action of Chlorofluorocarbons CFC compounds degrades ozone down to oxygen. Some of these gases have a very long residence time in the stratosphere and may cause the ozone molecules to be destroyed even many years after their emission. Reduced concentration of the ozone (hole in the ozone layer) causes an increased transmission of UV sun rays with negative consequences for plants, animal and human beings (for instance increased skin cancer hazard, DNA damage, etc). The ozone depletion potential is expressed in terms of mass equivalence of Trichlorofluoromethane (CCl<sub>3</sub>F = CFC-11), which is the measure used to assess the importance of the effect produced by the various gases.

### **2.2.8 Resources Use**

Resources use, reported in kilograms (kg), addresses the resource extraction activities associated with the manufacturing of each building material. As stated in the Athena IE software, the values reported for this impact category are the sum of the weighted resource requirements for all products used in each of the building cases.

## **2.3 Energy Sources**

In order to estimate the environmental impact, the emissions from energy production must be known. During a 60-year life cycle, the energy source or the energy supply system will supposedly change several times. In the calculations, however, it is assumed that the energy supply system will be constant during the entire life cycle.

The average US average electricity mix is used to determine the environmental impact due to energy use. The purpose of using the US electricity mix, e.g. during the operation phase (and not the local electricity net i.e. Midwest Grid) is primarily to compare the impact of the building and not the impact of the energy supply systems. Since every region in the US has its own source of electricity e.g. Hydro, wind, coal, nuclear, etc., the emissions for every kilowatt of electricity is different *by source* of energy. Therefore, the average US electricity mix will be used for future replication to other buildings in order to get same *emission set* from the source.

## **2.4 Methodological Consideration of Life Cycle Phases**

### **2.4.1 Building Elements and Materials**

The following building element categories were included in the study: foundation, structural frame (beams & columns), floors, external walls (envelope), roofs, and some internal elements e.g., doors, partition walls, and 2 stairs. The amount of each material used in the building was derived from the bill of quantities, architectural and engineering drawings, and the architect’s specifications. Around 30 different building materials were identified and modeled.

#### **2.4.2 Building Construction**

The construction phase of the building included all materials and energy used in on-site activities. Data were modeled for the use of electricity, construction equipment, and transportation of building materials to the site (average 100 mi). Some of the data were collected from the contractor, and were further confirmed by interview with his representative on-site.

#### **2.4.3 Building Operation and Use**

The use of the building was divided into mainly heating service (by natural gas) and electrical consumption. For the purpose of energy simulation, the buildings were estimated to be used 55 hr/week for 60 years. Energy calculations were performed using eQUEST, a DOE 2 energy simulation program for electricity use and HVAC heating and cooling loads. All building parameters (dimensions, orientation, walls, windows, etc) were modeled.

#### **2.4.4 Maintenance**

The maintenance phase included all of the life-cycle elements needed during the 60 years of maintenance; use of building materials, construction activities, and waste management of discarded building materials. An estimated 75% of building materials was assumed to go to landfill, and 25% was assumed recovered for other purposes such as recycling.

#### **2.4.5 Demolition**

The demolition phase included demolition activities on-site, transportation of discarded building materials (75% of the total) to a landfill (50 mi), and shipping of recovered building materials to a recycling site (70 mi, on average). The entire building was assumed to be demolished. Energy needed for demolition was estimated by the LCA software based on bldg parameters and another report from Athena (1997) for steel buildings demolition energy.

**Table 1: Environmental Footprint (Impacts) by Life Cycle Stage – Brookside**

	Manufacturing		Construction		Maintenance		End - Of - Life		Oper Energy		Total	/m2		
	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Annual	Total				
<b>Fossil Fuel MJ</b>	9E+06	2E+05	97938	2E+05	3E+05	45598	2E+06	585.3	1E+05	69430	2E+05	51434	2E+08	54664
<b>Resources kg</b>	3E+06	4619	2325	5853	8177	2.201	1E+05	38.31	3431	1636	5067	4734	2E+07	5505
<b>GWP kg CO2 eq</b>	7E+05	13084	6500	18590	25091	6.752	1E+05	34.9	9499	5197	14696	4448	2E+07	4679
<b>AP moles H+ eq</b>	3E+05	4473	3334	5864	9198	2.475	86676	23.62	526.6	1639	2166	1608	6E+06	1708
<b>Resp kg PM2.5</b>	1909	5.393	3706	7.048	1075	0.003	1157	0.312	0.501	1.97	2.471	9	36526	9.829
<b>EP kg N eq</b>	380.3	4.657	3.151	6.075	9.226	0.002	31.06	0.009	0.362	1.549	1.91	0.042	582.7	0.157
<b>ODP kg CFC-11</b>	8E-04	5E-07	2E-11	8E-07	8E-07	2E-10	1E-04	3E-08	4E-07	2E-07	6E-07	1E-09	9E-04	2E-07
<b>Smog kg NOx eq</b>	1729	100.9	79	130.9	209.9	0.056	546.1	0.153	6.767	36.59	43.35	0.745	5420	1.459

**Table 2: Environmental Footprint (Impacts) by Life Cycle Stage – Southfield**

	Manufacturing		Construction		Maintenance		End - Of - Life		Oper Energy		Total	/m2		
	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Annual	Total				
<b>Fossil Fuel MJ</b>	7E+06	1E+05	59331	2E+05	3E+05	27149	1E+06	456.7	1E+05	57096	2E+05	68456	2E+08	71922
<b>Resources kg</b>	2E+06	3514	1458	4889	6347	2.36	86025	32.22	2827	1345	4172	6343	2E+07	7158
<b>GWP kg CO2 eq</b>	5E+05	9922	3991	15524	19514	7.254	76526	29.2	7826	4274	12100	5937	2E+07	6181
<b>AP moles H+ eq</b>	2E+05	3400	2109	4899	7008	2.605	57280	21.53	433.9	1348	1782	2145	6E+06	2251
<b>Resp kg PM2.5eq</b>	1407	4.1	2.431	5.887	8.318	0.003	746.5	0.278	0.413	1.62	2.033	12.01	34489	12.85
<b>EP kg N eq</b>	321.7	3.541	1.964	5.075	7.039	0.003	19.1	0.007	0.298	1.274	1.571	0.055	500.4	0.186
<b>ODP kg CFC-11</b>	5E-04	4E-07	3E-11	6E-07	6E-07	2E-10	7E-05	3E-08	4E-07	2E-07	5E-07	2E-10	6E-04	2E-07
<b>Smog kg NOx eq</b>	1097	76.69	49.21	109.3	158.6	0.059	351.8	0.136	5.575	30.09	35.66	0.989	4394	1.637

**Table 3: Environmental Footprint (Impacts) by Life Cycle Stage - Huron**

	Manufacturing		Construction		Maintenance		End - Of - Life		Oper Energy		Total	/m2		
	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Matr'l	Transp	Annual	Total				
<b>Fossil Fuel MJ</b>	5E+06	1E+05	86521	2E+05	3E+05	23120	2E+06	939	92194	52735	1E+05	41953	9E+07	45920
<b>Resources kg</b>	2E+06	2962	2029	4019	6047	3.057	90369	45.96	2171	1243	3414	3851	1E+07	4870
<b>GWP kg CO2 eq</b>	4E+05	8482	5818	12765	18583	9.395	80199	41.41	6011	3948	9959	3624	8E+06	3894
<b>AP moles H+ eq</b>	2E+05	2878	2990	4027	7016	3.547	52054	26.59	333.3	1245	1578	1311	3E+06	1430
<b>Resp kg PM2.5</b>	1193	3.469	3.238	4.839	8.077	0.004	556.1	0.281	0.317	1.496	1.814	7.332	16266	8.223
<b>EP kg N eq</b>	201.8	2.995	2.806	4.171	6.977	0.004	19.86	0.01	0.229	1.176	1.405	0.034	301.1	0.152
<b>ODP kg CFC-11</b>	6E-04	3E-07	8E-12	5E-07	5E-07	3E-10	9E-05	4E-08	3E-07	2E-07	4E-07	1E-09	7E-04	3E-07
<b>Smog kg NOx eq</b>	1333	64.84	71.31	89.87	161.2	0.081	297.5	0.157	4.282	27.79	32.07	0.608	3104	1.569

### 3. RESEARCH RESULTS

Tables 1,2, and 3 show detailed environmental footprint (impacts) of the 3 cases in this study. These are used to draw conclusions and graphs to interpret results.

#### 3.1 Normalization of Results

Since the 3 case studies are of different floor areas, the normalization of results is a must to ensure the validity of the comparison among cases. Before discussing in details why a specific normalization factor was selected, it should be mentioned that, although the selection of a normalization factor ( $m^2$  vs.  $m^3$ ) *does* affect the results in *absolute values* (the environmental impacts of each building), it *does not* affect the results in *relative values* (the environmental impact contribution to the building life cycle phases) which is the main focus of this study.

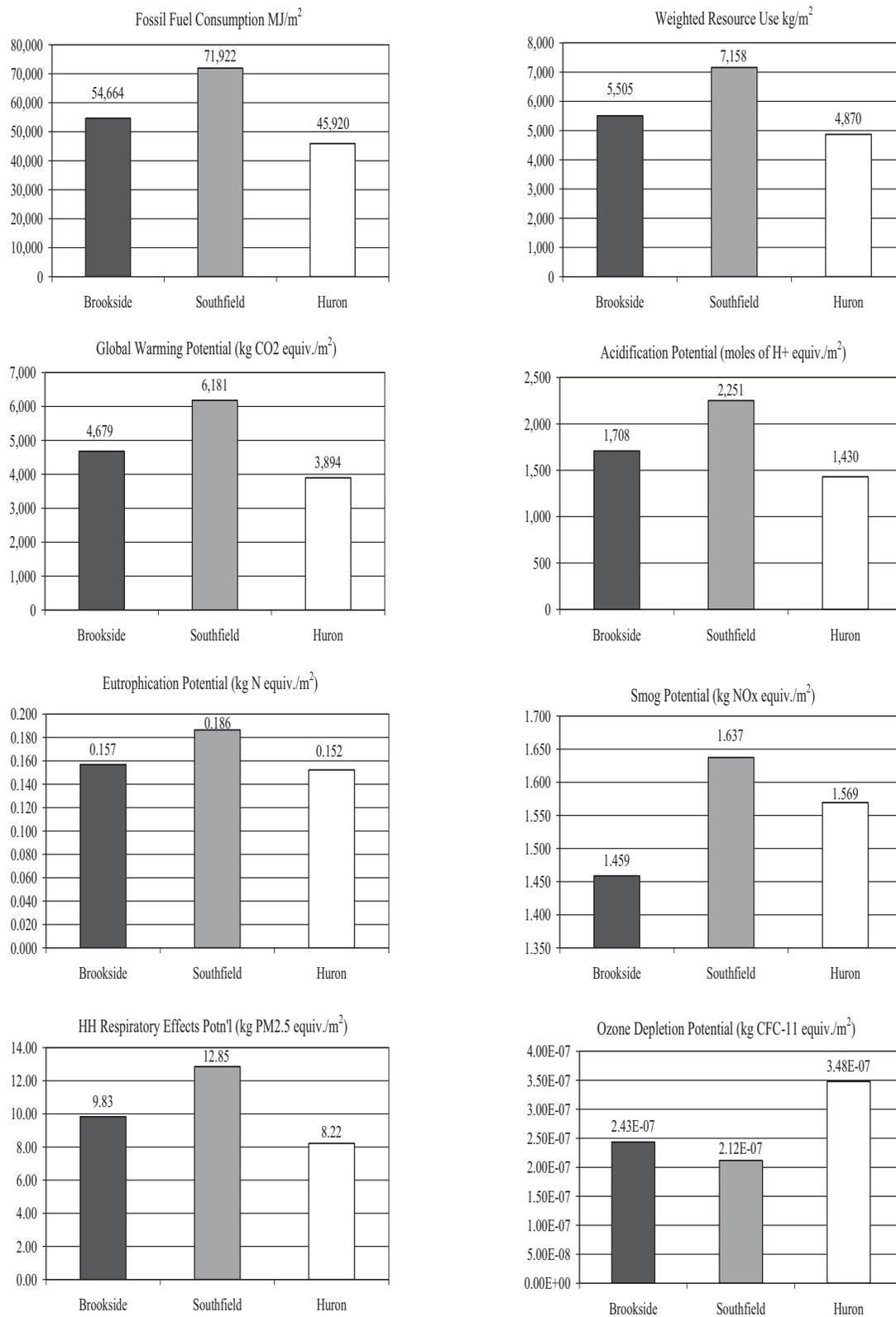
For comparison purposes, the results have been normalized per square meter ( $m^2$ ) of floor area of the 3 buildings. Although the data base used in the study (ATHENA) allows some inputs in imperial units, the results of impact assessment, which is more important to the study findings, are presented in metric units. For this reason and for consistency purposes the square meter ( $m^2$ ) is used as normalization factor instead of the square foot ( $ft^2$ ). Another normalization factor could have been used is the volume unit of the building in cubic meter ( $m^3$ ). The specific factor between the two measures is the height of the office spaces which will influence the quantities of materials in columns and walls. Since the height in Huron case is 16.5 ft which is the highest among others (15 ft for Brookside and 14.6 average for Southfield), the results of this case per  $m^2$  would render between 5-10% higher than they would be in  $m^3$ .

#### 3.2 Environmental Impact Absolute Values of the Cases

The results of impact assessment of the 3 office buildings are shown in Fig.2. The results show that there are differences between the buildings impacts. Southfield (case 2) has the highest impacts in almost all categories per unit area ( $m^2$ ) although its floor area (2690  $m^2$ ) falls between Brookside (3716  $m^2$ ) and Huron (1978  $m^2$ ). Huron (case 3) has the lowest impact values in all categories. The values of the impacts of Huron are around 15% less in values than Brookside (case 1) with some exception of Brookside being less than Huron only in the smog potential (or POCP) by 7% (Fig.2).

It's important to mention that Huron is a LEED certified building. By looking at the nature of the life cycle phases where *operation* phase has the most impacts on the whole life cycle, Huron case saves significant energy during that phase due to the use of geothermal (earth energy) loop system in its HVAC systems both for heating and cooling (eQuest results). Impact absolute values would have been close if not more than Brookside if Huron uses the traditional HVAC system which includes boilers and chillers.

One conclusion on why Southfield case has the highest impacts absolute values could be the extensive use of steel W-sections (wide-flange beams and columns) as the structure system vs. HSS sections (Hollow Structural Steel) in columns for the other two cases. W-sections have significant embodied energy than the HSS sections.



**Figure 2: Environmental Impacts for 3 Buildings**

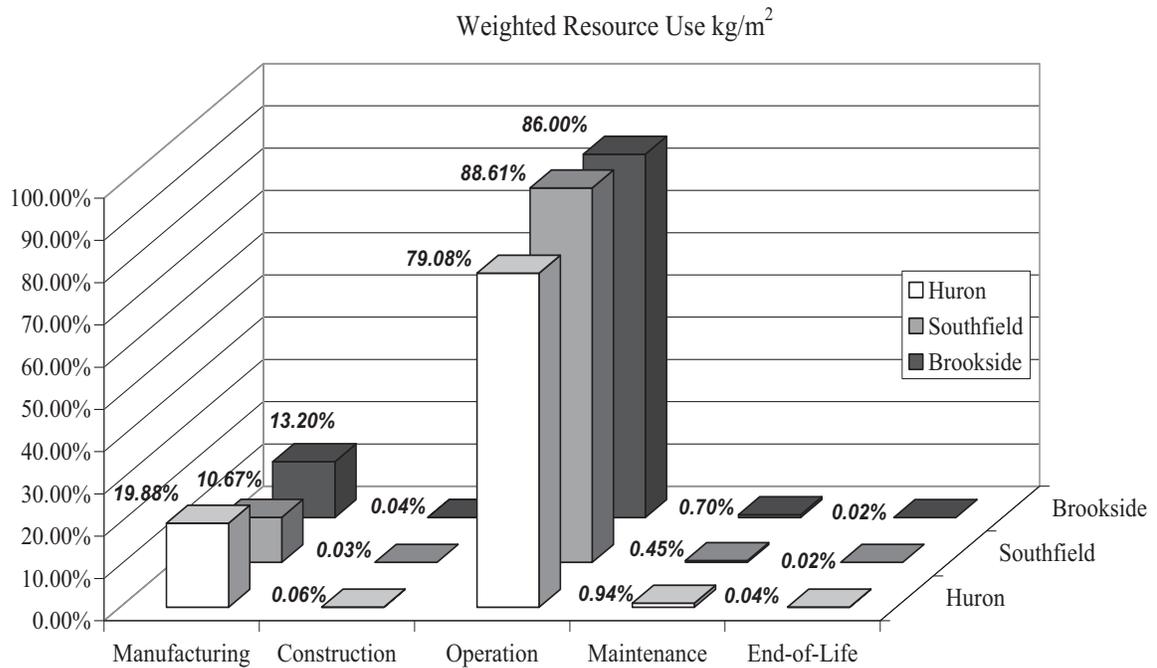
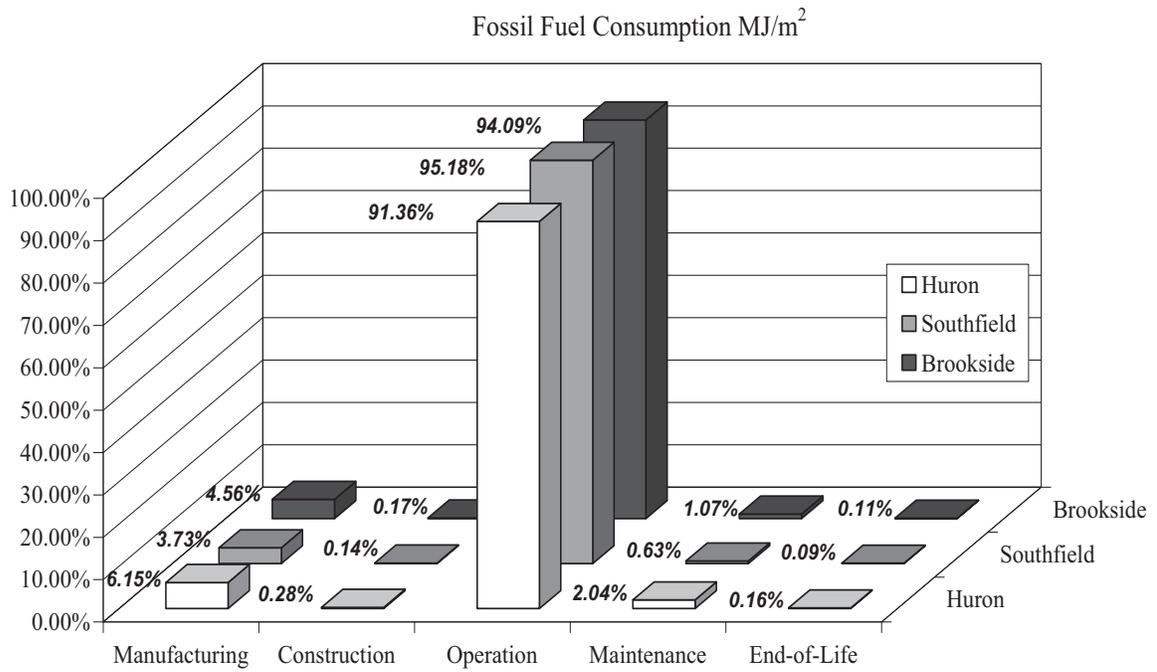
### 3.3 Environmental Impacts Contribution to Life Cycle Phases

The overall environmental impact contribution to the life cycle phases of the 3 cases is shown in figure 3. However, very detailed results could be obtained for the tables 1-3.

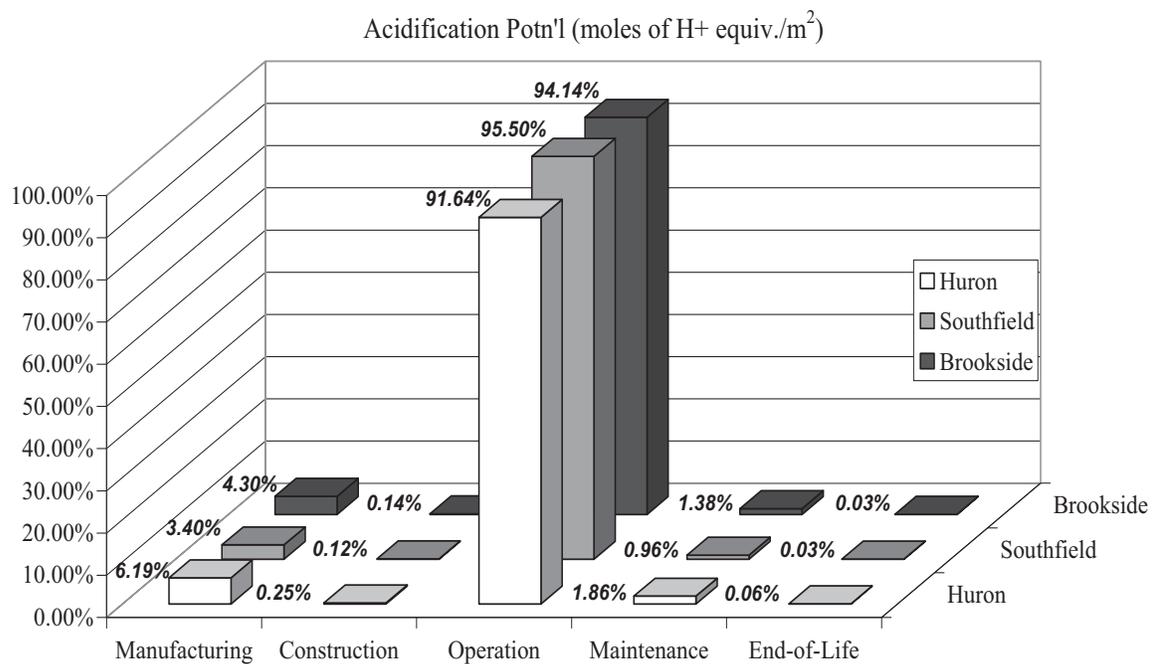
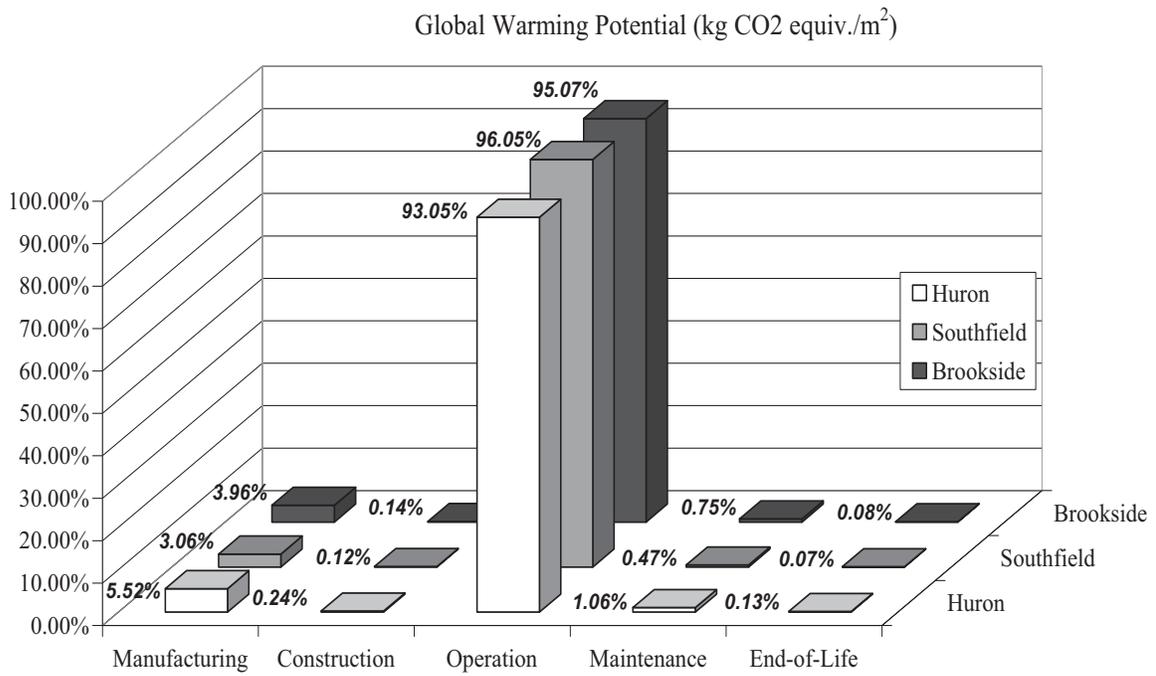
Transportation impact in every phase is considered for more accurate results to this study. Interestingly, results show that the transportation contributes 80% and 70% of the Global Warming Potential (GWP) and Acidification Potential (AP) respectively to the total life cycle impact during construction phase. At the end-of-life phase, this ratio represents 43% of GWP and 80% of the AP (Tables 1-3). In fact, the highest impact of transportation with higher ratios to the total phase impact is concentrated during these two phases; *construction* and *end-of-life*. This supports the argument of using local materials in building construction.

Although the 3 cases are different in floor areas and some architectural features, the contribution of each life cycle to the total impacts seems to follow a similar pattern. The following percentages represent an *average* of the 3 cases.

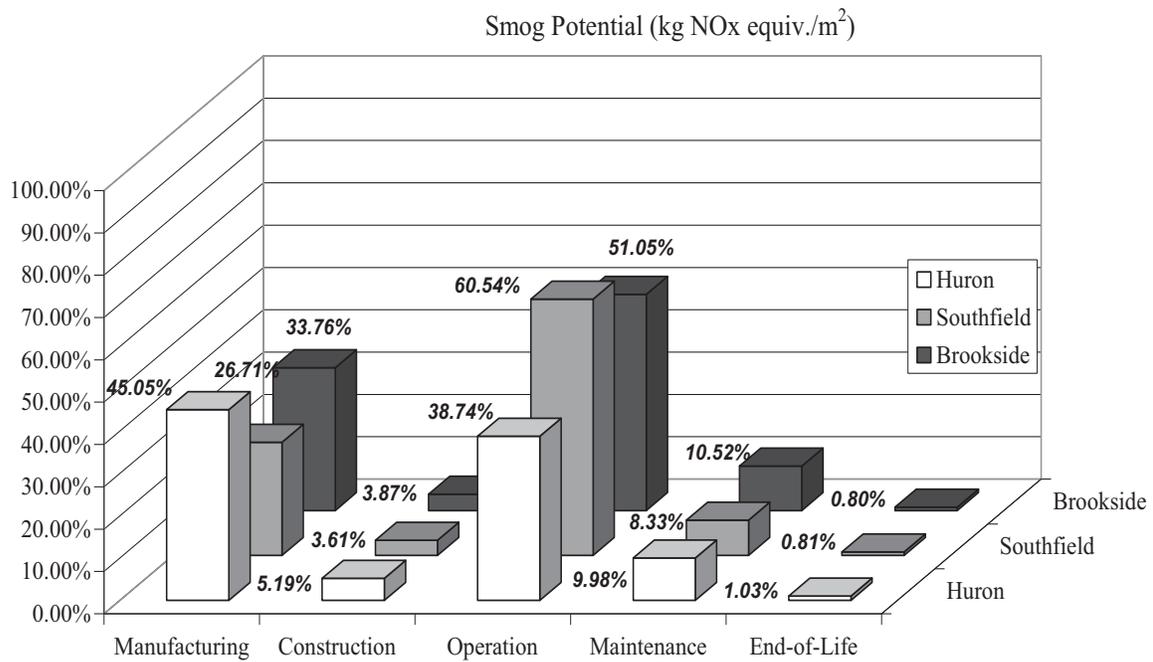
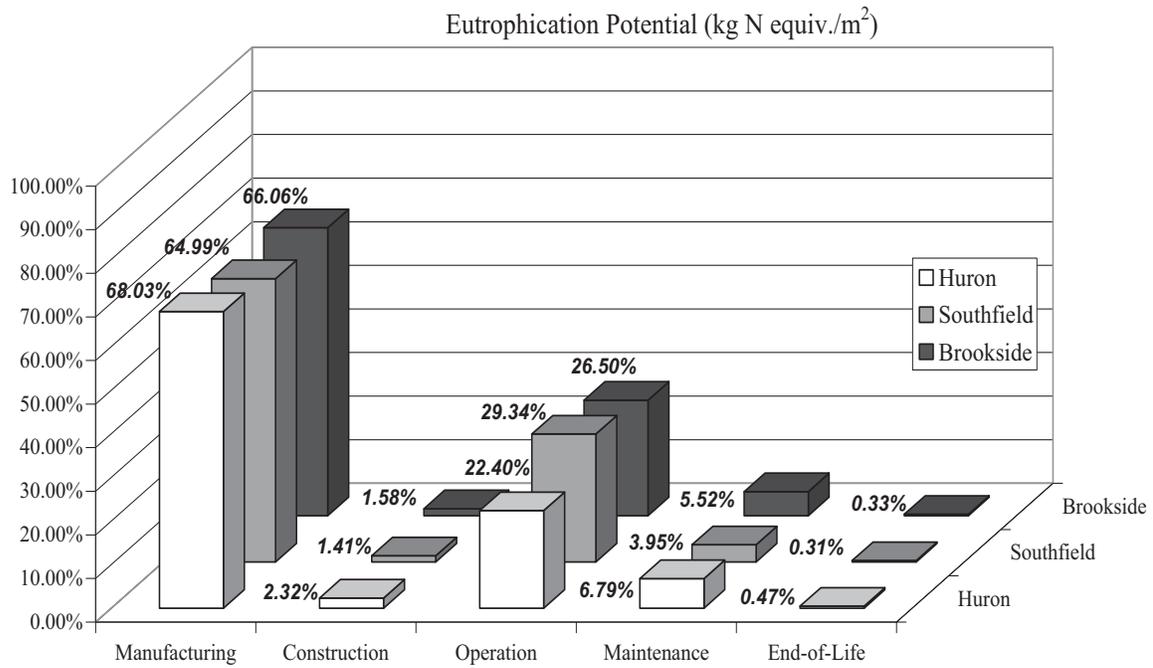
- The operation (use) phase in all buildings dominates the environmental impacts in all impact categories except in Eutrophication Potential (EP) and Ozone Depletion Potential (ODP) which are dominated by the manufacturing phase.
- Operation phase's share of impacts averages 93% in fuel consumption, 84% in resources use (WRU), 95% in GWP, 93% in AP, and 91% in respiratory effects potential (Fig. 3). These results are mostly associated with the energy consumed in this phase which results in massive air emissions such as CO<sub>2</sub> (main cause of GWP), SO<sub>2</sub> and NO<sub>x</sub> (main cause to AP), and effects of particulates (PM<sub>2.5</sub>) on the human respiratory system.
- Manufacturing phase has the highest impact in the ozone depletion at 87%, and in eutrophication at 65%. These results are mainly due to the release of CFCs and Halon (main cause of ODP) to air specifically in this phase. Also, these results demonstrate that this phase has the highest releases of water pollutants such as COD, BOD, heavy metals, nitrogen and phosphorous compounds (main cause of EP) during manufacturing processes of different building materials.
- The operation and manufacturing phases are somewhat balanced in the smog potential (POCP) impact category. Operation phase contributes to 49% of this impact and manufacturing contributes to 35%. The results reflect the influence on Nitrogen releases, whether to air or to water, in these two categories.
- It is also noteworthy to mention that besides these 2 impact-dominant phases (operation and manufacturing), the *maintenance* phase comes third to dominate the whole impacts especially in ODP (12%), smog (10%), and eutrophication (6%). This is due to the materials replacement, renovations, and retrofit during the building life cycle.



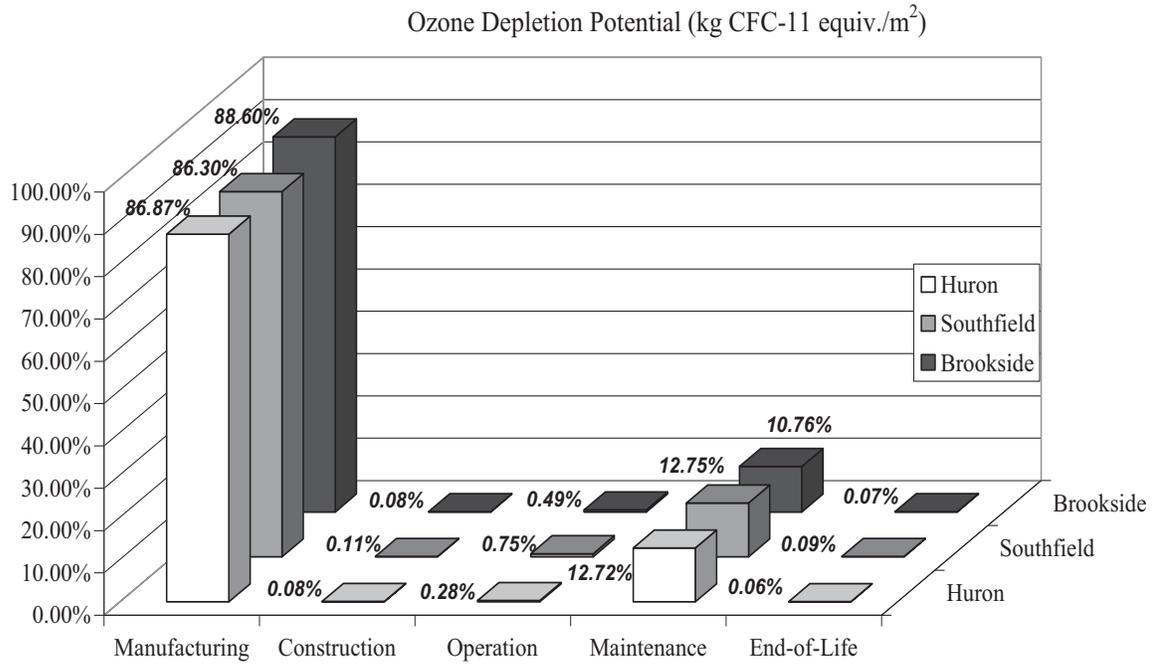
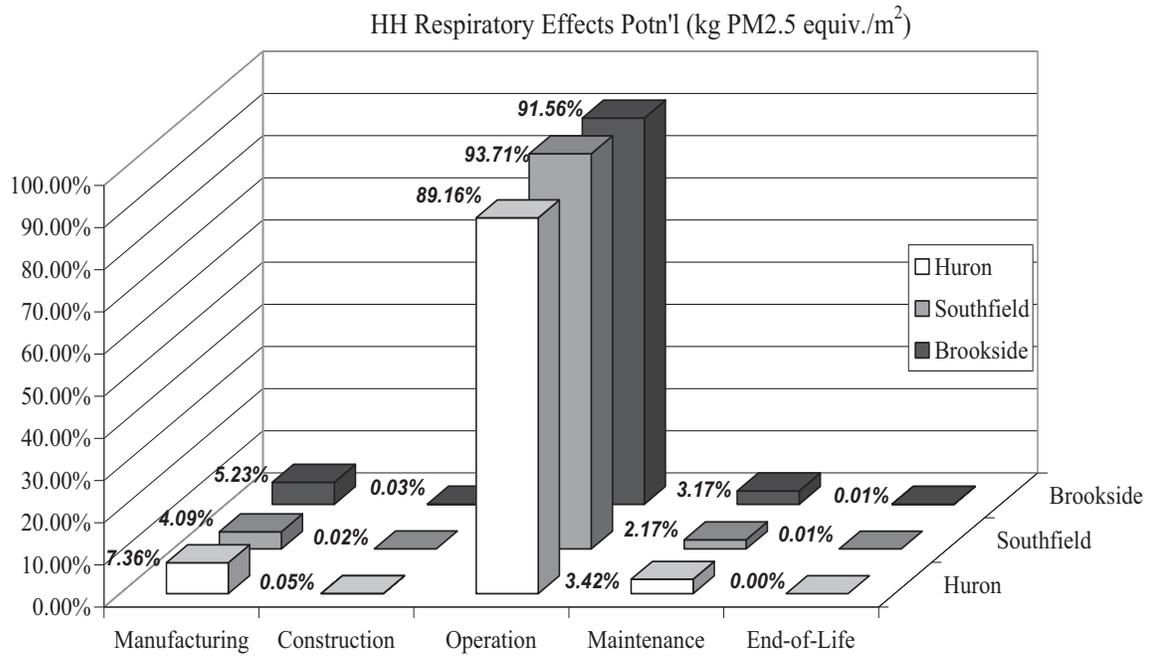
**Figure 3: Contribution of Each Environmental Impact by Life Cycle Stage**



**Figure 3:** Contribution of Each Environmental Impact by Life Cycle Stage- Continued



**Figure 3: Contribution of Each Environmental Impact by Life Cycle Stage- Continued**



**Figure 3: Contribution of Each Environmental Impact by Life Cycle Stage- Continued**

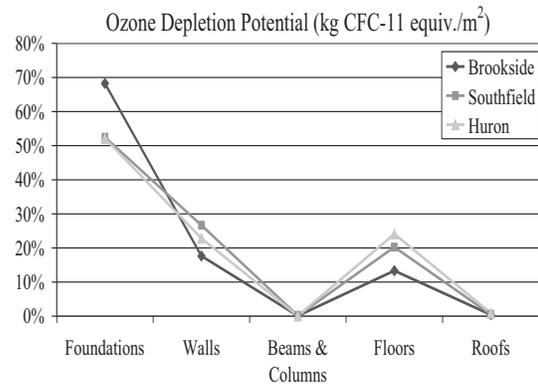
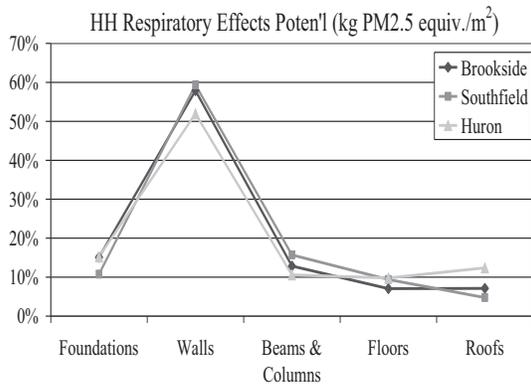
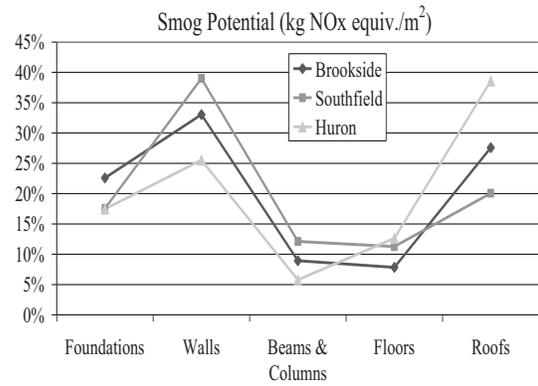
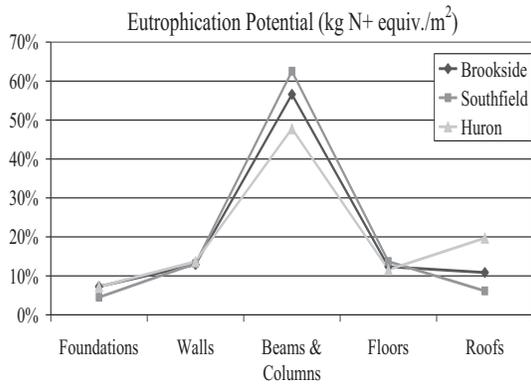
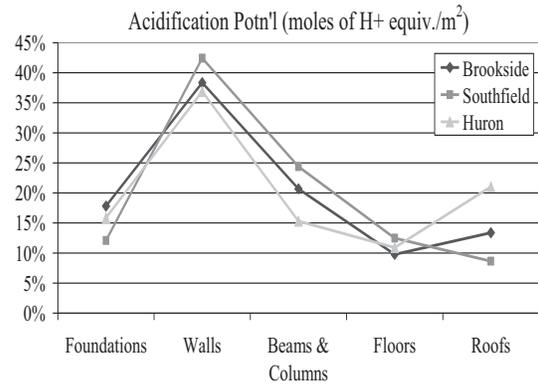
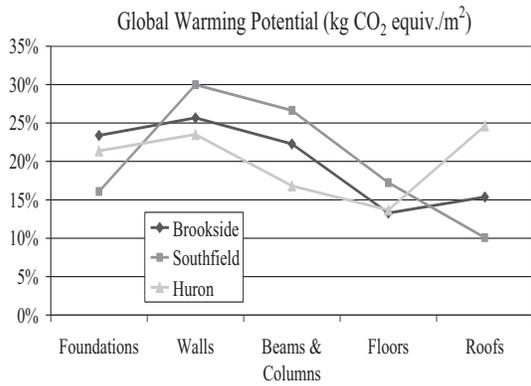
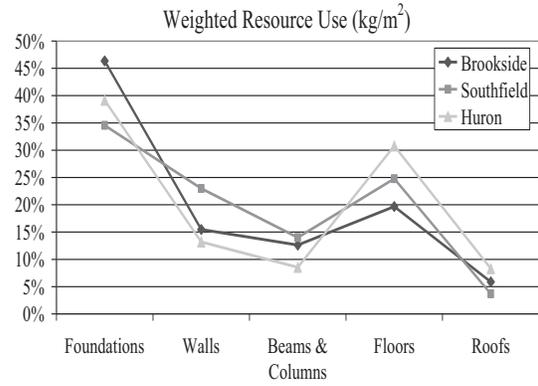
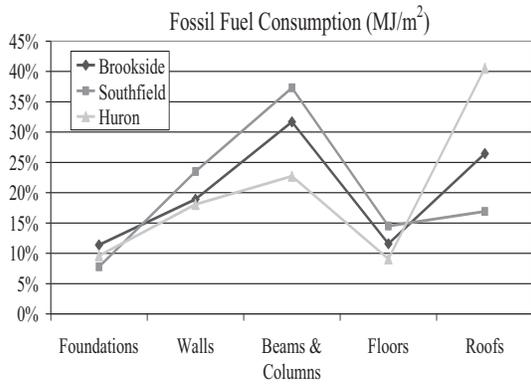
### 3.4 Environmental Impacts Contribution to Assembly Systems

It is important to mention here that in architectural practice, the design of the building systems has different order than the chronological order of its life cycle phases in this study. The design of the building assembly systems (foundations, structure, walls, floors, and roofs) usually takes place during the design process where determination of these systems is identified.

The overall environmental impact contribution to building assembly systems (foundations, structure, walls, floors, roof) of the 3 case studies are presented in (Figure 4). Although the 3 buildings have different architectural features (mainly number of floors, floor height, windows to wall ratios, and slight difference in insulation R-values), the contribution of each assembly system to the total impacts seems to follow a similar pattern. The following percentages represent an *average* of the 3 cases:

- *Walls* system in all buildings dominates the environmental impacts in global warming (26%), acidification (40%), smog potential (35%), and respiratory effect potential (57%) categories. A major factor of these impacts attributed to the use of insulation materials which cover large areas of building facades. Other factor is the embodied energy of metals such as steel and anodized aluminum in windows and curtain walls.
- *Structure (beams and columns)* system of the buildings dominates the impacts in fossil fuel consumption (31%), eutrophication (56%) categories. These results attributed to the massive embodied energy of steel sections and the associated water emissions during manufacturing processes.
- *Roofs* system in all cases has also significant impacts (second to beams and columns) in fossil fuel consumption (27%), in global warming GWP (17%), and comes second to walls in smog potential (29%). A major factor of these impacts attributed to the manufacturing of roof insulation materials and to some extent the roof membrane (black EPDM rubber).
- *Foundations* system dominates the cause of ozone depletion at (58%). This high ratio associated with the release of CFCs during manufacturing of paint and cement. Since foundation is the heaviest system among others, it also dominates the Resources Use (RU) at (40%) (Fig. 4).

It is also important to mention that the *roof* system of Huron building has highest potential impacts among other roof systems, while Southfield has the lowest roof impacts. Albeit a LEED certified, the impact of Huron roof is due to the use of thicker insulation layers which interprets the energy saving it has. It uses 1.5 times the insulation used in other buildings. Another note that slightly affect the results is that Huron has one-floor plan where the ratio of *roof area/floor area* in  $m^2$  is equal to 1 (the roof cover the whole area of the building). On the other hand, Southfield building has 3 floors where the ratio of *roof area/floor area* in  $m^2$  is  $1/3^{rd}$ . (the roof cover one third of the whole area of the building). In conclusion to this important point, roof has significant impacts as an assembly system and a minor change in its material flow with more environmental friendly alternatives (especially insulation) would render significant reduction of those impacts.



**Fig. 4: Environmental Impact Contribution to Bldg Assembly Systems**

## **4. INTERPRETATION OF RESULTS**

### **4.1 Building Materials Manufacturing**

Tables 1-3 shows that the greatest contribution to overall impacts in the manufacturing phase comes from the extensive use of fossil fuel impact (45%) in the manufacturing processes of the construction materials (steel, concrete, aluminum, glass, etc) that are required for construction. The resource depletion in this phase also represents 45% due to all virgin materials that are used and processed from the nature. GWP and AP represent the rest of the impacts at this phase at 10% mainly due to the releases from fossil fuel use in that phase.

### **4.2 Construction**

The study shows that in the construction phase, the use of construction equipment is the only life-cycle element with significant impacts (90%). That is due to the fuel and electricity used during the erection of the bldg. The other 10% attributed to GWP and AP with small fraction attributed to EP and Smog impacts.

### **4.3 Operation /Use**

The operations phase dominates life cycle energy consumption. Tables 1-3 show the buildings operational demands over a 60 year life span, representing 96% ( $4.92 \times 10^8$  MJ) of the total life cycle energy. This ratio is off 2% of other studies in the same climate at 97.7% (Scheuer 2003). Almost 90% of life-cycle impacts in the use phase caused by electricity and natural gas used for heating in cold climate like Michigan.

### **4.4 Maintenance**

This phase comes second to manufacturing in terms of resources use where several parts of the buildings are replaced or renovated. Ozone Depletion Potential ODP, albeit almost negligible in the study, most of its causes are concentrated in the manufacturing and maintenance due to the VOCs released by paint manufacturing and the re-painting processes. The significance of the paint products has increased considerably from the original construction phase due to the frequency of repainting (every 10 years).

### **4.5 End of Life**

Table 1 and Fig.3 show that the demolition phase does not have significant impacts in the overall life cycle, except for the Eutrophication category (2%) and Smog (4%). Transportation of the waste material to the landfill produces most of the impacts in this phase.

## **5. CONCLUSION**

The purpose of the study was to quantify and compare the potential environmental impacts caused by 3 office buildings' life-cycle phases. The study also determined the life-cycle phases contributing most to the impact and defines the significant environmental impacts of the building. The study also examines the building assembly components that most contribute to its life cycle impact. All life cycle phases were found to have

significant environmental impacts. However, most of the significant impacts were in the operation phase and the building materials manufacturing phase.

The results of the current study on the contribution of different life-cycle phases are consistent with results from previous studies. Most of the previous studies have emphasized the significance of operational energy impact (Sheuer *et al.* 2003; Seo and Hwang 2001; Treloar *et al.* 2001; Thormark 2000), and some have also reported the possible significance of some building materials (Ochoa *et al.* 2002; Junnila and Saari 1998).

The study aimed at comprehensiveness; however, it included 8 impact categories of which others have not covered deeply such as Human Health Respiratory Potential, Summer Smog, Ozone Depletion, and Resources Use (consumption). Some limitation on impacts included biodiversity, and indoor air quality are not assessed due to the lack of data. Some other elements like office furniture, computers, construction of infrastructure, were excluded to focus the attention on modeling the building itself as simply as possible.

The results of the study can be interpreted together with the results from previous studies. Another limitation of the study is the lack of other important environmental impact categories such as the construction wastes due to lack of data and modeling difficulty. The findings of this study support previous arguments that operation energy is a major environmental issue in the life-cycle of an office building, and that some building materials are also significant. This is typical for an office building in the U.S. For other countries, it is more difficult to generalize based on the results of this study. There are many regional conditions used in the calculations that could affect considerably the results outside the U.S. Building design, intensity of materials, construction methods, and intensity of energy use in the operation phase differ. Most importantly, there are differences in electricity generation and energy use (grid mix); e.g., a higher proportion of coal is burned in the United States, while Europe and Canada have a higher percentage of electricity from hydro (almost no emissions) and non-fossil fuels which will affect the final emissions especially the release of CO<sub>2</sub>, SO<sub>2</sub>, and NO<sub>x</sub> to air. The study is also unique in modeling the building with the U.S. electricity grid which depends on coal as resource at 45% (DOE, EIA 2009).

The study also acknowledges the relationship between LCA and LEED rating system. LCA results demonstrated that a LEED certified building (Huron case) has the lowest impact among other cases over 60 years of life. This is mainly due to using geo-thermal HVAC system which saved significant amount of energy during the operation phase in which most of the impacts would occur. One shortcoming though was the use of tighter envelope and thicker insulation without considering the negative impact of using such insulation alternative (polyisocyanurate). This resulted in that the roof system of the LEED building had the highest impact in most categories than the other two cases (not LEED certified). The LCA method in this study opens the way for more testing of LEED certified buildings with high ratings e.g. gold or platinum using LCA impact analysis to verify their environmental performance. This helps to narrow down the sensitive area of design and material choices (e.g. insulation) that LEED falls short by awarding points for

overall energy savings without looking at the significant environmental impact of material alternatives that achieve this saving.

Practical applications of the study's results could be directed to more environmentally conscious design and more facilities management of office buildings. Companies, owners, project and facility managers, and designers who are not yet familiar with environmental impacts could use the profiles of the significant impacts and phases of the bldg where this happen to help them focus their attention on environmentally sensitive areas of design, construction, use, maintenance, and even demolition.

## ACKNOWLEDGEMENTS

The author is very grateful for the support provided by the AIA Upjohn Research Grant program which makes this research possible. Many thanks also go to Dr. Richard Hayes, AIA Director of Resources and Research for publicity and interest in quantifying sustainability in buildings. Special thanks also to my advisors Dr. J.J. Kim and Dr. K.H. Mancy at University of Michigan, Ann Arbor.

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### **Students Aspire**

By Elizabeth Catlett

Located at Howard University

Washington DC, USA

## **KEYNOTE PRESENTATION**

### **The Research of Place/The Place of Research**

**Jane Rendell, MSc, Ph.D.**

The Bartlett School of Architecture

University College

London

Professor Jane Rendell is Director of Architectural Research at the Bartlett School of Architecture, University College London. An architectural designer and historian, art critic and writer, her work has explored various interdisciplinary intersections: feminist theory and architectural history, fine art and architectural design, autobiographical writing and criticism. She is author of *Site-Writing: The Architecture of Art Criticism* (2010), *Art and Architecture* (2006), *The Pursuit of Pleasure* (2002) and co-editor of *Pattern* (2007), *Critical Architecture* (2007), *Spatial Imagination* (2005), *The Unknown City* (2001), *Intersections* (2000), *Gender Space Architecture* (1999) and *Strangely Familiar* (1995). Her talks and texts have been commissioned by artists such as Daniel Arsham and Bik Van Der Pol, and galleries, for example, the Baltic, the Hayward, Kunstmuseum Thon, the Serpentine, the Tate and the Whitechapel. She is on the Editorial Board for *ARQ* (Architectural Research Quarterly), *Haecceity*, *The Happy Hypocrite*, *The Issues* and the *Journal of Visual Culture in Britain*, and was a member of the AHRC Peer Review College (2004–2008) and chair of the RIBA President's Awards for Research (2005–2007). In 2006 she was a research fellow at CRASSH (Centre for Research in Arts, Social Sciences and Humanities) at the University of Cambridge.

## The Research of Place/The Place of Research

Jane Rendell

[Part of this paper is to be published as Jane Rendell, 'May Mo(u)rn: A Site-Writing', Nadir Lahiji (ed) *Essays in honour of Frederic Jameson*, (London: Ashgate, forthcoming 2011).]

Many thanks for the invitation to speak at this interesting conference organised by the European Association for Architectural Education, apologies for not being able to be with you in person. I would dearly love to have been, but I am doing my best to reduce my carbon footprint, and that means missing out on the face to face conversations of occasions like today.

The phrase 'the research of place' encapsulates a way of thinking that we are all familiar with, where research is the activity, and place the subject matter or object of study of a research enquiry. This conference has thematized the possible approaches to place through seven modes of research: Environmental, Cultural, Social, Technological, Design, Organizational and Educational. It is also worth considering, as I did in my paper for *Architecture Research Quarterly* from 2004, entitled 'Architecture and Disciplinarity', that architecture is a subject and as such it draws on multiple disciplinary modes of knowledge production and transmission, from science, to social science, to the humanities, to art and design. If architecture is a subject, at the heart of that subject is the activity of design, and perhaps design is architecture's discipline.<sup>1</sup> .[i]

In a much-cited paper from 1993, called 'Research in Art and Design', Christopher Frayling, one-time Rector of the Royal College of Art in London, put forward a tri-partite model for clarifying the complex set of relationships between design and research. In his view, research 'for' design tends to involve investigations conducted with a design application in mind and operates through a science/technology model; while research 'into' design, examines design from a historical and theoretical perspective, using a humanities research model. In both these types of design research, design is the object and research the process; whereas in the third type, research 'through' design, design constitutes both the research object and the process. It is this last category that we call design or 'practice-led' research, where the research operates through design, where design can be considered in terms of research, and research as a form of design.

The use of prepositions becomes important at this point - to, for, as - so do textual inversions. This is far more than simply word play; rather, different linguistic expressions can suggest new ways of thinking and challenge given epistemological orders. As philosopher Michel Serres has said of prepositions:

That's prepositions for you. They don't change in themselves, but they change everything around them: words, things and people.[ii]

I am interested then in the critical inversion suggested by the second phrase of this conference's title: 'The Place of Research'. It moves place out of a passive position as the object of enquiry, and allows us to reconsider place as an active research process, and to rethink the relation between the two terms – place and research. In this way it is much closer to my own intellectual approach, which takes research to be a form of situated practice, which operates using site-specific techniques to critique disciplinary methods of enquiry, interpretation and creative construction.

In 2003, in an article called 'A Place Between Art, Architecture and Critical Theory', I identified the concept of 'critical spatial practice', which I later consolidated in my book of 2006, called *Art and Architecture: A Place Between*. Here I argue that critical spatial practice operates at the cross roads of two sets of continuum, one between art and architecture, the other between theory and practice. My interest has been in locating a constellation of projects, which, in different ways, intervene into specific sites in order to critique them. The term 'critical spatial practice' tries to draw attention to a kind of practice that is both critical and spatial: critical (following the definition of critical theory) in the sense that the works engage self-reflection *and* importantly *social critique*, and spatial, following de Certeau, in that they practice place in order to produce space, and Lefebvre, in operating between two modes of spatial practice – those that seek to dominate and those which aim to resist.

In writing *Art and Architecture* I came to realize that the changing critical positions I occupied in relation to art, architecture and theory – physical as well as ideological, private as well as public – did not proceed but were rather produced through the act of writing.[iii] I concluded *Art and Architecture* by arguing that critical writing is *itself* a form of critical spatial practice.

My suggestion is that this kind of writing questions the terms of reference that relate the critic to the artwork positioned 'under' critique. My aim is to shift the relation between the critic and her object of study from one of mastery – the object *under* critique – or distance – writing *about* an object – to one of

equivalence ‘to’ and analogy – writing *as* the object. The use of analogy – the desire to invent a writing that is somehow ‘like’ the object – allows a certain creativity to intervene in the critical act as the critic comes to understand and interpret the work by remaking it on his/her own terms.

My forthcoming *Site-Writing* book, composed of a series of texts and works developed over the last ten years, seeks to write sites (and these can include places, buildings and artworks) rather than write about site. The project involves rethinking the terms of criticism, specifically judgment, discrimination and distance, from a spatial perspective, architectural as well as metaphorical, remembered, dreamed and imagined, as well as empirically experienced and critically analysed.<sup>[iv]</sup> I suggest that with his/her responsibility to ‘interpret’ and ‘perform’ the work for another audience, the critic (or researcher) occupies a discrete position as mediator and that this *situatedness* plays a part in conditioning the performance of his/her interpretative role. I am interested then in how the spatial and often changing positions we occupy as critics materially, conceptually, emotionally and ideologically set up conditions for acts of interpretation and the making of meaning.<sup>[v]</sup>

Following his own reading of philosopher Immanuel Kant, cultural critic Howard Caygill has asserted that:

Strategic critique moves between the work and its own externality, situating the work in the context of experience, and being in its turn situated by it.<sup>[vi]</sup>

Literary critic Mary Jacobus has described ‘the scene of reading’ in terms of a relation, which exists between the inner world of the reader and the world contained in the book.<sup>[vii]</sup> Taking up this insightful observation I suggest that criticism involves a double movement back and forth between inside and outside.

In the terms of today’s conference we might say that places take researchers outside themselves, offering new geographies, new possibilities, but places can also return researchers to their own interiors, their own biographies. This two-way movement suspends what we might call objectivity in research, and instead, through what I call the practice of ‘site-writing’, uses the spatial qualities of the writing to construct as well as trace sites of meaning between researcher, place and reader or user.

In 1965 to 1966 artist Robert Smithson worked as a consultant artist for an architectural firm called TAMS on designs for Dallas Forth Worth Airport. The project alerted him to ways of working outside the gallery, to consider how art works might be viewed from the air and to think about how to communicate aspects of exterior works to passengers in the terminal building. This latter aspect he termed the 'non-site'. He says:

I was sort of interested in the dialogue between the indoor and the outdoor ... I developed a method or a dialectic that involved what I call site and non-site ... (it's a back and forth rhythm that moves between indoors and outdoors). [viii]

Smithson's first non-site, 'A Nonsite (an indoor earthwork)', later retitled 'A Nonsite, Pine Barrens, New Jersey' (1969), consisted of bins filled with sand taken from the runways of a little-used wilderness airfield laid out in a hexagonal pattern in the gallery with a photostat map and a text that read:

31 subdivisions based on a hexagonal 'airfield' in the Woodmansie Quadrangle – New Jersey (Topographic) map. Each subdivision of the *Nonsite* contains sand from the *site* shown on the map. Tours between the *Nonsite* and *site* are possible. The red dot on the map is the place where the sand was collected. [ix]

My site-writings are non-sites, of a kind, remakings of sites through textual construction.

In his 'A Provisional Theory of Non-Sites' from 1968 Smithson proposed that:

Between the actual site in the Pine Barrens and The Non-Site itself exists a space of metaphoric significance. ...

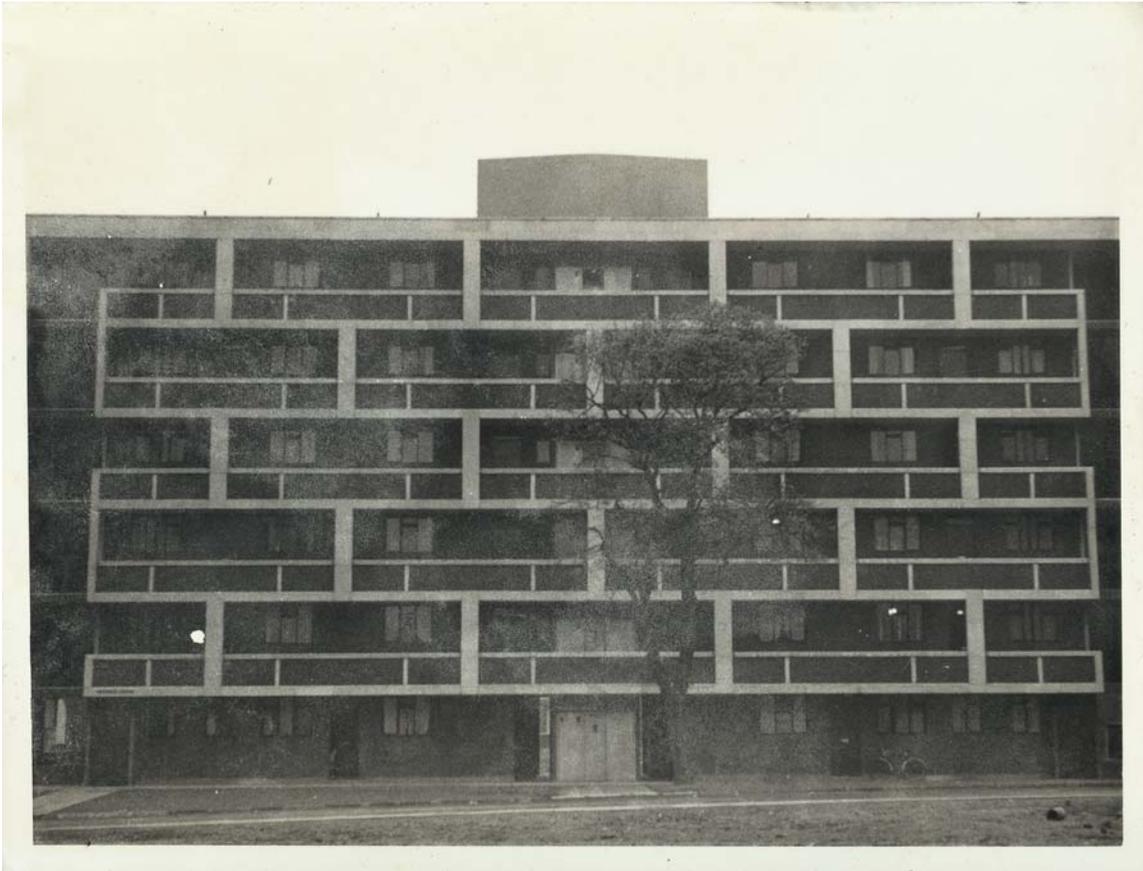
Let us say that one goes on a fictitious trip if one decides to go to the site of the Non-Site.

Today's talk operates in the place of this fictitious trip: where sites are imagined through the representational forms of their non-sites, as if I were in Washington and you were in London.

The place I am currently occupying is in a basement room in the southwest corner of University College London's main quadrangle. In the image on the screen please square C1, well I am almost under the N of 'North Wing'. The room has no daylight, it is almost square in plan, with a low ceiling, and three of its

four walls draped with slate blue curtains – it feels a little like a funeral parlour. This thought disturbed me for a while, until I realised that I had probably already had such a place in mind, that my mental expectation entered the room before me, since the site-writing I am now going to present to you is entitled: *May Mo(u)rn*, and in many ways is a work of mourning.

### **Moss Green**



The house is beautiful – a one-storey building, with a square plan – born at the birth of modernism in the aftermath of the First World War.



It embodies the values of early English modernism, of the Arts and Crafts movement: 'truth to materials' and honest craftsmanship.



From the road it looks a little unloved, in need of some care and attention.



Up close it is clearly derelict, almost in ruins.



We enter a room with windows at each end.



Curtains are falling away from the runners.



The fabric has been soaked overnight and is drying in the spring afternoon sunshine.



On the window sill and spilling over onto the floor are piles of old magazines.



The pages are stuck together and disintegrate if you try to pull them apart.



There are some photographs of buildings.



One is particularly damp; the corners are soft, the surface is wrinkled.



It shows a tower block, just completed, empty and pristine, a moss green utopia, the modernist dream dispersing as it soaks up spring rain.

Note: The photographs were found by me in an abandoned house, and the captions are taken from a text, originally entitled 'Moss Green', written as one in a series of three, contained within a critical essay on the work of artist Elina Brotherus, published as 'Longing for the Lightness of Spring'. [x]

### **Longing for the Lightness of Spring**

In 2001 curator Jules Wright from the Wapping Project in London invited me to write an essay about Brotherus's work *Spring*. *Spring* was composed of two installations: a video triptych *Rain, The Oak Forest, Flood* (2001) in the boiler house of this disused pumping station on the north bank of the Thames and a back-lit image *Untitled* (2001), three metres by eight metres, reflected in the water tank on the roof. *Untitled* showed an illuminated horizon dividing sky from earth: the pale grey sky of Iceland floating above what was once viscous lava now covered in green moss. Projected on screens hung from the ceiling, *Rain, The Oak Forest and Flood*, comprise a video triptych. In the first video, the viewer, located on the inside of a window, watches, as rain streams down the outside of the glass. The second shows an oak forest after the rain has stopped, but when drops, still heavy, continue to fall to the ground, John Betjeman's 'second rain'. The third video is of a flood, a forest of elegant trees rise silver from a pane of shining water

In responding to *Spring*, I found myself returning to scenes – real and imagined, dreamed and remembered – that corresponded with Brotherus's images. I supplemented her landscapes with places of my own. The three places I described made spatial, material and visual associations with Brotherus's *Spring*. In 'Moss Green' I remembered a derelict house in the green belt where in spring we found photographs of a brave new world of modernist high-rise housing. Just after the autumn equinox, just after her death, I dreamt of the shrouded home of my Welsh great aunt. 'White Linen' recalled the presence of life in the form of plants in this dream. While 'Bittersweet' recounted another spring visit, this time to an abandoned cork factory in Catalunya, where we found the names of the colours scattered, abandoned, all over the floor: black, white, orange, turquoise, bittersweet. Anticipating the end of winter, *Spring* opened in Wapping just after the autumn equinox in the northern hemisphere. Curatorially, the work faced towards the long decline into winter, the season from which it desired to turn away. Paralleling this juxtaposition which poised spring's hope for winter's retreat right at its early edge, I positioned *Spring's* foregrounding of anticipation as a yearning that looks forward to new life, against my own fascination with the backwards gaze of nostalgia. My three texts – 'Moss Green', 'White Linen' and 'Bittersweet' – connected Brotherus's landscapes infused with anticipatory longing to places

tinted by nostalgia, constructing a tension between life and death, rejuvenation and decay, a looking forward and a turning backward.

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For an expedition to Seoul, as 'what is the colour of memory?' (April 2002), each text was translated into Korean and accompanied by its 'object': an album of photographs found at Moss Green, a white linen cloth, and the word 'bittersweet' found in the factory. To journey to Los Angeles as 'the voice one cannot control' (November 2002) the texts were translated back into written English from the Korean audio recordings. In moving, the words were translated from English to Korean and back again, from writing to speaking and back again. For 'Concrete Feedback at SYARC curated by artist Brandon La Belle, the three pairs of texts were placed along a corridor with three columns, each one either side of a column. Three audio installations positioned the Korean voice at the point where the texts could no longer be read together. When the work moved again, this time to the Entwistle Gallery in London as 'Les Mots et Les Choses' for 'Material Intelligence' in 2002, three objects were re-inserted, sited in the slippage in language produced through translation and displacement.

In 'Les Mots and Les Choses' (1966), translated into English as 'The Order of Things', Michel Foucault explores the ordering of relationships between different cultural elements, for example, those that are real, those that represent, those that resemble, those that can be imagined.<sup>[xi]</sup> Between words and things, this site-writing is a two-way inscription, of sites written and writings sited.

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### May Morn

My first visit to the house I came to call 'Moss Green' had occurred in the spring of 2001. For the next decade I was to walk past Moss Green several times a year, as part of my weekly Sunday walk. Every Sunday morning, whatever the weather, taking a flask of hot soup to be supped under the dripping branches of winter trees, or a picnic to be eaten in a sunlit meadow, my partner and I make the journey to Waterloo or London Bridge, and board a train taking us to the limit of the metropolis – to London's so-called green belt. After an about an hour (and more recently with the collapse of the Sunday rail network, more like two, or sometimes three, or even seven) we disembark the train and walk into the dusk along the paths of the Weald.

In our walks out of Sevenoaks we sometimes take the route down Oak Lane, then Grassy Lane, past Fig Street, and along Gracious Lane, drawing to a halt at the fork in the road where Moss Green is situated. When we first saw the house we were entirely enchanted, with the way of life it represented as well as the arresting beauty of its slow yet gentle decay. It was single story, of a brick and timber construction, placed at the top of a scarp slope – with a porch facing a view out over southern England, under which two benches faced one another. The interior was full of exquisite touches: a perfectly placed built-in cupboard, a carefully detailed window sill and frame, a thoughtful light switch, a door handle that fitted like a glove. It was hovering at that point where the decay was still able to provide an atmosphere of charm, where the thought of collapse could be held off, and where it was still possible to imagine oneself into the house, repairing the woodwork and occupying the rooms. We guessed it had probably been built after the First World War, perhaps as part of the programme – ‘Homes fit for Heroes’ – which allowed returning and often traumatized soldiers to readjust to civilian life in the comfort of a simple domestic setting with space for gardening and growing food.

Over the years the house has increasingly fallen into disrepair, and our spirits now sink each time we see it. When its slate roof was removed around three years ago the rot really set in and as a structure it is now barely stable. As it slipped passed the threshold of being ‘save-able’; we have surrendered our dream of living there ourselves in a modest rural retreat. No doubt the new owner is waiting for the moment of collapse, when the walls cave in, in order to construct a dwelling, which requires no restorative work. I wonder whether Moss Green should have been listed, whether I should have taken on that task myself. And if it is not valued as a piece of architectural heritage, what are those emotional qualities it holds that make it feel special enough to want to save?

On one visit, years ago, when the house was open to the elements, but some of its contents still present, we noted books on architecture, old journals from the building trade, and piles of photographs. We salvaged a few items – notably one book, *New Architecture of London: A Selection of Buildings since 1930*,<sup>[xii]</sup> along with a selection of black and white photographs, some of which are reproduced here. Recently in examining the photographs more closely I have become fascinated with tracking down the buildings imaged in them. As well as the architectural qualities of the structures, I have had five text-based clues to work with – a board in front of one block of flats with the name: ‘Ernest Knifton Ltd.’; a car parked outside another with the registration plate: ‘SLX 956’; a street sign reading ‘Westmoreland Terrace’; and letters over the entrances to two other buildings with the words: ‘1-24 Edmund Street’ and ‘Witl-’. In working between *New Architecture of London* as well as web searches for the various clues, I have managed to track down most of the structures – it turns out that the majority we now

regard as modernist icons, such as: The Elmington Estate (1957), LCC Architect's Dept., now largely demolished; The Hallfield Estate (1952-1955), Tecton, Drake and Lasdun for Paddington Borough Council; The Alton East Estate (1952-1955) and The Alton West Estate (1955-1959), designed by the LCC Architect's Dept.; and Churchill Gardens (1950-1962) designed by Powell and Moya for Westminster City Council.

At the same time I have been searching for a new flat of my own in London to live in. So I took the opportunity to view these buildings via a property or real estate website called primelocation.com. The search revealed their 'value' in economic terms, as property, as commodities. From an estate agent's perspective, these flats are described as ideal investments, not as places where the purchaser might choose to live, but rather as buy-to-let opportunities, to be rented out to students and others. The images of fully occupied domestic settings on the property website provides an interesting counterbalance to the just completed exteriors of the same buildings photographed from the outside, positioning the architecture as a commodity to be purchased by individuals as well as (or instead of?) social entities to be lived in by communities.

Searching for modernist icons through primelocation.com has been a stark reminder of what has happened to the socialist ideals of modernism. Some of the modern movement's public housing projects have become oases of cool property in the London postcodes associated with the rich, well maintained, sometimes privatized and provided with concierge schemes. For others in areas of regeneration, the somewhat grimy conditions of their rather neglected public spaces – lifts, stairways and facades – are overlooked by purchasers keen to be part of the lifestyles offered by certain parts of London in terms of cultural caché. Those outside the pockets of existing wealth and the aspiring regeneration zones have been allowed to decline materially, often not included in the large scale council repair and maintenance cycles and often located in so-called 'sink estates', housing the poorest families in London. Some have been demolished either because the years of neglect have led to conditions of terminal dereliction, or because the original construction is viewed to be too expensive to overhaul. But the seemingly pragmatic solution offered by viewing the problems through economic concerns, is perhaps better understood as a symptom. Modern architecture is often seen as intimately tied to social deprivation and this has forced the designers of certain regeneration schemes to adopt a new architectural language: one which is not so obviously 'modern' and is therefore capable of suggesting optimism, community and better standards of living in a different way.

But what of the person who lived in Moss Green and once owned the photographs of these modern buildings? Was he or she an architect, and if so did they play a role in designing the buildings in the photographs? How did they compare these schemes for urban mass housing with their own rural bungalow. If the delicate beauty of Moss Green points outwards to a whole network of modernist icons, how should one compare these two modernisms – the earlier vernacular craft-based phase of the Arts and Crafts with the later phase of industrialisation and standardization?

From Tacita Dean's work critiquing the heroism of the modernism by pointing to the failure of certain technological schemes, such as *Delft Hydraulics* (1996) or here *Sound Mirrors* (1999), to Rut Blees Luxemburg's glowing photographs of north London's highrise flats, entitled *Caliban Towers I and II*, from *London – A Modern Project* (1997), which title modernist architecture as a monster, there has been a recent fascination with the so-called failure of the modern project. In some cases, this takes the form of a wistful melancholy for modernism's passing, at other times a more gleeful delight at the collapse of a social dream, that some see as too forceful and others as ridiculously idealistic. For a short period in 1998, as part of a public art project, 'Wide', curated by art-architecture collaborative muf, 'Caliban Towers I and II' was installed under a railway bridge on the corner of Old Street and Shoreditch High Street in east London, a mile or so down the road from the very housing projects depicted in the image. Along with the commercial billboards, pigeon dirt and rough graffiti, the insertion of fine art photography into a grubby bit of Hackney could be understood as an indication of the future of the area. Within a few months, the photograph was removed, but for a short while in 1998 a fragment of the democratic socialism of the modernist high-rise dream was juxtaposed with a particular stretch of street undergoing the first stage of gentrification, the kind of urban improvement typical of the postmodern capitalist city, while up the Hackney Road on a sunny Sunday in July, while 'Caliban Towers I and II' were resident in south Hoxton, a block of flats just like them was demolished, dust in nine seconds.

But I'm not so sure modernism has failed, rather I think the aspirations for social community and progress it embodies have been driven out, in England at least, by a Conservative, and then a Labour, government keen to promote an ideology of home-ownership. If everyone is weighed down by a hefty mortgage, the capacity for dissent is drastically reduced, losing a day's pay by striking, might easily mean losing the roof over one's head. There is a lot at stake when the social housing of the modernist project is sold off as 'a good opportunity for investment' on [primelocation.com](http://primelocation.com); it is perhaps not overstating the case to suggest it has created a disaster for the left, not only because the number of homes available to let by the council are reduced for those who need them, but also because those who buy them become part of the propertied class and all that entails.

I know this because I am part of the problem.

In 2005 Alison Marchant made *Field Study 3: Charged Atmospheres*, where she reproduced photographs dating back to the 1970s, thrown away from the National Monuments Records, blown up to life size. The decaying photographs showed neglected interiors, high ceilinged salons from London's Georgian building stock. The work doubled the materiality of decay and the related affects or emotional states associated with neglect and abandonment. The deterioration in *Charged Atmospheres* operates at the level of both signifier and signified – *abandoned* interiors appear in *abandoned* photographs.

The situation of the photographs found at *May Morn* is somewhat different; the material decay of the photographs, as ink and paper documents, is counteracted by the aspiration of the just-completed buildings in the images. In these photographs, the buildings – the signifieds – are new – they look ahead, it is only the photographs themselves – the signifiers – that bear the passage of time. The buildings are well tended to, indeed it might be that what holds them together is their place as the centre of attention in a tour of newly completed social housing projects. It is only the photographs themselves that have been left behind, to weather the rain on the Weald over the years.

Returning to Moss Green, once again, several weekends ago, much of the timberwork had collapsed and was lying in pieces over the grass. I turned one rotten section over to reveal two words painted in fast fragmenting white letters: 'May Morn'. This, I remembered, was the building's name plaque, which had been located at the entrance to the plot, framed by brambles, when we first came across the house.

Morn and mourn are homonyms, one suggests a beginning, the other an ending. Morning begins the day, while mourning – in grieving the loss of something or someone – marks an ending. Due to their deteriorating material states, the Moss Green house, the paper of the photographs, and the painted letters May Morn, all three point towards their own disintegration – or endings, yet the buildings contained within the photographs are shown at the beginning of their life. What does it mean, now, to turn back and examine these icons of modernism at an early moment – a spring time – when hope for a better future was not viewed as a naïvely misjudged optimism.

On a bright spring day – a May Morn – no less, days before a general election, I remain hopeful, facing forward. This is not a time for mourning the failure of the modernist project: such a gesture needs to be

resisted. It is precisely because an aspiration for social change still remains that we are being presented, continuously, with an image of modernism as a project which has collapsed – this is the myth-making of a capitalist ideology.

Writing positively of nostalgia, as a longing for something better, contemporary cultural critic Frederic Jameson has pointed out, with reference to the earlier work of Walter Benjamin on allegory and ruin, that looking back to a past because it appears to be better than the problems of the present is not necessarily regressive, especially if it can be used to change the future. He writes: ‘But if nostalgia as a political motivation is most frequently associated with Fascism, there is no reason why a nostalgia conscious of itself, a lucid and remorseless dissatisfaction with the present on the grounds of some remembered plenitude, cannot furnish as adequate a revolutionary stimulus as any other ....’ [xiii]

Epilogue: I May Mourn

I delivered the first version of this essay on 12 May 2010, a May morn six days after a general election, after I had voted Liberal for the first time in my life, so disgusted was I with New Labour’s lies over the Iraq War, and with the transfer of public funds into the hands of the banking élite, a morn the coalition between the Liberals and Tories was formed, a morn on which I discovered I had helped to deliver the country a Tory government.

A bright PhD student, Justin Hunt, approached me after my talk and asked: ‘Did you know there are two homonyms in the title of your talk not one.’ I looked back blankly. ‘May the month and may the verb’, he explained. And then added, ‘You seem to be asking for a right to mourn’.

It turns out May is a homograph not a homonym; May is a month of the year, but may is also a modal verb – one which expresses possibility.

I may mourn.

So post election and post New Labour’s ambivalence towards the public sphere, the advent of the new Liberal Conservative agenda suggests there will be no longer by any kind of question mark concerning the public sector – drastic cuts are being made. Yesterday, we heard that there is to be a two-year wage freeze for all those earning over £21,000 working in the public sector. ‘Twenty colleges and universities are currently in dispute with UCU [University and College Union] over compulsory redundancies’, and

this is just the beginning, the autumn budget promises a lot worse.[xiv] In such a political climate this essay and its sense of hope starts to feel rather inappropriate as an emotion for these dark times – a nostalgia for modernist housing is a turning back to an idealised time, in order to seek inspiration for a better future, but this turning back now takes place not so much with romantic regret but rather with a deep anger as I watch the start of the slow demolition of the public sector – potentially the end of that post war modern project of which these housing schemes are a key part.

#### May Mourn (Reprieve)

A spacious one bedroom flat situated on the eight floor, commanding marvellous views of communal gardens and the city beyond. The property is located in a Grade II listed ex-local authority block with two newly installed lifts giving easy access to the shopping, restaurants and transport facilities of Bayswater (Circle & District lines) and Queensway (Central line), plus overground routes of Paddington. Magnificent Kensington Gardens are also close by.

This property comprises of two double bedrooms and offers spacious living accommodation. The property is situated on the third floor and is in very good condition. The flat would be ideal for a first time buyer or a rental investment. It also benefits from being close to Roehampton university and local amenities.

A well-presented, bright one bedroom flat on the sixth floor of this Grade II listed modern block of flats, serviced by two lifts. This ex-council flat benefits from spacious rooms and communal gardens. The property is offered in good decorative order throughout further benefiting from being chain free.

A practical three bedroom flat split over two levels on the upper level of this small block in Churchill Gardens. The property requires updating but gives potential buyers the chance to put their own stamp on the property.

An unmodernised two bedroom flat set on the first floor (lift) of this block on the superbly located Hallfield Estate (Westminster Council) in Bayswater.

Occupying approximately 68 sq.m, once refurbished would make an excellent Central London home or long term rental investment.

Another great located flat for sale. The property offers a well proportioned one bed roomed flat located on the eight floor with great views (don't worry about the mortgage, most high street banks will lend due to its excellent location).

## Biography

Jane Rendell BA (Hons), Dip Arch, MSc, PhD, is Professor of Architecture and Art and Vice Dean of Research at the Bartlett, UCL. An architectural designer and historian, art critic and writer, her work has explored various interdisciplinary intersections: feminist theory and architectural history, fine art and architectural design, autobiographical writing and criticism. She is author of *Site-Writing: The Architecture of Art Criticism* (2009), *Art and Architecture*, (2006), *The Pursuit of Pleasure*, (2002) and co-editor of *Pattern* (2007), *Critical Architecture* (2007), *Spatial Imagination*, (2005), *The Unknown City*, (2001), *Intersections*, (2000), *Gender Space Architecture*, (1999), *Strangely Familiar*, (1995). She is on the Editorial Board for *ARQ* (Architectural Research Quarterly) and the *Journal of Visual Culture in Britain*, a member of the AHRC Peer Review College (2004–2008) and chair of the RIBA President's Awards for Research (2005—). In 2006 she was a research fellow at CRASSH (Centre for Research in Arts, Social Sciences and Humanities) at the University of Cambridge and received an honorary degree from the University College of the Creative Arts.

## Notes

[i] 'Architectural Research and Disciplinarity', *ARQ* (2004) v. 8, n. 4, pp. 141–7.

[ii] Michel Serres, 'Winged Messengers', in *Angels: A Modern Myth* (Paris: Flammarion, 1995), pp. 139–49, p. 140.

[iii] See Jane Rendell, *Art and Architecture: A Place Between* (London: I. B. Tauris, 2006).

[iv] Howard Caygill, *Walter Benjamin: The Colour of Experience*, London: Routledge, 1998, p. 34 and pp. 64 and 79.

[v] See Jane Flax, *Thinking Fragments: Psychoanalysis, Feminism and Postmodernism in the Contemporary West*, Berkeley, Los Angeles: University of California Press, 1991, p. 232; Donna Haraway. 'Situated Knowledges: the Science Question in Feminism and the Privilege of Partial Knowledge', *Feminist Studies*, v. 14, n. 3, (Fall 1988), pp. 575-603, especially, pp. 583-8 and Elspeth Probyn, 'Travels in the Postmodern: Making Sense of the Local' in Linda Nicholson ed., *Feminism/Postmodernism*, London: Routledge, 1990, pp. 176-89, p. 178. See also Rosi Braidotti, *Nomadic Subjects*, New York: Columbia University Press, 1994 and bell hooks, *Yearnings: Race, Gender, and Cultural Politics*, London: Turnaround Press, 1989.

[vi] Caygill, *Walter Benjamin*, p. 64.

[vii] Mary Jacobus, *Psychoanalysis and the Scene of Reading* (Oxford: Oxford University Press, 1999) p. 18. This is a point also made in a slightly different way by Shoshana Felman when she argues that the relation between psychoanalysis and literature is one of 'interimplication'. Felman argues that the term 'application' locates one

field exterior to the other, and suggests instead that the analyst is already inside the text. See Shoshana Felman, 'On Reading Poetry: Reflections on the Limits and Possibilities of Psychoanalytic Approaches', Joseph H. Smith (ed.) *The Literary Freud: Mechanisms of Defense and the Poetic Will* (New Haven: Yale University Press, 1980) pp. 119–148, p. 145.

[viii] Robert Smithson, "'Earth" (1969) symposium at White Museum, Cornell University', in Jack Flam (ed.) *Robert Smithson: The Collected Writings* (Los Angeles: University of California Press, 1996) p. 178.

[ix] Robert Smithson quoted in Suzaan Boettger, *Earthworks: Art and the Landscape of the Sixties* (Los Angeles: University of California Press, 2002) p. 67.

[x] This essay was commissioned by Jules Wright of the Wapping Project, London and originally published as Jane Rendell, 'Longing for the Lightness of Spring', *Elina Brotherus* (London: The Wapping Project, 2001) pp. 19–26. This essay is part of my larger project of site-writing, initiated as a pedagogic tool at the Bartlett School of Architecture, UCL, from 2001, and as a mode of spatializing writing first in Jane Rendell, 'Doing it, (Un)Doing it, (Over)Doing it Yourself: Rhetorics of Architectural Abuse', Jonathan Hill (ed.) *Occupying Architecture* (London: Routledge, 1998), pp. 229–46, and then developed through a whole series of essays and works, brought together in Jane Rendell, *Site-Writing: The Architecture of Art Criticism* (London: IB Tauris, 2010).

[xi] Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences*, [1966], (translated from the French), London: Routledge, 1992. Originally published in French under the title *Les Mots et Les Choses* by Editions Gallimard. This translation first published in Great Britain in 1970 by Tavistock Publications Limited.

[xii] Sam Lambert (ed), *New Architecture of London: A Selection of Buildings since 1930* (The British Travel and Holidays Association in collaboration with the Architectural Association, 1963).

[xiii] See Fredric Jameson, *Marxism and Form: Twentieth-Century Dialectical Theories of Literature* (Princeton: Princeton University Press, 1971) p. 82.

[xiv] Email correspondence from Sally Hunt, 'An update for members from Sally Hunt, UCU general secretary', 26 May 2010.

## WALKING TOURS

- **Judiciary Square/Gallery Place/National Building Museum Tour**

**(26 June 2010; 1:00 pm - 3:00 pm)**

The name Judiciary Square refers to a multi-block area spanning from the D to G streets and from 4th to 5th streets, NW. The National Building Museum (NBM) is the home of the world's most visited museums of architecture and engineering. The main interior space is known as the Great Hall and is larger than a football field and soars to 159 feet at its highest point. The NBM offers educational programs, special events, and occasional exhibitions.

- **Monuments (West Side of National Mall) Tour**

**(26 June 2010; 1:00 pm - 3:00 pm)**

Tour may include: the Einstein Statue; Vietnam Veterans Memorial; Lincoln Memorial Mall, The Korean War Veterans Memorial, District of Columbia World War Memorial, Reflecting Pool, World War II Memorial, Capitol Gate Houses, Organization of American States, National Society Daughters of the American Revolution, American Red Cross, Corcoran Gallery of Art, Dwight D. Eisenhower (Old Executive Office Building)

- **U Street Corridor Tour**

**(26 June 2010; 1:00 pm - 3:00 pm)**

Visitors to Washington, DC can't help but make a "U" turn down this historic city street near Howard University. Residential, business, and cultural structures are points of interest. Sites may include the Lincoln Theater and the African American Civil War Memorial



National Building Museum

*Photo © Maxwell MacKenzie*



## PECHA KUCHA SESSION PROCEEDINGS

Pecha Kucha (usually pronounced in three syllables as "pe-chak-cha") is the onomatopoeic Japanese word for the sound of conversation. Pecha Kucha Night was devised in 2003 by Astrid Klein and Mark Dytham of Tokyo's Klein-Dytham Architecture (KDa), as a way to attract people to Super Deluxe, their experimental event space in Roppongi. Pecha Kucha Night events consist of around a dozen presentations, each presenter having 20 slides, each shown for 20 seconds. Each presenter has just 6 minutes 40 seconds to explain their ideas before the next presenter takes the stage. Conceived as a venue through which young designers could meet, show their work, exchange ideas, and network, the format keeps presentations concise, fast-paced and entertaining. (source: [http://en.wikipedia.org/wiki/Pecha\\_Kucha](http://en.wikipedia.org/wiki/Pecha_Kucha))

### **PECHA KUCHA PARTICIPANTS**

John Comazzi (University of Minnesota)

Helle Brabrand (The Royal Danish Academy of Fine Arts)

May al-Ibrashy (The British University in Egypt)

George Intsiful (Kwame Nkrumah University of Science and Technology)

Meike Rehder (The Royal Danish Academy of Fine Arts)

Nubras Samayeen (Howard University)

Adalberto Del Bo (Politecnico di Milano)

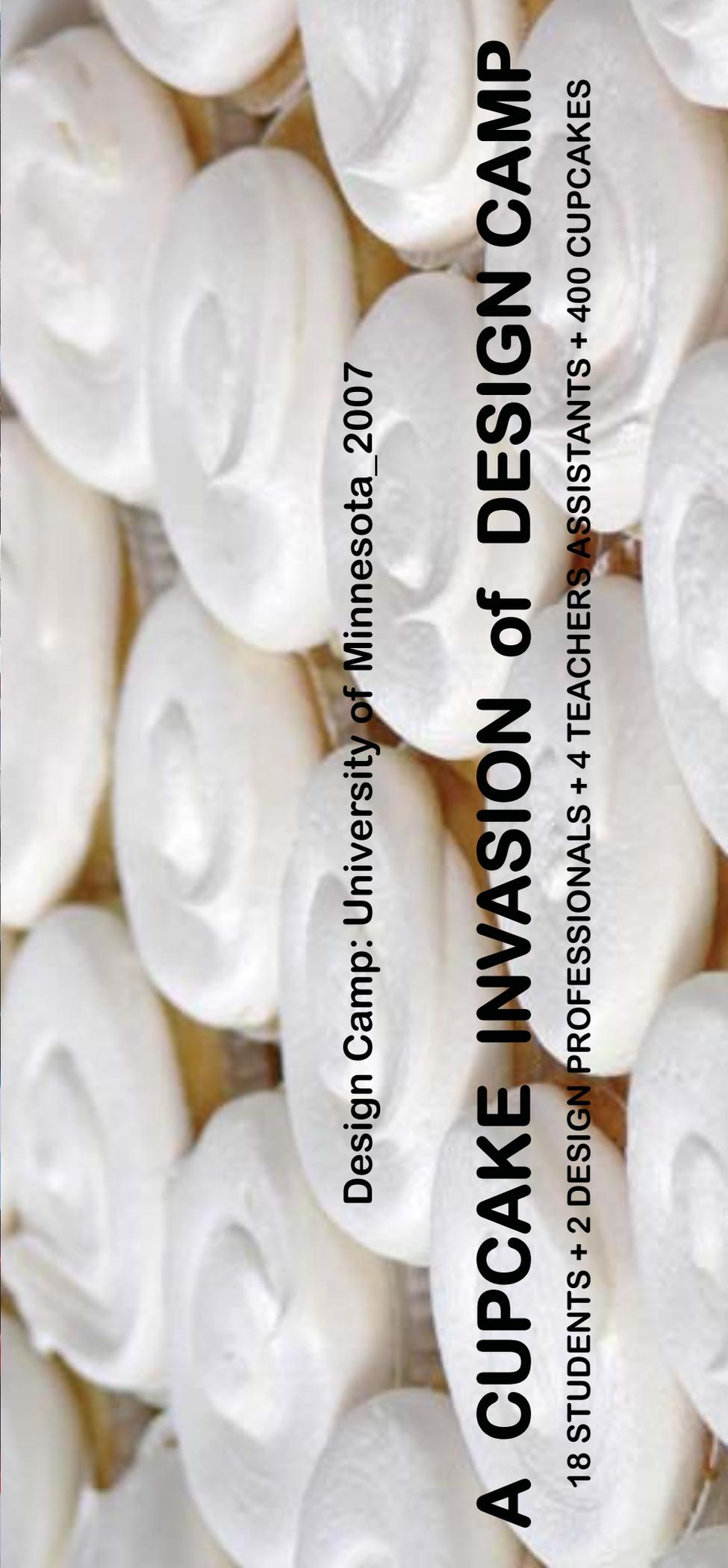
**John Comazzi**  
University of Minnesota



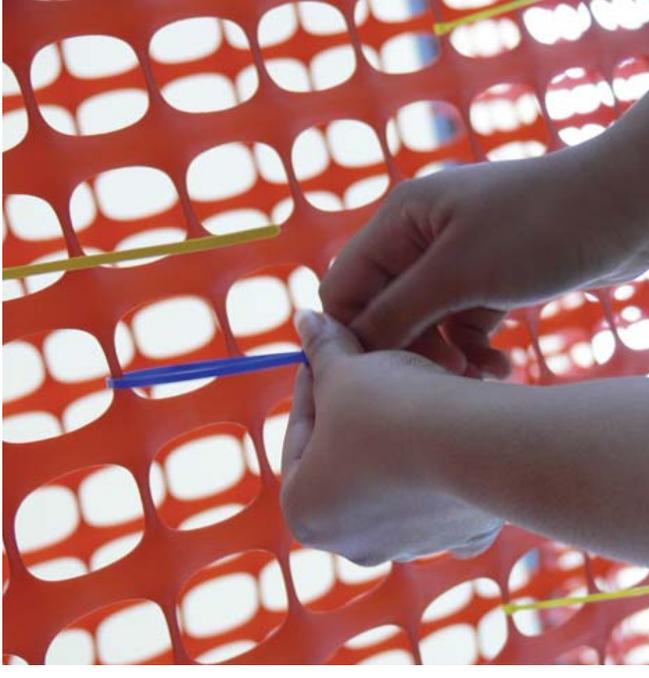
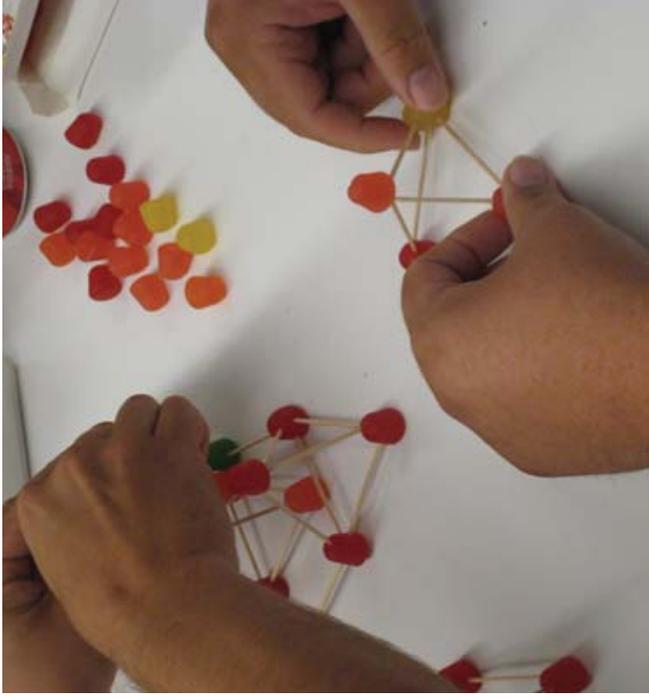
Design Camp: University of Minnesota\_2007

# A CUPCAKE INVASION of DESIGN CAMP

18 STUDENTS + 2 DESIGN PROFESSIONALS + 4 TEACHERS ASSISTANTS + 400 CUPCAKES



## 6. Get Lost in the Content



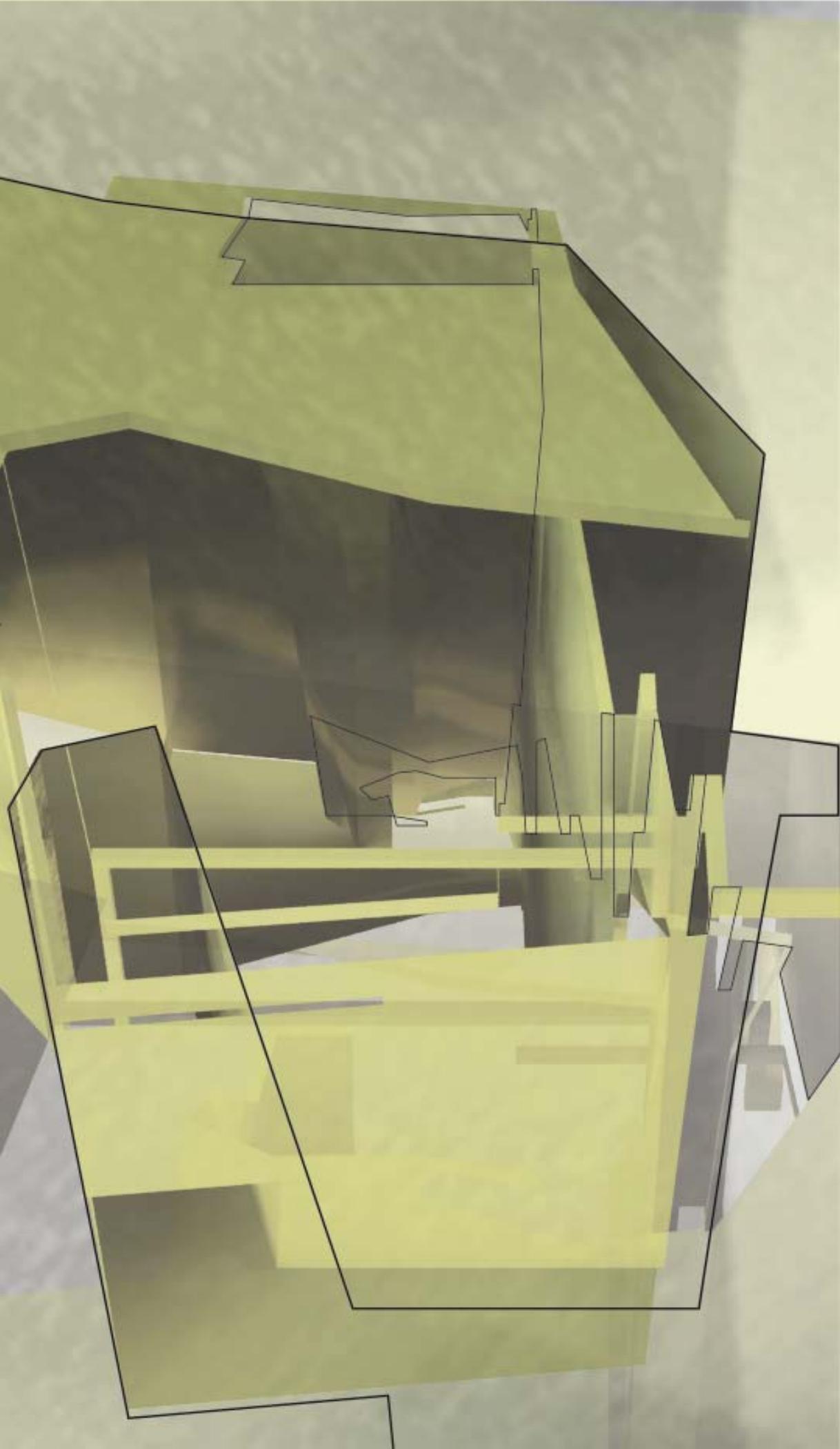
# Helle Brabrand

## The Royal Danish Academy of Fine Arts

# MIXED MOVEMENTS PERFORMANCE-BASED DRAWING

Helle Brabrand  
Artistic Development Work

The Royal Danish Academy of Fine Arts, School of Architecture  
Copenhagen



# May al-Ibrashy

## The British University in Egypt



# The Monumental vs. the Imaginary

The construction of the locale in the historic cemeteries of Cairo.

May al-Ibrashy  
Washington2010

مدافن جمعية ابناء  
ملك خاقان منوفية

الجمعية الخيرية  
لابناء مشيرف  
منوفية

الملك الخاقان منوفية

مدافن  
اطباء ارباب ماري

الجمعية الخيرية  
لابناء ملك مشيرف  
منوفية

الى مقابر قويسنا

الجمعية الخيرية  
لابناء ملك مشيرف  
منوفية

مدافن ابناء مشيرف  
منوفية

بسم الامام احمد الرضوي  
جمعية القطن في مصر المسماة بجماعة  
5 جارة روض النور الناصري  
الى مدفن جمعية القطن في مصر المسماة

الجمعية الخيرية  
لابناء ملك مشيرف  
منوفية

مقابر ماري  
بالقاهرة  
تحت رقم 674

الى مقابر  
الاولاد منوفية

مدافن جمع النجار  
سهوج

الى مدفن  
الحاج علي محمد عيسى

الى مقابر قويسنا

مدافن  
عائلة الحاج  
محمد عيسى النوراني



**George Intsiful**  
**Kwame Nkrumah University of Science and  
Technology (KNUST)**



UNIVERSITY OF CAPE COAST – NEW ADMINISTRATION BUILDING UNDER CONSTRUCTION.

**Meike Rehder**

**The Royal Danish Academy of Fine Arts**



# EXTERIOR SPACES AT THE NEW HARBOR FRONTS

Meike Rehder, architect maa, Ph.D.-student

Centre for Public Space Research / The Royal Danish Academy of Fine Arts School of Architecture, Copenhagen, Denmark

View into the open  
looking from  
somewhere

not me in an open space  
but me in a space  
somewhere here

something is holding me

**here**

this grey wall  
the rough surface  
the soft wood  
here

looking out there not lost out there somewhere but out there

hold onto here

I stay **inside** myself  
taking the outside inside

**Nubras Samayeen**  
**Howard University**

# Mega Cellular CITY



banglalink desh... বিএফএফ

০.৭৯

০.৫৯

GMG

Malaysia Trade Centre

CM International Immigration Service

FIRST CLASS HOMES IN ALL THE WAY

International

TOILET

RESTING

BSB

Global Network

পেশ-বিদেশে ভ্রমণ

ASLAM LIGHTING

আসলাম লাইটিং

WESTAR OPTIC

Baba

WESTAR OPTIC

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LIGHTING WORLD

TACHI LIGHTING

BEING HUNG

LIGHTING WORLD

Premier Bank

mukti art

PH.9558753

Mo.01712140404

Construction Machinery

Marine Engines

Water Pumps

Oil Engines

Dhaka: 8888123

LIGHTING WORLD

LIGHTING WORLD

Iec Advantage

LIGHTING WORLD

LIGHTING WORLD



# An International Call for Papers

## ARCC/EAAE 2010 International Conference on Architectural Research

23 - 26 June 2010  
Washington DC USA

### THE PLACE OF RESEARCH THE RESEARCH OF PLACE

Abstracts due: 15 October 2009

#### INTRODUCTION

The Architectural Research Centers Consortium (ARCC) and the European Association for Architectural Education (EAAE) are holding their joint 2010 Architectural Research Conference next summer in Washington DC USA. The conference is to serve as a forum for the dissemination and discussion of architectural research issues, concerns, findings, approaches, philosophies, and potentials. The Consortium welcomes researchers, educators, practitioners and scholars in architecture, landscape architecture, and planning to become involved. The final session themes of the conference will be formed to reflect the diversity of the presenters' work and investigations.

#### THEME

The growing interest in performance-based architecture energizes our discipline to engage in rigorous research. What is the place of research in the discipline of architecture? Where does research enter into the practice and pedagogy of architecture? How do architecture schools teach research methods and engage students in meaningful investigations? How do practices conduct research and apply findings in the design process? How does society recognize the importance of research in architecture? What funding sources exist for architectural research? What is the place of pure research? ... applied research?

Multiple questions emerge in our diverse field. A focus on seven modes of research begins to reveal the scope of the discipline. Environmental Research investigates the physical context of architecture, opening timely questions about the influence of society on environment. Cultural Research studies place-making and the norms of the inhabitants of natural and built places past, present, and future. Social Research examines the people who inhabit and use the spaces of architecture. Technological Research studies the physical materials, methods, elements, systems, and science of architecture and the design and construction processes. Design Research considers the processes of shaping and making of places. Organizational Research examines the ways in which individuals and teams collaborate in the practice of architecture and in the client organizations. Educational Research examines the pedagogies of architecture and related fields. Unifying our discipline is the underlying concern with the research of place. The mission of this international research conference is to consider significant and rigorous investigations that will engage participants in dialogue about the place of research and the research of place in the disciplines of architecture, landscape architecture, and related fields.

The District of Columbia, capital of the United States and home to a vibrant international diplomatic community, is the venue for the upcoming joint ARCC/EAAE 2010 International Conference on Architectural Research. The Conference will capitalize on its location close to US government agencies and the embassies of the world in its consideration of

the public nature and global context of research. The host institutions include Howard University, the American Institute of Architects, The Catholic University and the University of Maryland.

The ARCC and EAAE call for papers that reveal new and ongoing research that addresses questions of the place of research and the research of place. We welcome submissions that cover a wide range of research initiatives in the seven broad categories of Environmental Research, Cultural Research, Social Research, Technological Research, Design Research, Organizational Research, and Educational Research

#### **Conference Organizing Committee**

Victor Dzidzienyo, Chair, Howard University  
Richard Hayes, American Institute of Architects, Washington DC  
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#### **CONFERENCE VENUE & ACCOMMODATIONS**

Howard University, and the American Institute of Architects are serving as the principal host institutions with The Catholic University and the University of Maryland serving as co-hosts for this conference. More specific information regarding the conference venue, accommodations, and registration costs will be forthcoming.

#### **ABSTRACT/PAPER SUBMISSION INFORMATION**

- The paper review for this conference will be conducted in two stages. The first stage of the review will involve a blind peer review of the brief abstract. Successful review at this stage will result in an invitation to submit a full paper for peer review.
- Submit a 500-word (maximum) abstract to be received no later than midnight (EST) **15 October 2009**. Images (two maximum, 72 dpi) may be included as part of the abstract if they enhance the text and are an integral element of the abstract. Abstracts should be well written, clearly organized and compelling. All abstracts must be submitted in electronic form. The abstract shall be submitted for blind peer review, with identification of the author/s and contact information on a separate cover page. Abstracts and papers must be in English.
- Results of the first stage selection process will be conveyed at all submitters by **19 November 2009**.
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- **Final papers** should not exceed 5,000 words and must be submitted for peer review in digital form by **10 February 2010**, formatting and more specific details will be issued in the future. Notification of paper acceptance with reviewer's comments and concerns will be conveyed to all submitters by **21 March 2010**.

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A digital and hard copy version of the proceedings will be developed after the conference.

Direct all questions to "arceaae@temple.edu"

## PRESENTATION SESSIONS | **SOCIAL / CULTURAL**

Session One

Moderator: Michel A. Mounayar, RA



# People's Impressions of a Tourist-Historic District

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## Abstract

The combination of tourism industry and historic district is a complicated phenomenon. Many built heritage, particularly in developing countries, are found in the middle of living communities. Uncontrolled development of residential settlements in historic districts can destroy a city's heritage assets and its tourist potential, while turning historic precincts into 'urban museums' can destroy a city's living social fabric. So, for these countries, this kind of situation often fundamentally becomes one of the problems of development. However, historic area, as a tourist destination and people's settlement, should evoke a sense of delight and pleasure for residents as well as visitors. From a practical standpoint, knowledge gained from visitor impressions can assist local bodies involved in management of these sites to convey a favorable impression to visitors. Meanwhile an understanding of resident impressions is important to provide a good living environment for the local community that is also conducive to tourism. This paper addresses these issues. It will assist environmental designers and policy makers to develop historic districts that are beneficial for local people as well as for tourists.

Kampong Taman Sari, Yogyakarta, Indonesia that faces those problems was considered as appropriate to be selected as a case study site. The case study was done as preparatory to the main body of the research. The study purposed to identify salient dimensions of people's impressions of historic districts.

This research used a multiple-method survey research design, included participant photography and survey questionnaire involving the semantic differential method.

A total of 306 people rated nine consensus photographs, which were gained from the participant photography. Factor analysis was employed to answer the research questions.

## Introduction

An increased concern for local identity has influence a historical change from modernism to postmodernism in urban design and planning ((Tiesdell, Oc & Heath, 1996). While modernist planning tended towards the universal, postmodernism and contemporary urban design and planning draws more upon the sense of place, the significance of the local and particular (Robins, 1991).

A notion of 'the past' as an important element of local identification has been referred to by many authors (e.g. Harvey, 2000; Herbert, 1995; Hewison, 1987; Lowenthal, 1985). Since built heritage has a potential for enabling people to make 'a journey to the past', historic sites usually attract many tourists. With such economic potential, historic sites linked to urban policies as a product to generate tourist activities is a worthwhile contribution to urban economic development.

These situations raise the notion of urban redevelopment of the sites in order to attract visitors, both domestic and international. Unfortunately, in developing countries, where the majority of people living in these areas are middle to low income people due to a tendency for historic complexes being surrounded by dense residential settlements (kampong), urban redevelopment of the areas leads to the possibility of community relocation. Relocating people to other places may destroy the living social fabric of the local community.

An historic district, without a doubt, if it is to be successful as a tourism site, requires great care in planning, development and management. In the conservation and development process, not only historic environments need to be safeguarded, but also the communities that inhabit them (Orbasli, 2000).

In response to this, questions now arise in tourism literature about how to achieve a balance between the expectations of tourists in respect of the totality of the tourist experience and those of the community (Trotter, 2001). A review of the literature also reveals that historic conservation may become a pressure on the local community, especially if it is treated as a product of tourism. Local people, who live in an historic area, interact with these structures directly in their everyday lives. Therefore, there is a need to understand the interdependencies that exist between the community and the historic structure. Such understanding will point to the possibility of using the positive efforts of local people as an

integral part of the 'historic locus', to contribute vitality to the site and thereby assist in the maintenance of an atmosphere conducive to tourism (Ashworth & Turnbridge, 1990; Schulz, 1980).

Therefore, local people as well as tourists play important roles in the development and maintenance of historic remains. Urban management of the historic environment should be based on a thorough understanding of the place and the evaluation of the local people (Orbasli, 2000). The perceived quality of tourist-historic districts depends on the evaluation of the tourists and host community.

However, this has not been a focus of previous studies. Although some researchers have looked at the host community to have a more balanced study, most of them deal with the tourism impact on those communities. The importance of the local people's points of view as a valuable resource in the process of planning and management of urban historic districts is still neglected.

The aim of this research was, therefore, to identify factors that underlie people's impressions of tourist-historic districts and to examine the visual quality of the district. It is assumed that an understanding of people's impressions is important to maintain a quality living environment for the local community while knowledge gained from tourist impressions can assist management of these sites to convey a favorable impression to visitors.

### **A Tourist-Historic District: Kampong Taman Sari, Yogyakarta, Indonesia**

Every city consists of a series of parts such as districts. These parts of a city have different attributes and dominant characteristics that make them able to be distinguished from each other (Spreiregen, 1965). These districts vary considerably in their strength of character. One of these kinds of districts is the urban historic environment. Such districts have historical value and meaning that may be able to communicate to people something about the history of the city. Architects, urban planners and designers can recognize those qualities to improve appearance and urban quality of cities.

The phenomenon in which the cultural, historical and ethnic components of a society or place are harnessed as resources to attract tourist, as well as to develop a

leisure and tourism industry is defined as heritage tourism (Hewison, 1987). It is identified, in industry terms, as a subset of cultural tourism (Trotter, 2001). One main form of heritage tourism is historical tourism, which maintains historically accurate places and objects as evidence of cultural, social and historical characteristics of a place or its people, such as historic precincts and sites. Historic district as a tourism object is known as tourist-historic districts.

The term "historic district" employed here, therefore, is understood to be a cluster of historical buildings where not only the individual units themselves but also their concentrated continuity as heritage (Naoi et al., 2006). It focuses on areas which retain their historic integrity and cohesion as districts, rather than being determined by size. This kind of historic districts could be regarded as the object of the collective gaze, in which the presence of other people is necessary to give atmosphere to the experience of a place (Naoi et al., 2006).

The aim of urban design, particularly for historic environments, should be to create experiential and enjoyable places for the public. As nowadays historic sites and historic precincts are becoming increasingly popular as tourist destinations (Trotter, 2001), these places have become a product that can be marketed, sold and re-created (Orbasli, 2000). They are seen as assets, readily transformed into products that are sold to consumers seeking an "experience". Therefore, knowing about user reactions to the quality of this historic built environment allows the planning and design of responsive environments. By shaping the physical and spatial form of these tourist-historic environments, urban design, in turn, affects the experience of many observers.

Kampong Taman Sari, Yogyakarta, Indonesia is a prime example of a tourist-historic district that faces the problem of development. Yogyakarta is a well-known tourist destination city that is located in the centre of the Island of Java, the most densely populated island in Indonesia. It is one of the most densely populated cities in the world (Dahles, 2001). Many people live in high density, unplanned housing areas that are called "*kampong*" (Devas, 1981). On the other hand, Yogyakarta was the centre of the Mataram Kingdom. The first king, Sultan Hamengku Buwono I, began the building of Kraton Yogyakarta, the Yogyakarta Palace, which was to occupy the extensive 140 hectare site (Kedaulatan Rakyat, 1996),

in 1756 (Brongtodingrat, 1978) and completed it in 1757 (Dahles, 2001). The Kraton was surrounded by walls of around 1-1.3 kilometers in length on each side, which were in turn protected by a moat (Brongtodingrat, 1978). In the inner city of Yogyakarta, the Kraton area is the most important tourist attraction (Dahles, 2001).

Taman Sari is a group of buildings that occupy 12.66 hectares of land in the inner southwest part of the old walled city. It originally consisted of 57 buildings and 18 fruit and flower gardens with water as the dominant feature, such as a large artificial lake, a series of sunken bathing pools and a network of underground and underwater passageways. It was built in 1758, two years after the construction of the Kraton was commenced. The area was originally designed not only as a pleasure garden and rest houses of the Sultan of Yogyakarta's family but as a defensive complex as well (Dahles, 2001). Taman Sari continued to function as The Royal Pleasure Garden until 1867, when an earthquake caused the draining of the artificial lake and damaged its buildings and infrastructure.

There are 20 major buildings or portions of buildings of architectural and archaeological interest still existing. These remnants still carry with them a sense of the luxury and romance of the original Taman Sari. However, the historic precinct is now occupied by a very dense *kampong*. Historical buildings and people's houses are juxtaposed and there is almost no space between the buildings. Thus old and new are quite literally united.

## **Studies of People's Impressions**

The study of people's impressions of particular environments such as historic districts is based on the assumption that we can better understand people's actions and desires with regard to the environment if we know how they conceive of it. The environment, in essence, is what people think it is, and how citizens or users and decision makers respond to it and deal with it as they conceive it to be (Moore & Golledge, 1976).

Many theorists have also pointed out that what we do in the world is related to how we perceive and how we think about the world (Proshansky, Ittelson & Rivlin, 1976). The environment is experienced the way it is because one chooses to think of it that way (Ittelson, 1973). Urban planners and designers are concerned with

'manner in which the products of their efforts are perceived by the public' (Ittelson, 1973, p. 162) since perceived environment has critical influences on people's choice and behavior.

The study of environmental impressions is part of the study of environmental cognition. As Moore & Golledge (1976) noted, '*Environmental cognition* is the study of the subjective information, images, impressions, and beliefs that people have of the environment, the ways in which these conceptions arise from experience, and the ways in which they affect subsequent behavior with respect to the environment' (p. 3). In this regard, what people know and understand about their surroundings influences their impressions of the physical environment (Gärling & Evans, 1991).

The physical environment provides information to observers through the various sensory modalities (Altman & Chamer, 1980), especially vision, which accounts for more than 80% of sensory input (Porteous, 1996). The visual aspect of historic districts is therefore of importance to the management of these places. People's impressions of these environments are primarily influenced by the look of the surroundings. Berlyne (1971) has demonstrated that the visual character of stimuli influences behavior such as attention, looking time, or forced choice. Urban design in these particular areas should therefore attempt to maintain and control the visual character for the public good (Nasar, 1994).

Environmental impression results from the interaction between observers, i.e. tourists and local people, and their environment, the historic districts. An historic district has many attributes. Part of this environmental character, according to Nasar (1998), engages the attention of immediate users, visitors and locals, who evaluate the environment based on both internal and external factors. This indicated impressions may be influenced by the experiences and backgrounds of the people (Altman & chemers, 1980; Nasar, 1988, 1994). This means a tourist-historic district may mean different things to different people who view it, experience it, or use it. However, there may be communality in people impressions.

## Method

### *Respondents*

Two hundred and six tourists, consisted of 100 international and 106 domestic tourists, participated on the research. They were selected randomly. The researcher went to the gates to the district at a variety of random times. At the time of each visit the first person of each group of international or domestic tourists in view was invited to be a participant.

One hundred and two local people participated on the research. They were selected randomly based on the map of the Taman Sari complex. When the interviewer approaching the house, the first adult resident found by the interviewer was chosen as the participant.

### *Stimuli*

To select pictures as stimuli that was meaningful to participants rather than meaningful to the researcher, a participant photography method (see Chenoweth, 1984; Hull & Revell, 1989) was employed. Sixty people, consisted of tourists and local people, were given inexpensive cameras and asked to photograph the most “impressive” scenes to them in the area. The consensus scenes taken by at least 10% of the participants of each group were then re-photographed by the researcher using a high-quality camera and were used as stimuli.

Nine stimuli were produced by this process. The nine stimuli were then divided into two questionnaires, which each questionnaire contained the three most preferred scenes plus three of the remaining six photos. This arrangement was based on the pilot study, which found that six pictures was the most reasonable number of stimuli that met respondent’s time limitation.

### *Instrument*

The semantic differential method was used to measure people’s impressions. Based on the literature and previous research in the field, this study employed a 25-item scale to investigate the underlying dimensions of people’s impressions of the tourist-historic district.

Table 1: “Semantic differential scale items”

Adjective pairs	Source
unattractive-attractive	Franke (1969) and Franke & Bortz (1972); both in German; cited in Krampen (1979)
subdued-colorful	
strange-familiar	
restricted-free space	
ugly-beautiful	
dull-varied	
unpleasant-pleasant	
monotonous-diverse	
interesting-uninteresting	
like-dislike	Nasar (1998)
complex-simple	Stamps (2004); Gifford (2002)
incoherent-coherent	
orderly-chaotic	Hershberger & Cass (1988)
exciting-calming	
disorganized-organized	Kasmar (1988)
impressive-unimpressive	
neat-messy	
ordinary-distinctive	Green (1999) and Kasmar (1988)
desirable-undesirable	
common-unique	Hershberger & Cass (1988)

	and Kasmar (1988)
meaningless-meaningful	Ertel (1964)
forgettable-memorable	Prentice (1993)
disturbing-restful	Invented by the researcher
worthless-valuable	
expected-unexpected	

Using those descriptors, a seven-point bipolar semantic differential scale was used to measure people's impressions of the tourist-historic district. Each item had seven points ranging from one adjective (e.g. very unattractive=1) to its opposite (e.g. very attractive=7) with number four as the neutral point.

### **Procedure**

Each tourist respondent was asked to fill out the questionnaire at the rest area near the exit gate of Taman Sari historic precinct after they completed their visit, while local people respondent participated on the research at their homes. Each participant received an album of six photographs of the Taman Sari historic area along with the semantic-differential questionnaire. Respondents were asked to rate each picture on each of the 25 scale items by circling the number that best described their impressions of each scene.

### **Data Analysis**

Principal factor analysis was applied to the 25 semantic differential items to identify the dimensions underlying tourists' and residents' impressions of the tourist-historic district. After preliminary tests, three variables – strange, complex, and coherent – were dropped from further analysis (see Field, 2009). Factor analysis was then conducted on the remaining 22 variables with oblique rotation (direct Oblimin).

## **Results and Discussions**

Results indicated there are three principle dimensions underlying people's impressions of the tourist-historic district. These are Attractiveness (that consists of nine variables), Organization (that consists of five variables) and Novelty (that consists of eight variables). These three factors explained 87.9% of the total variance.

The reliability test that was conducted on the three factors extracted from the factor analysis yielded a Cronbach's alpha of .89 for Attractiveness, .88 for Organization, and .85 for Novelty. These test indicated that all three factors were internally consistent.

The research found that Attractiveness that consists of the variables interestingness, pleasantness, beauty, attractiveness, variety, diversity, impressiveness, liking, and colorfulness is a major common dimension in people's impressions of this tourist-historic district. This factor seems to be primarily an affective reaction to the Taman Sari complex. Russell et al. (1981) listed adjectives such as beautiful and interesting as descriptors of affective qualities of environments. This finding is also consonant with other research on environmental aesthetics. Pleasant, beautiful and likeable were described as general themes of aesthetic appreciation. Diversity has also been repeatedly found to be an important influence on aesthetic response (Berlyne, 1974; Wohlwill, 1976). From the visitor's viewpoint, tourists feel the need to seek out diversity within a tourist- historic setting that they experience. To the extent that such diversity is absent, an historic complex can lose its fascination for tourists. The qualities of diversity of the scenes do not apply only to the tourists, but also to the local inhabitants. These are evident in the physical design qualities of communities at all levels of scale (Altman & Chemers, 1980).

In sum, the attractive quality of a tourist-historic district epitomizes the overall feelings about how far towards the ideal the place lays. This implies how good or bad the historic precinct is in people's minds. Tourist-historic district should, therefore, aim to generate positive impressions of Attractiveness to provide a good living environment as well as a tourist destination.

Organization that consists of the variables orderly, neat, organized, restful, and free is found as another common dimension of impressions of the tourist-

historic district. This dimension seems concerned with the formal quality of the site. Organizedness or coherence has been found to be one of predictors of environmental preference (Kaplan & Kaplan, 1982). This study shows that people also tend to prefer historic environment that are well organized, orderly, and neat.

Novelty dimension that consists of the variables uniqueness, distinctiveness, unexpectedness, meaningfulness, valuableness, memorability, desirability, and excitingness is also found as a significant factor in people's impressions of an historic district. The power of historic places lays in their value as heritage and their distinctive quality and uniqueness. These qualities make these historic places desirable or undesirable for visitors, while the loss of meaningful environmental features in the district may also lose a community's sense of attachment and continuity (Brown & Perkins, 1992). Fundamentally, what a visitor seeks in an historic site is a quality of difference from that which constitutes everyday life.

Historic places which people evaluates as unique and distinctive can produce strong mental images of a remembered or imagined character. People attach values to those places. These values then manifest themselves in the expression of the historic complex and create a desire to visit or return to it. Memories of local people, who have shared a common past, were triggered by those places. At the same time the historic places can represent shared pasts to visitors who might be interested in knowing about them in the present (Hayden, 1995). This research finding is in line with the heritage literature that stresses the importance of the Novelty quality of historic sites (e.g. Boniface, 1995; Orbasli, 2000; Tiesdell *et al.*, 1996).

Concerning the relationship among those three factors, this study found a high correlation existing between Attractiveness and Organization of the historic district ( $r=.627$ ). Although the historic precinct may have an outstanding aesthetic quality despite its organization, the correlation that exists between these two factors suggests that a better Organization should improve people's impressions of its Attractiveness.

Result also indicated that the Attractiveness and Novelty of the historic site are moderately inter-correlated ( $r = .480$ ). The finding suggests that to be highly attractive in a competitive market, a tourist-historic district should have a strong distinctive quality. As Boniface (1995) suggested,

the ideal in developing an appealing attraction would be to reveal the unique aspect of a place. The Attractiveness dimension, the affective quality attributed to a place, is evident as a key component of the full meaning attributed to that place, the Novelty of the place. In a series of studies on the meaning of large-scale environments, affective quality was repeatedly found to be a salient and important way in which environments are interpreted and compared with one another (Russell & Ward, 1981; Russell *et al.* 1981).

Looking at the relationship between the Organisation and Novelty of the tourist-historic district, the results indicated that although the Organization of the site correlated relatively highly with Attractiveness ( $r = .627$ ), it had relatively low correlation with the Novelty dimension ( $r = .340$ ). This finding suggests that the Novelty of the precinct seems unlikely to be affected by the Organization of the district. This indicates that although some urban tourism destinations in developing countries may not be well-organized, global tourists may still find them unique, distinctive, and desirable. In this sense, the Novelty dimension of impressions was possibly affected by the special meaning that attaches to historic district and the sense of place rather than by the Organization factor.

### **Implications of the Findings for the Development of Tourist-Historic Districts**

The research findings suggest people's impression is a key component in the planning, design and management of an historic district, as a tourist destination as well as a living environment. The findings further suggest that the most dominant factors that evoke impressions are the Attractiveness, Organization and Novelty quality of the historic precinct complex. This stresses the need for environmental planning and design that accommodates these qualities.

The major fault of many comprehensive planning efforts is that they fail to recognize and reflect the special qualities of a place (Garnham, 1985). The research findings indicate the importance of conferring a sense of place as the special qualities of the historic precinct complex. This suggests a need for creative thinking by urban designers to produce a Novelty quality within these

particular settings. This situation further suggests the possibility of creating a “spirit of place”, which according to Harison (1990) has general appeal. The nature of the relationships among the three factors of impressions contributes to an understanding of how to deal with the juxtaposition between historic precinct and urban living environments. In this sense, the idea of relocating local people to other places should be put aside. This is in line with what Orbasli (2000) suggests, ‘city authorities have to work towards enhancing the values of the place and the live-in environment through the resource best available to them, the local community’ (p. 187).

In general, the management and development of urban historic sites should take a highly consideration in managing the visual quality of the environments. The appearance of a tourist-historic district is obviously crucial to the aesthetic experience. Tourist-historic districts appearance must satisfy tourists and local residents who experience it. A good environment provides satisfaction for both groups.

## Future Research Directions

Although this research found three principal dimensions underlying people’s impressions of tourist-historic districts, it did not reveal the specific environmental cues that provide such impressions. Further study is necessary to explore the environmental features of tourist-historic districts from which such impressions emerge.

This study employed only international tourists that speak English as participants. To make wider generalizations from the research findings, It is necessary for future research to employ wider participants.

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## **The Appraisal of Istanbul through the Perspective on the Information City**

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### **Abstract**

In today's world, information has transformed the fundamental facts of the urbanization and architecture disciplines, as it has done in many other disciplines. Since the 19<sup>th</sup> century, information has continuously flowed between spaces and cities owing to the effects of the switch from analog communication to a digital one. As a result of this, the characteristics of today's spaces have changed and information cities in which the information gathers have emerged. These cities have been produced not only with an understanding focused on 'place', 'context', 'human', 'form,' and 'function' but also with the equipments of 'political, economical, and cultural information networks' as well.

Istanbul has been a city affected by the continuity of the flows of people, commodity, money and information throughout history. Since 1980s, the urban and architectural context of Istanbul has been affected by the transformation process which the flow created. This study, prepared by taking some questions into account such as how the city exposes the development of urban space and whether Istanbul is an information city or not, is important in terms of determining the route of the city's future visions. Putting forth the effect of information circulation on the concept of space and discussing the spatial characteristics of information cities have made up an important part of the study. Presenting these conceptual grounds has defined a methodology for evaluation of qualitative and quantitative datas specific to cities and has played a part in understanding the urban and architectural context.

### **Introduction**

Throughout history, the forces on societies have led to the dislocation of stereotyped ideas and have changed them in

the course of time. In today's world, information, as a power continuously growing while changing its environment, has transformed the fundamental facts of the urbanization and architecture disciplines, as it has done in many other disciplines. In the 19<sup>th</sup> century, information was spread and lost its place of origin due to the transformation in the areas of communication and transportation. Since that period, information has continuously flowed and moved between spaces and cities owing to the effects of the switch from analog communication to a digital one. As a result of this, the characteristics of today's spaces have changed and information cities in which the information gathers have emerged.

This study examines the relations that affect the production of space in today's world within a perspective that focuses on the aggregation of information in cities and evaluates the parameters that are peculiar to Istanbul with regard to the definition of 'information city'. In this sense, it is important to understand the aggregation of information in cities in order to interpret the spatial and urban context of Istanbul that has been changing in the last few years. Istanbul, one of the important locations in the network of global flow today, has been a city affected by the continuity of the flows of people, commodity, money and information throughout history. Since 1980s in particular, the urban and architectural context of Istanbul has been affected by the transformation process which the flow created. Istanbul, where transnational capital heads for, is in a situation different from the other cities in Turkey. This study, prepared by taking some questions into account such as what Istanbul means in this process regarding space, how the city exposes the development of urban space and whether Istanbul is an information city or not, is important in terms of determining the route of the city's future visions. Putting forth the effect of information circulation on the concept of space, understanding how the information is processed in the course of spatial production, and discussing the spatial characteristics of information cities have made up an important part of the study. Presenting these conceptual grounds has defined a methodology for evaluation of qualitative and quantitative datas specific to cities and has played a part in understanding the urban and architectural context. Looking through this perspective, appraising the lately changed urban and spatial pattern of Istanbul and comparing it to information cities are the main purpose of this study. On the other hand, comprehending a world in which the flow of information happens at a great speed and intensity is also important as to reveal the historical connections of Istanbul. It is in this sense that the speed and fluidity that the flow of information indicates are avoided being shown as temporary and tricenary values. These concepts are momentarily mentioned in the sense that they refer to the historical values of cities.

Owing to the multidimensional, interdisciplinary and questionable character of the flow of information, the difficulty of suggesting the effects of flow on space and cities is explicit. In this sense, the study has been limited to last 30 years period during which the aggregation in cities has started to change, and it has been based on the supposition that the speed of the circulation of information has changed in this period as its transparency and amount has also increased. This supposition puts emphasis on the multilayered character of cities throughout this study.

### **The Concept of Information and the Information Flow**

The concepts of 'information' and 'knowledge' which are generally considered to be the same differ from each other in some basic points. According to Peter Burke (2004, p. 12), knowledge is used to express what's 'processed and systematized by a thought', whereas information is full of potentials and takes the form of information only when it is interpreted in the recipient's perception. The recipient can be a person, society or city.

The concept of information that forms the basis of this study is produced by a wide range of sub-concepts. Human, technology, money, ideas and images are all accepted as the sub concepts that produce information throughout this study. Yet, the distribution and replacement of each of these concepts are the same with the distribution and replacement of information.

In this part of the study, Arjun Appadurai's (1996) examination between the five dimensions of global cultural flow is worth analyzing. Appadurai states that the nature of the relations within the global cultural economies is affected by the flows. According to him, the dynamics of global cultural systems are determined by the relations between the flows of human, technology, money, ideology and image. The five flows that take place in the modern world are 'ethnoscape', 'technoscape', 'financescape', 'ideoscape' and 'mediascape'. The mutual 'scape' appendix in these terms indicates the fluid structures of these areas on the one hand, while on the other suggests spatiality within a broad perspective. In this sense, the things that evolve in the basis that is generated by the five flows can be read as 'information' throughout this study.

If we get to know these five areas briefly, 'ethnoscape' is the flow of people who move between nations; such as tourists, immigrants, exiles, guestworkers and refugees. 'Technoscape' is the flow of technology. Relations in many diverse areas such as the market economy and politics are governed by the technospace. 'Financescape' is the flow of global capital, currency markets and stock exchanges. 'Mediascape' is the flow of data that offers a large

repertoire of images and stories to the audiences worldwide by means of electronic media. 'Ideoscape' is the flow of official state ideologies and counter-ideologies and is generally formed by the components of political ideologies.

Human beings, technology, money, ideas and images are valued as 'capital' in today's world. Capital brings along information and in time, information becomes capital. According to Zygmunt Bauman (2006, p. 65), capital is no longer tied up to space. Capital was formerly represented as 'value', whereas now it is referred to as 'information'. Information used to be carried from one place to another by supporter bodies in the traditional world, while there is no such need in today's high speed world anymore. In addition, by means of easy communication, new information can now reach its place quicker than ever, cover and repress existing information and make place for itself there (Bauman, 2006, pp. 22-32).

### **City as the Place of Information Aggregation: Information City**

Throughout history, cities have always been exposed to the flow of information. They have been shaped by the aggregation of information. This aggregation which also used to exist in the past did not form a convenient basis for the multitransitivity in the old cities. Considering the last 30 years, it has undergone a great change, especially as parallel to the breaking points that go hand in hand with the transition from analog to digital. This period coincides with the phase that this study emphasizes as a threshold which can differ from one city to another. In some periods, less information has flown to the cities with less speed. Today, the amount of the information in cities is very much more and the flow of it is so fast and transparent. The flowing information is stacked one after the other, constantly changing form and circulating worldwide. The flow direction is determined by the dynamics of cities. Whereas the dissemination terminates in some cities, the speed, intensity and pattern of dissemination changes in others. These places in which dissemination is intensified are the 'information cities'. Information cities are produced not only with an understanding focused on 'place', 'context', 'human', 'form,' and 'function' but also with the equipments of political, economical, and cultural information networks as well. They are the places where diverse people, technologies, money resources, ideologies and images encounter.

Based on the thesis that a new city exists, but the concepts and definitions related to it are not clarified yet, a two phased route has been executed in the process of revealing the concepts related to information city. First of all, the literature related to contemporary urban theories

have been browsed and the table 1 has been generated. Other urban theories have also been evaluated in terms of the qualities that may be deterministic in the understanding of information cities. In this sense, the definition of 'information city' within the literature has also been examined. Secondly, some key concepts have been determined for the definition of 'new city' and table 2 has been formed upon these concepts.

Michael Storper (1997)	<b>Four theories</b> in order to understand contemporary urbanization: Global City World City Informational City Post-Fordist City
Edward Soja (2002)	<b>Six diverse urban theories</b> based on the Los Angeles example: Flexibility Cosmopolis Eksopolis Large City-Polarization (Metropolarization) Castle Cities (Prison Society) Cities of Affinity (Simcities)
David C. Thorns (2004)	<b>Global City</b> Key areas in the control and coordination of information, its processing and distribution.
John Friedmann (Thorns, 2004)	<b>Cities as centres from which money, workers, goods and economic variables pass through</b> Global accumulation areas Economic and political power Spatial variety and complexity
Gilles Deleuze, Felix Guattari (1993)	<b>City</b> Defined by exits and entrances Necessitates an intense periodicity
Saskia Sassen (2009)	<b>Global city</b> Cities create strategic areas for economies and cultures that are formed around capital, labour, good and passenger flows. They form the spaces for economic, political and cultural powers who may govern intersections.

Manuel Castells (1999)	<b>Informational City</b> The control point of economic, political and cultural relations
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Table 1: "Some definitions and explanations on today's urban theories and informational city."

Within the world literature, the definition of 'informational city' by Castells leads the way. Castells (1999) states that the effects of information technologies are evident on economy, society and spatial structures. In information cities, the system of the information flow is different from the others. In these cities, not only economic relations, but also political and cultural relations can be controlled. The images and the spatial symbols that environ these cities capture great attention. Beneath the images that cover urban spaces and architectural products; political, economic and social factors take place.

When we take a look at the Turkish literature, Selim Ökem's definition comes into prominence. Ökem (2006) states that however the concept of 'information city' is closely related to the concept of 'global city', it is used in his study in order to point out the harmony between economical infrastructure and cultural superstructure. Architecture is a reflection of economic infrastructure. Therefore, rarity, functionality and embodiment of energy as the specialties that define 'value' in economy correspond with the concept of 'value' in the discipline of architecture. However, in the information city, the value structure of economic and architectural formation differs from this model. Information city is a city in which information goods circulate. The general properties of this city can be defined in diverse contexts. The first factor is the geographical distribution of economic activities. Secondly, information cities are the areas of production for the leading information industries of today's world. Another denominator of these cities is the number of headquarters they accommodate. These cities are neither architectural intentions nor ends. They neither can be represented as the new trend of contemporary architecture agenda, nor are they alternatives or representatives for existing urban formations.

After the discussions related to contemporary cities and informational city within the literature are examined, three key concepts that can lead the way in order to understand the new city's specialties have been determined and the table 2 has been composed. These concepts (information, capital and space-city) lead the way in terms of highlighting the specialties that are considered within the scope of the study. This table can also be qualified as the summary of the main theme of the study.

<b>INFORMATION CITY</b>	
<b>CENTRAL CONCEPTS</b>	<b>IDEAS ON CENTRAL CONCEPTS</b>
<b>INFORMATION</b>	
Information	Unarranged, unassociated one that is shaped according to its receiver... Information: People, money, goods, ideas and images
Knowledge	One that is interpreted has been subject to historical process, categorized...
Flow	Information circulates around the world between cities as it is aggregated... It has influence on the formation of space and city...
Human	People move by conveying other types of information and changing the world...
Money	The flow of the global money is faster than it was in the past; large amounts of money circulate in enormous speeds.
Technology	Informational goods are used in cities by means of technological opportunities.
Idea	Cities can now operate as producers of information through the ideas that circulate in them.
Image	A large repertoire of images is offered to the audiences worldwide by means of new media.
<b>CAPITAL</b>	
Capital	It is not only in the form of financial capital: Human capital, technological capital, idea capital, the capital composed of images... All of these are raw materials. Information turns into capital while capital turns into

	information.
Economy	The economy of the information city has influence on other cities' economies as well.
Production	The scope of production is so wide. In addition to industrial and agricultural production, the production of technology exists mainly.
<b>SPACE-CITY</b>	
Space	The space of economic, political and cultural relations... Independent, flexible space that has no limits... Space has not a rigid form.
City	Strategic areas that are formed around human, technology, money, idea and image flows and that constitute the spaces of economic, political and cultural powers that are to govern these intersections.
Time	Time can not be isolated from space/place. Stereotyped thoughts are displaced over time. Constant flow defragments time and space.
Other definitions of modern city	The parameters that define other cities are limited; information city is more than this...

Table 2: "The definition of information city upon three concepts."

To sum up, a wide range of economic, political and cultural relations constantly pass through the information space. It is in this sense that the limits of information space are so flexible, soft and fluid as composed of foreign relations and concepts. The constant flow of people to cities changes the nature of relations that one establishes with the city. With constant flow of money, the production of spaces and cities with high image value increases. As a result of the flow of international capital between countries, the number of buildings that are constructed with foreign investments increase. Spatial and urban designs that were formerly governed by limited national resources are now afforded by international capital. The flow of goods triggers the development of the service sector while new kinds of

buildings that support this sector as well as new urban regions. With the flow of political ideas, the city can operate as a producer of information. The flow of images enables the rise of new technologies and this situation in turn generates improvements regarding the production and use of space. In today's world, these cities which produce information, accumulate capital and actively involve in politics preclude the system of nation-state and take the form of city-state over time.

### An Evaluation of Istanbul through a Context of the Flows in the Modern World

Throughout history, Istanbul has been the accumulator of information; that information has flown to this city for long years. As all other cities, Istanbul has been shaped by diverse accumulations that have taken place in different scales with different speeds. According to Yüksel Dinçer (2008), the period in which Istanbul has started to be transformed into a global city coincides with the descent of Beirut.

If we take a look at the figure 1, it is possible to see that Istanbul started to develop from the historical peninsula on the Bosphorus in the late Ottoman era. By 1950, the built-up area expanded along the east-west axis, covering the Marmara Sea's coast on the Anatolian side. Between 1950 and 1970, the migration from Anatolia to Istanbul brought with uncontrolled informal settlements on the peripheries. In 2000, the built up area spread further outwards on the European and Asian sides (Istanbul: City of Intersections, 2009, p. 24).

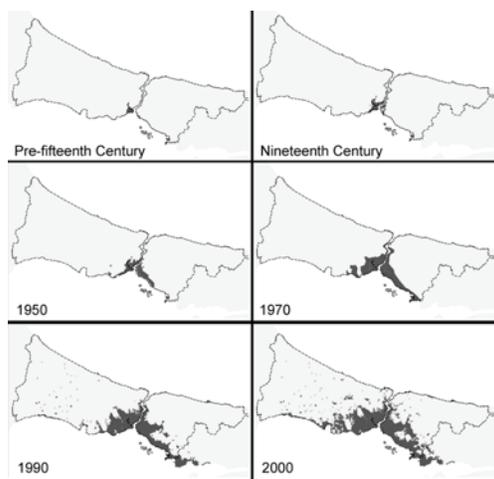


Figure 1: Historical evolution of Istanbul's urban footprint. (Source: Istanbul: City of Intersections, 2009, p. 24).

Sassen (2009) defines Istanbul as the intersection of diverse mobilities that move along east-west and north-

south axes. He also states that in order for this intersection to function as a network, some abilities must have been developed. These abilities have revealed three basic tendencies in today's world. The first is about the flow of capital that lies from east to west. Istanbul is placed just at the centre of this extension. The second tendency is about the circulation of people. There is a constant flow of people between Europe and Asia mutually. In this sense, the variety of people coming to and migrating via Istanbul is also of considerable value. As for the third tendency, the significant location of Istanbul within overall global political activities comes into prominence.

The Urban Age conference that has been organized in Istanbul on November 2009 as to evaluate the urban trends of the city has provided a discussion platform for the ascertainment of important urban findings. Istanbul has been chosen as the 9th city to host Urban Age. The former cities that hosted the conference were; New York, Shanghai and London in 2005, Mexico City, Johannesburg and Berlin in 2006, Mumbai in 2007 and Sao Paulo in 2008. With the datas it has collected, Urban Age presents an evaluation which compares these nine world cities upon basic indicators of performance. During the conference, cities have been emphasized as intersections in which people, cultures and goods constantly come across, whereas Istanbul has been represented as a city that has carried this function for thousands of years, more than any other participant cities of Urban Age. Examining Figure 2 and 3 under the topic of flow of people, Istanbul's location is worth analyzing.

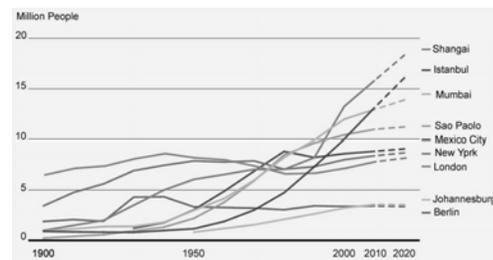


Figure 2: Population growth in the Urban Age cities. (Source: Istanbul: City of Intersections, 2009, p. 19).

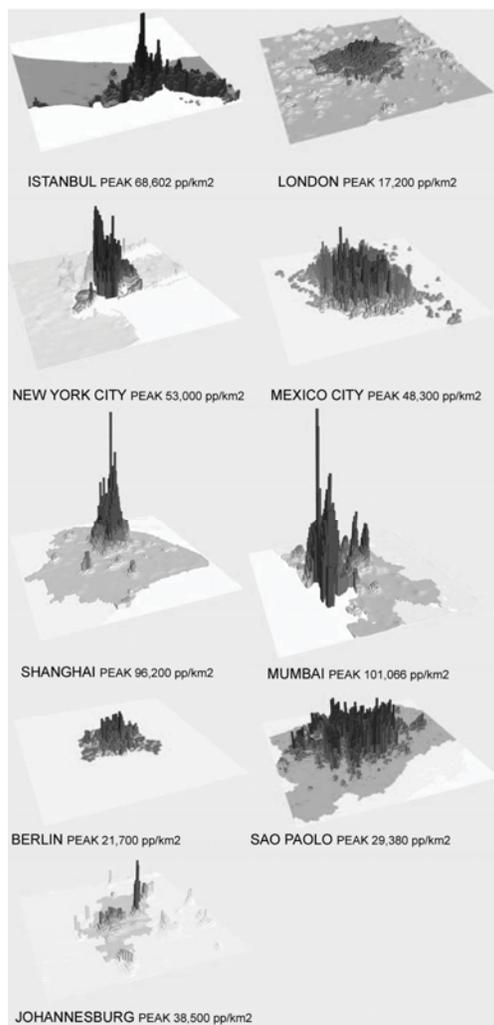


Figure 3: Graphics of urban density composed with regard to the population densities of nine Urban Age cities. (Source: *Istanbul: City of Intersections*, 2009, p. 29).

Urban density is illustrated in figure 3 in terms of the number of people living in each km<sup>2</sup> of a 100x100 km urban area. According to figure 3, density levels in Istanbul are high, particularly when compared to other European cities. The average within a radius of 10 kms is at least 30 per cent higher than that of any of the other American and European Urban Age cities (Istanbul, *City of Intersections*, 2009, p. 28).

According to Kearney's research that has been realized upon 'human capital' variable on 60 cities in 2009, Istanbul is one of the 15 cities among which Tokyo, Chicago and London take place. The research defines Istanbul as a magnet that attracts different groups of people (Sassen, 2009).

Istanbul as a city that has a rapid rise of population within the overall country (it still is exposed to a great migration from Anatolia) creates a large proportion of the added value of Turkey's budget. Turkey's population is recorded as 70.586.256 by the end of 2007, whereas it has reached 71.517.100 by the end of 2008. The city which has the highest population within the overall country is Istanbul with its population that has reached 12.57 million in 2007 and 12.69 million in 2008.

Throughout this period, local and foreign investments in Turkey operated decisions as hand in hand with central management and created the necessary infrastructure in order to render the city an important point of destination. One of the most important decisions among these is rendering Istanbul a city of finance first in Turkey and then within the global scale. In order to invest in Istanbul which was thought to be a desirable market for multinational companies, large amounts of hot money have flown to the city. Examining the responses of this flow under 'real estate investments' topic, we come to see the table below:

The real estate investments in Istanbul are subjected to development and investment foresights as well as risk evaluations that take place in the annual reports of PW Coopers and ULI over time. According to these, within overall countries that are subjected to research, in 2008, we come to see Istanbul in the second rank in terms of investment and development foresights. In 2009, it ranks first in the development foresights and third in the investment foresights.

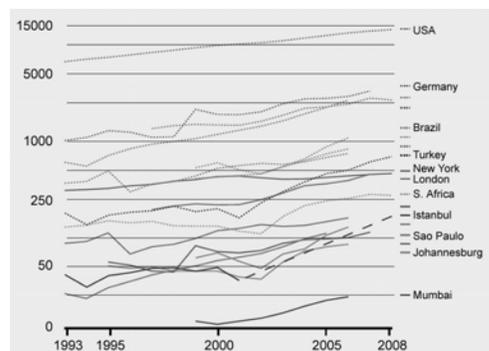


Figure 4: GDP of cities and countries (US\$ billion). (Source: *Istanbul: City of Intersections*, 2009, p. 23).

Figure 4 shows how the Gross Domestic Product (GDP) measured in billion of current US\$ has changed from 1993 to 2008 for the Urban Age cities. Istanbul contributed 22 per cent of Turkey's GDP in 2008. The economic weight of New York ve London is clearly visible in figure 4. Shanghai and Istanbul are the fastest growing economies (Istanbul: *City of Intersections*, 2009, p. 23).

On the other hand, the city has become a mutual shopping centre of politics. In the research that Kearney has developed upon 'political connections' variable, Istanbul has become one of the 10 cities along with Washington and London. The research defines political connections variable as 'the production of global policy'.

### **Evaluation of Istanbul's Spatial and Urban Transformation through the Perspective of Information City**

Considering the flows that Appadurai (1996) suggests as the five circulations of the modern world, Istanbul's position that Sassen (2009) evaluates upon urban dynamics and the spatial and urban transformation it has undergone; here is the portrait that occurs:

- Istanbul is going through a period in which social and political distinction has reached an enormous speed, urban lands have gained great importance and a struggle of share has originated as parallel to these developments.
- Global capital and the real estate market have resulted in the emergence of new functional areas and building typologies. New shopping centres, offices, residences and multifunctional buildings aim to transform the life culture, shopping habits and traditional spaces of people. These new urban spaces which are marketed by media become widespread in all parts of Turkey, starting from Istanbul. The investments could not be afforded with one functional area merely and therefore, multifunctional buildings have been transformed into a model that has been imposed from the West.
- Along with globalization and the hot money that is specifically flown to a particular part of society, poor people who establish their lives at the centre of the city are forced to leave their places, mostly in order to make place for social groups who climb the social ladder. Especially spaces with historical significance change hands and go into the period of gentrification as in the examples of rehabilitation of Fener and Balat. In addition, these people who migrate and settle in the city are removed from the shanties they live in. In these areas, some patterns that have to be protected are destroyed in the name of urban transformation as to be delivered to the multi storied raw buildings of Housing Development Administration of Turkey (TOKI).
- The Metropolitan Planning Bureau of Istanbul Municipality had announced international urban design competitions for two development areas in Istanbul and invited worldwide famous architects in 2005. Those projects were proposed for Küçükçekmece on the western and for Kartal on the eastern end of the urban area. Zaha

Hadid's proposal won the competition for Kartal and Ken Yeang's proposal won the competition for Küçükçekmece.

- The pioneer architectural companies of Istanbul that determine the architectural agenda have been subjected to a survey in order to evaluate the changing urban formation of Istanbul. In this survey, questions related to which building types and countries those firms have been working on mainly have been asked. According to the answers from the offices, the foreign executions of architectural firms gain importance in the Arabian countries, Russia, Azerbaijan, India, Balkan countries and Italy mainly. This result reveals that Turkey cooperates with some foreign architectural groups and its field of action is intensified in the countries that have declared their independence with the dispersion of Soviet Socialist Republics. Considering the scope of recently built projects; offices, houses, shopping centres and multi functional buildings come into prominence as structures that global capital needs the most (Görgülü and Koca, 2009).

### **Conclusions**

In today's world, the tools for acquiring and producing information has eased the free circulation and sharing of architectural forms, new kinds of structures and urban trends. The formations of cities are now molded and shaped by information. The spaces that occur in this sense have deep informational meanings. Definition of the information city is related to the flows that are spread within the city and the relations that get through it. Every new relationship carries its own special history and culture.

In this sense, cities can be perceived as strategic areas that are formed around human, technology, money, idea and image flows and that create spaces for economic, political and cultural powers that are to govern these intersections. In this point, one can argue that the historical and geographical location of Istanbul increases this strategic importance even more and the flows have important effects on the spatial and urban formation of the city. Istanbul is a point of intersection between diverse economies, policies, goods and people. In today's world that is becoming more interconnected as days go by, this role that Istanbul has borne upon attains great importance.

Considering the origins of the flows that are intensified in Istanbul; we come to see the concept of 'power' that has started to show its effects starting from 1980's, a power that established itself upon the trial of becoming integrated with the West. In this sense, it is an undeniable fact that in the context of the process of globalization it has undergone a great change in economic and social areas apart from urbanization in the last 10 years in Turkey. With the

political changes that have taken place in neighbour countries on one hand (the dispersion of Soviet Socialist Republics, Iraq war and the role America has casted on Turkey in this context) and the important location of Turkey and particularly Istanbul on the other, the direction of flows has started to rotate towards Istanbul with its central location.

In the last 10 years, Turkey's integration with the world has failed in cultural, legal and social dimensions unfortunately, that it has been effective only in terms of opening its public investments and lands to foreign investments in the economic sense. One can argue that Istanbul has enriched itself with the flows in terms of information, however it is an undeniable fact that it has not yet reached the statue of 'governing city' which is one of the most important necessities of becoming a global city.

Despite all these, Istanbul is one of the most important cities all over the world in terms of the economic circulation it creates, the synergy it enables in social and cultural areas and its spatial wealth.

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## PRESENTATION SESSIONS | **SOCIAL / CULTURAL**

Session Two

Moderator: Philip Plowright



# Preparing for a Swedish papy boom: On aging as a concept in a design process

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## Abstract

Sweden has to prepare for a *papy boom*, a French term for the increasing proportion of senior citizens in society, viz. those aged 65 years or older. This paper focuses on a municipal organizer's decision-making process to arrange an open, municipal architecture competition with the aim of promoting future-oriented architecture for senior citizens. A sample comprising twenty-seven informants (municipal employees, political officials and other representatives) was selected, and these people were interviewed using a qualitative, interviewing guide. A section in the guide included a photograph compilation in order to encourage discussion about both the competition brief and the Swedish guideline of hominess in architecture intended for elderly, frail people. The aim of this study was to explore notions about the appropriate, future-oriented habitats of the aging population. Such findings describe spatial aspects possible to use as primary generators in an architectural design process, and to assist the creative work of architects, when they conceive new architecture and built environments for the future, aging society. The result of this study suggests that the photograph compilation was effective in defining twelve key aspects of appropriate architecture for aging. The results of this study lend support to an overarching conclusion that the appropriate habitat for aging in the future society must exploit the aesthetic and sensuous dimension of architecture.

**Keywords:** architecture, habitats for aging, design process, primary generators, Photolanguage method.

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## Introduction

In the peacetime following the Second World War between 1945 and 1950, there were 760,120 registered births in Sweden (Statistics Sweden, 2009). This generation is now approaching retirement, a fact that is transforming Sweden into an aging society. This phenomenon has been identified in the majority of Western countries (Maucunovich, 2004). In the European Union, statistics measuring the proportion of senior citizens rank Italy as having the largest percentage of senior citizens (18.2% of its inhabitants being 65 years or older), followed by Germany (17.5%) and Greece (17.3%). Fourth largest is Sweden with 17.2% (Council of Europe, 2005).

As this baby boom generation has aged, the term *papy boom* has come into play. This French term describes the opposite process of rejuvenation, namely the increase in the proportion of elderly people in the population (Martel & Légaré, 1995). According to research, the papy boomers will experience comfortable aging, having a secure financial situation, and good health (Batljan & Lagergren, 2004; Batljan & Lagergren, 2005). In Sweden, very late stages in life imply that there exists an accumulation of health issues and an increasing degree of dependency (Parker & Thorslund, 2007). Recent statistics from the Swedish National Board of Health and Welfare (NBHW) indicate that approximately 6% of the age group 65 years and older will encounter health issues that will require 24-hour availability of nursing services in special housing (NBHW, 2008). In Sweden, the local municipalities are responsible for both the provision of appropriate housing facilities and individually assessed eldercare for senior citizens ("The Swedish Local Government Act", 1991).

The present paper focuses on a multi-level, decision-making process concerning the organization of an open, architecture competition on future habitats for an aging population in a suburban Swedish municipality situated in the expansive Greater Stockholm area. During the last century, this municipality expanded from being a small rural community in 1950 with some 7,300 citizens, to an expansive region with a population of 64,355 citizens in 2009. Migrating Swedes, and immigrants of other nationalities were attracted by the municipality's vicinity to Stockholm. The peak in population growth occurred during the 1960s when the number of citizens increased by 264% in

just one decade. In December 2008, the proportion of the age group 65 years and older was 15.8%, and the municipality forecasts 20% annual growth taking place in this age group until 2018. In 2006, the municipality organized an open, architecture competition<sup>1</sup> with the aim of highlighting the question of appropriate, architectural space for the aging population (Andersson, 2010 (in press)). The competition's purpose was two-fold: at the urbanistic level the task was to provide a detailed development plan for the site; at the architectonic level it was to renew space for elderly, frail people. In February 2007, a Danish entrant<sup>2</sup> was proclaimed winner of the competition. The aim of the present study is to explore notions about the appropriate, future habitats for an aging population, which were awakened by the municipality's preparations for the competition. The findings are relevant for the creative work of architects and other professionals who use conceptual thinking and primary generators (Darke, 1984) to visualize new architectural space for an aging society.

## **Research material and methods**

This study takes place as part of a comprehensive case study of an open, architecture competition organized by a Swedish, suburban municipality. The organizer's considerations in conjunction with the organization of the competition are in focus for this study. Data was collected using a survey of the official documents pertaining to the aforementioned competition, and this was supplemented with open-ended interviews with identified players. The data collection started in 2008 (one year after the conclusion of the competition), and the transcriptions of the interviews were completed in August 2009.

### ***Study sample***

A survey of the municipality's reasons for holding an architecture competition gave rise to the formation of a sample of twenty-seven informants, some of whom were key agents in the process of innovating habitats for elderly people by the use of architectonic visions. Official documents<sup>3</sup> revealed that there were four key players who were affiliated with three municipal administrations: the Administration for Social Welfare and Health (ASWH) for social and eldercare matters; the City Planning Office (CPO) for planning and built environment concerns; and the Municipal Executive Office (MEO) for executive matters. Besides the four key players, eleven informants

were selected from within the ASWH, CPO and MEO. These eleven underwent an interviewing process, which was necessary for corroborating the key players' statements. Additional informants were members of the competition jury or one of the two referential working committees that had assisted the jury in the assessment of the thirty-three submitted entrants. Thus, two informants from the Municipal Assembly (MA), six members of the Senior Citizens Council (SCC), and four representatives from the Swedish Association of Architects (SAA) were included in the sample.<sup>4</sup> In all, twenty-seven informants were settled upon—eight men and nineteen women (see table 1). The study draws conclusions from all twenty-seven interviews in the sample. Quotations are taken from twenty-four interviews, since three of the interviews were not approved by the respective informants. These three interviews have been integrated into the sample, since they supplied knowledge about the organizational process.

### ***The interviewing guide***

The aim of the qualitative interviewing guide was to facilitate a relaxed conversation about the competition, key issues in the competition brief; and the work to promote innovative space for elderly, frail people. It aimed to enable personal reflections upon the outcome of the competition. The guide focused on the municipality's considerations of the architecture competition as an instrument to renew architecture for senior citizens. The guide consisted of twelve sections, with three to six sub-questions (eighty-two questions in total).<sup>5</sup> One section consisted of three thematic questions. First, the informant was invited to answer these questions by making a choice of one to three photographs from the photograph compilation. Second, the informant was encouraged to describe his or her associations in relation to the thematic question and the personal choice of motifs. This section was inspired by the Photolanguage© method (Baptiste, Belisle, & Pechenart, 1991). The photograph compilation consisted of twenty-five photographs taken by the author and originally intended for repertoire-based usage in the conception of new, architectonic visions (Schön, 1983) (see table 2). To follow the guidelines of the Photolanguage© method, other photographs of animals or nature were added to the collection. On average, the interviews lasted ninety minutes. In order to avoid a focus on age, background questions were restricted to education, professional experience, and previous experience with eldercare or building matters.

**Table 1. Informant characteristics: age group, years of professional experience, professional background, education and affiliations with municipal administration or official organization (municipal or trade).**

Affiliation with municipal administration or official organization (municipal or trade)	Informant	Gender	Age group	Years of professional experience	Professional background	Number of interviewers	Status of transcription
ASWH	Informant A1	f	35–44	20	GSSS	2	A
ASWH	Informant A2	f	35–44	18	GSSS	2	A
ASWH	Informant A3	f	35–44	15	Med. Gymnast	2	A
ASWH	Informant A4	f	45–54	18	Med. Gymnast	2	A
ASWH	Informant A5	f	45–54	22	Nurse, RN	2	A
ASWH	Informant A6	f	55–64	26	GSSS	1	A
ASWH	Informant A7	m	55–64	38	GSSS	1	NA
ASWH	Informant A8	f	55–64	34	GSSS	2	NA
ASWH	Informant A9	m	55–64	38	Engineer	1	A
ASWH	Informant A10	f	55–64	37	Nurse, RN	2	NA
ASWH	Informant A11	f	55–64	43	NHA	2	A
CPO	Informant B1	f	25–34	5	architect MSA	2	A
CPO	Informant B2	f	55–64	33	architect MSA	2	A
MA	Informant C1	f	35–44	18	SHS	1	A
MA	Informant C2	f	55–64	38	Economist	2	A
MEO	Informant D1	m	35–44	17	SP	2	A
MEO	Informant D2	m	55–64	33	GSSS	2	A
SAA	Informant E1	f	45–55	21	architect MSA	2	A
SAA	Informant E2	f	55–64	39	architect MSA	2	A
SAA	Informant E3	m	65–74	38	architect MSA	2	NA
SAA	Informant E4	m	65–74	42	architect MSA	2	A
SCC	Informant F1	m	65–74	40	EW	1	A
SCC	Informant F2	f	65–74	39	Engineer	1	A
SCC	Informant F3	f	65–74	42	Insurance agent	1	A
SCC	Informant F4	f	65–74	40	Staff Nurse	1	A
SCC	Informant F6	m	75–84	40	MD	2	A
SCC	Informant F5	f	75–84	35	Nurse, RN	1	A

**Abbreviations:**

A = informant approved transcript of interview; EW = engineering worker; GSSS = Graduate of School of Social Studies; MD = managing director; MSA = Member of Swedish architect MSA; NA = Informant did not approve the transcript of the interview; NHA = Nursing Home Administrator; RN = Registered Nurse; SHS = Senior High School; SP = social planner.

**Notes:**

The approved transcripts of the twenty-seven interviews are cited in the study, whereas the non-approved transcripts are not cited in study.

**Table 2. Description of the photo compilation and its specifics: built space, content, details, format, location, nature scenery, origin.**

Items in photograph compilation <sup>1</sup>	Origin of photograph		Photograph details			Photograph format in millimeters (14,8x21,0 MM)	Photograph location	
	existing built space (EBS)	staged built space (SBS)	built space (bs)	nature scenery (n)	content (A = animal; H = human; SI = social interaction)		exterior (E)	interior (I)
Photograph A	EBS			n		landscape	E	
Photograph B		SBS	bs		H, SI	portrait	E	
Photograph C	EBS		bs		SI	portrait		I
Photograph D	EBS			n		portrait	E	
Photograph E	EBS		bs			portrait		I
Photograph F		SBS	bs	n		portrait	E	
Photograph G	EBS			n	A	portrait	E	
Photograph H		SBS	bs			portrait	E	
Photograph I		SBS	bs		H	portrait		I
Photograph J		SBS	bs			portrait		I
Photograph K	EBS		bs	n		landscape	E	
Photograph L		SBS	bs		H, SI	portrait	E	
Photograph M	EBS		bs			portrait	E	
Photograph N	EBS		bs			portrait		I
Photograph O		SBS	bs			portrait		I
Photograph P	EBS			n		landscape	E	
Photograph Q	EBS			n	H	portrait	E	
Photograph R		SBS		n	H	portrait	E	
Photograph S	EBS			n	A	landscape	E	
Photograph T	EBS		bs			portrait	E	
Photograph U	EBS		bs			portrait		I
Photograph V	EBS		bs		H, SI	portrait	E	
Photograph X	EBS		bs		H, SI	landscape		I
Photograph Y	EBS		bs			portrait	E	
Photograph Z	EBS		bs			landscape	E	

**Abbreviations:**

A = animal; bs = built space; E = exterior location; EBS = existing built space; H = human being; I = interior location; n = nature scenery; SBS = staged built space (building expositions); SI = social interaction.

**Notes:**

1) Each photograph had a small white dot with a letter in the right hand corner.

**The interviewing process**

It was assumed that the informants in the municipal administrations could be biased by their earlier involvement in the process of organizing the architecture competition, and that they could be inclined to either exaggerate or

dismiss their influence on the process, depending on the degree of their involvement in the process. The interviewing guide was adjusted with each informant to annul this bias. Furthermore, it was assumed that the photograph-based questions and the interview situation would establish the true circumstances concerning the interviewees' involvement in the municipal preparation for

the competition. The interview survey was conducted between January and June in 2008. The interviewees were contacted by email with a letter of introduction attached. All selected informants agreed to be interviewed.<sup>6</sup> A date and a place for the interview were set up. Each interview was transcribed verbatim by the author, and after the interviews the informants were asked to read the transcript and to approve it. The majority of the informants complied with this suggestion, making just minor changes to the text. However, two informants declined to approve their transcripts, while one suggested corrections that made the text erroneous in comparison with what was recorded during the interview. Just the same, these three interviewees—informants B7, B10 and E3—were integrated into the sample, since by their participation they provided information about the organizational process. But they are not quoted in the following text.

### **Research data**

This study is based on the full sample of the twenty-seven interviews. The photograph section in the interviewing guide has been extracted for this study, and has supplied the research data. This section discussed the difference between homelike and institution-like environments in architecture for elderly, frail people. The interviewees were asked to choose one to three photographs from the photograph compilation of twenty-five motifs, in conjunction with the following three questions:

- Q1) In the competition brief, elderly, frail people within the municipality live in institutions called an institutional milieu in the competition brief. It is given this name because it is said that inside there exists is an institutional atmosphere. Please choose one to three photographs from the collection, and describe some characteristic features of this institutional milieu.
- Q2) In the competition brief, it is said that the municipality is looking for “a milieu which interacts with our senses and empowers an experience of being in an environment of quality, with care and security, and makes us feel the sublime within such an instance of architecture. Architecture, interior design and coloring, as well as the exterior landscape, shall be in harmony and interact, contributing to this feeling.” By choosing one to three photographs from the photograph compilation, could you describe some characteristic features of such an environment?
- Q3) The ordinances of the Swedish Social Services Act (“Social Services Act,” 2001) recommend comprehensive guidelines for the architectural design of housing for elderly, frail people. Which photographs, would you say reflect the definition of spatial criteria which form part of the Swedish guideline of hominess in architecture intended for elderly frail people? The criteria are: (1) the residential features derived from private, detached houses or apartment buildings; (2) a homelike environment; (3) a supportive milieu for way-finding; and (4) the opportunity for an interior, spatial prospect, an outlook, for the purpose of promoting a better understanding of the architectural configuration of the building (Svensson, 2008). By choosing one to three photographs from the collection, could you define these criteria separately?

### **Theoretical framework for analyzing research data**

The analysis of the research data employed a theoretical framework to apprehend the collected data (Fisher, 1997). In this study *architectural space* is defined as comprising any built environment, and this therefore includes landscape architecture, interior decorating, architectural design and physical planning. This implies the requirement of a holistic approach to the interaction between human beings and architectural space. For this reason, this paper promotes a transactional worldview, where human behavior is identified as a set of actions related to places and things (Altman & Rogoff, 1987).

In environmental, psychological research, photographs are used as surrogates to assess personal preferences of different settings (Hull & Stewart, 1992). The Photolanguage© method was originally developed as a pedagogic instrument for schools, but it has also been used in the field of psychiatric care to verbalize subconscious memories (Baptiste et al., 1991; Vacheret, 2000). In a previous study the author used a photograph compilation as a specimen to discuss the interior setting of an assisted living facility with the elderly, frail residents and the members of the staff (Andersson, 2005). In this case, three particular photographs were repeatedly chosen to illustrate hominess.<sup>7</sup> For comparison, this photograph compilation was included under the assumption that the images would assist recollection and activate non-rational memories.

The research data comprised two sets of information, namely various discourses on aging and space as supplied

by the transcripts of the interviews, and the spatial experiences related to the informants' personal choice of photographs from the photograph compilation. Discursive analysis operated on the assumption that spoken information could be examined as speech acts (Van Dijk, 1977), in relation to both the municipal, architecture competition, and the appropriate architectural space for aging. The analytical procedures began with the scrutiny of the verbatim transcriptions of the interviews. This approach has similarities to Applied Discourse Analysis (ADA), since it does *not* focus on language per se but on what is expressed through language (Gunnarsson, 1998). Consistent with this psycho-evolutionary framework, the photograph analysis assumed that the informants would choose photographs based on affective responses towards a motif, rather than adopting a cognitive-based assessment (Ulrich, 1983).

## **Results**

### **Findings on appropriate architectural space for aging**

Analysis of the research data yielded findings that pertained to the relevant architectural space for aging. The photograph compilation was used to measure preferences for either homelike or institution-like environments; the characteristics of the sublime dimension in the envisioned outcome of the architecture competition; and the employment of the Swedish guideline for hominess in the architecture of housing for elderly, frail people. These diverse findings formed part of the rationale about space for aging, whereas the photograph-based findings provided emotional associations with space for aging, potentially rooted in the respondents' personal experiences and preferences for space. A relative ranking for the photographs was created by comparing the number of positive connotations with the number of negative ones, as found in the discourses which took place during the photograph section in the interviewing guide. The ranking was calculated by deducting the number of negative connotations for each photograph from the number of positive ones (see table 3). Based on this ranking, a panorama of twelve key aspects in architectural space for aging ensued: 1) sensory stimulation; 2) homelike and residence-like character; 3) at home in the kitchen; 4) architecture and nature; 5) the linkage between indoor and outdoor space; 6) the domestic hearth; 7) interior colors in a room with a view; 8) familiarity, recognition and anticipation; 9)

existential space; 10) healing force of nature; 11) enabling personalization; 12) features representing an institutional environment.

#### ***1. Sensory stimulation***

Photograph F was of a picturesque bosket with an elevated water pond, and it generated genuinely positive connotations; it engendered a broad panorama of associations with the sublime dimension of architecture. One informant suggested that in essence the photograph depicted a befitting setting, since all of the human senses were stimulated by it. The possibility of being outdoors and experiencing the greenery, the smell of nature and the sounds of birds was identified as being of great importance. Another informant said that the photograph possessed a motif which was soothing and relaxing. A third informant offered what is arguably the best explanation for the photograph's attraction to the informants: "This photo is great architecture, it suggests the context which every type of architecture must respect: the setting, the greenery, and water. Sensory stimulation is important for all human beings."

#### ***2. Homelike and residence-like character***

Ranked in second and third places, were two photographs—photographs E and N—with interior motifs of communal space for dining and socializing. The photographs were used repetitively by the informants to answer the interviewing questions about aspects of homelike and residence-like qualities. The conclusion of the informants' use of these photographs was that the interior setting of a homelike space was an anachronism. It was not intentionally designed that way, but accidentally evolved over time, and therefore assumed a cozy quality.

#### ***3. At home in the kitchen***

Photograph C, a view of a Swedish kitchen from the 1940s or 50s, was perceived to be a true kitchen. The motif evoked decided connotations of hominess. The size of the kitchen seemed to be important, as the homelike character was related to space for a single family's household. If the kitchen was discerned as being too spacious, it lost its homelike character and mutate into a large kitchen space as found in institutions.

**Table 3. Use of the photographs in the photograph section of the interviewing guide with respect to the following questions: Q1) Identify the homelike versus institution-like environment; Q2) Describe the characteristics of the envisioned, sublime architecture; and Q3) Choose the photographs which reflect spatial criteria which form part of the Swedish guideline of hominess in architecture intended for elderly, frail people. These criteria are: (1) the residential-like features derived from private, detached houses or apartment buildings; (2) a homelike environment; (3) a supportive milieu for wayfinding; and (4) an opportunity for an interior, spatial prospect, an outlook, which promotes a better understanding of the architectural configuration of the building.**

Ranking order	Item in photo compilation	Perceived positive connotation (PPC)			PPC, total	Perceived negative connotation (PNC)			PNC, total	Use of photographs (UP) for positive or negative associations (UP = PPC+PNC)
		Question Q1.	Q2.	Q3.		Question Q1.	Q2.	Q3.		
1	F	0,0	18,0	1,0	19,0	0,0	0,0	0,0	0,0	19,0
2	E	1,0	6,0	17,6	24,6	-7,0	0,0	-1,0	-8,0	16,6
	N	2,0	5,0	11,3	18,3	-2,0	0,0	0,0	-2,0	16,3
3	C	0,0	2,1	14,3	16,4	-1,0	0,0	-1,0	-2,0	14,4
4	A	1,0	5,0	5,0	11,0	0,0	0,0	0,0	0,0	11,0
	Q	0,0	0,0	10,1	10,1	0,0	0,0	0,0	0,0	10,1
5	R	1,0	9,0	5,1	15,1	-4,0	-2,0	0,0	-6,0	9,1
	S	0,0	6,0	3,0	9,0	0,0	0,0	0,0	0,0	9,0
6	K	1,0	0,0	7,0	8,0	0,0	0,0	-1,0	-1,0	7,0
	L	1,0	5,0	1,0	7,0	0,0	0,0	0,0	0,0	7,0
	Z	0,0	2,0	5,0	7,0	0,0	0,0	0,0	0,0	7,0
7	O	2,0	4,0	3,0	9,0	-3,0	-1,0	0,0	-4,0	5,0
	X	0,0	3,0	3,0	6,0	-1,0	0,0	0,0	-1,0	5,0
8	T	0,0	1,0	4,0	5,0	-1,0	0,0	0,0	-1,0	4,0
	G	0,0	4,0	1,0	5,0	-1,0	0,0	0,0	-1,0	4,0
9	P	0,0	1,0	2,1	3,1	0,0	0,0	0,0	0,0	3,1
	B	0,0	6,0	1,0	7,0	-4,0	0,0	0,0	-4,0	3,0
	H	1,0	2,0	3,0	6,0	-3,0	0,0	0,0	-3,0	3,0
	M	1,0	0,0	3,0	4,0	-1,0	0,0	0,0	-1,0	3,0
10	Y	0,0	2,0	0,0	2,0	0,0	0,0	0,0	0,0	2,0
	D	0,0	1,0	0,0	1,0	0,0	0,0	0,0	0,0	1,0
11	I	1,0	2,0	5,1	8,1	-7,0	-1,0	0,0	-8,0	0,1
	J	1,0	3,0	5,1	9,1	-8,0	0,0	-2,0	-10,0	-0,9
12	V	1,0	1,0	2,0	4,0	-7,0	0,0	-1,0	-8,0	-4,0
	U	0,0	0,0	0,0	0,0	-16,0	0,0	0,0	-16,0	-16,0
	<b>Total use</b>	<b>14,0</b>	<b>88,1</b>	<b>112,7</b>	<b>214,8</b>	<b>-66,0</b>	<b>-4,0</b>	<b>-6,0</b>	<b>-76,0</b>	

**Note:**

Some photographs were used repetitively by the informants to answer one or all of the three questions, thereby describing different aspects of architectural space. This usage is indicated by the decimal point which denotes the frequency. The relative ranking is based on the whole number including the decimal.



**Figure 1. Associations generated by the photograph compilation: sensory stimulation (photograph F); homelike and residence-like character (photographs E and N); at home in the kitchen (photograph C); and, architecture and nature (photographs A and Q).**

(All photographs by author)

#### **4. Architecture and nature**

The two photographs of a slightly bending road—photograph A—and of red-painted, wooden buildings in a Swedish, pastoral, summer landscape—photograph Q—both generated positive connotations. These photographs were used to discuss the Swedish guideline which prescribes the creation of firstly a supportive milieu for wayfinding and secondly an opportunity to give rise to an interior, spatial outlook which promotes a better understanding of the architectural configuration of the building. Choosing randomly from the photograph compilation, the informants selected the photograph of the road to discuss wayfinding. One informant said with reference to photograph A that an architectural space with clear directions fostered wayfinding. The motif with the wooden buildings—photograph Q—was preferred by some, for its sense of familiarity was seen as necessary to understand architectural space. Another informant suggested that a familiar view of the exterior space reinforced the ability to proceed inside the building.

#### **5. Indoor space linked to outdoor space**

The two photographs of an exterior pergola—photograph R—and of a cat—photograph S—generated a mixture of positive and negative connotations. One informant suggested that the pergola motif evoked an institution-like environment, since the absence of tables and chairs discouraged a comfortable respite, although it could be part of a large patio with a pleasant climate behind protective walls. The cat intimated home, despite the fact that some informants were afraid of cats. Also, photograph C suggested the ideal, transparent line that traverses from indoors to outdoors of a private, detached house.

#### **6. The domestic hearth**

There were three photographs that gave rise to mainly positive connotations with respect to aspects of the domestic hearth. One informant suggested that photograph K evoked the warm feeling of a welcoming house at the closing nightfall. Another informant also stated that this photograph was homelike. Photograph L evoked the sublime dimension of architecture: a peaceful feeling of being at ease, of socializing, and interacting with nature. Photograph Z was said to represent a residence-like quality of architectural space, displaying a location that is easy to find. The informants said it was an example of a pleasant, residence-like architecture.

#### **7. Interior colors and a social space**

Photograph O was met with mixed reactions from the informants, with some assessing it as homelike, others as institution-like. The interior colors of the motif induced one informant to point out the importance of using colors in the habitat, while another focused on the design of the window, and in particular the necessity of having both a pleasant view of the exterior and excellent penetration of daylight. The interior decorating was perceived as futuristic. The informants stated that photograph X showed a community of some sort that implied the importance of being part of a social context. The religious aspect was not pointed out; rather it was said that the photograph expressed the spatial quality of an interior outlook that provided a better understanding of the architectural configuration of the building.



**Figure 2. Associations generated by the photo compilation: the linkage between indoor and outdoor space (photographs R and S); the domestic hearth (photographs K, L and Z); interior colors and a social space (photographs O and X); and, familiarity, recognition and anticipation (photographs T and G).**

(All photographs by author).

### **8. Familiarity, recognition and anticipation**

Two photographs—photographs T and G—evoked spatial aspects that dealt with familiarity, recognition, and anticipation. One informant suggested that photograph T indicated a chronological dimension in architecture, and that the different, architectural layers were significant in that connection. Informants appreciated the photograph for its evoking of a residence-like setting, but they also perceived a touch of anticipation in the motif, from the protected space inside the walls as opposed to the openness of the street. Another informant associated it with an institution-like environment, since the porch defined a separate space, hidden away from public eyes. Photograph G implied openness and endless space. The hardly noticeable bird on a branch indicated nature, and suggested to the informants a quiet and soothing place in which to spend time.

### **9. Existential space**

Photograph M was associated with a societal institution, whereas photograph P represented a wide, observable space. This photograph added potency to the idea of the

healing force of nature. Photographs B and H encountered some negative connotations from the informants relating to institution-like environments. These photographs were also used to illustrate a milieu helpful for wayfinding since they offered an opportunity for an interior, spatial outlook which propagated a better understanding of the architectural configuration of the building. More importantly, all of the photographs evoked the existential aspect of both the architecture and the built environment, in the sense that each represented the outdoor space closest to the building: the balcony, the patio, the terrace. Due to the cultural context, the informants pictured Swedish, summer traditions of drinking coffee with strawberry cake, eating lunch or dinner, and socializing with friends and relatives at this particular, protected, outdoor and sunny place.

### **10. Healing force of nature**

Two photographs were identified as symbolizing the impetuous forces of nature. One informant chose photograph D to emphasize the stimulating feeling of being amongst nature. Another informant decided that photograph Y aroused the same sensation. A third informant pointed out that a built environment must be sensuous to enable the exploration of architectural space and nature.



**Figure 3. Associations generated by the photo compilation: existential space (photograph P, B, H, and M); the healing force of nature (photographs Y and D); enabling personalization (photographs I and J); and, features representing an institutional environment (photographs V and U).**

(All photographs by author).

### **11. Enabling personalization**

Photographs I and J generated both positive and negative connotations. At best, the homelike features in the two motifs caused some informants to portray the environment as a hotel-like setting; at worst, as some kind of institution. The perceived austerity and rectilinear nature of both motifs seemed to emphasize the institutional affiliations. The overall lack of personal artifacts in the photographs caused the informants to consider the space portrayed by the photographs as not being fully furnished or having received an institutional ban on placing things on the walls. The interior colors in photograph I were perceived as obtrusive, and typical of institutions. Continuing with the negative apprehensions, some informants associated the stark colors on the walls with directional cues in an institution-like setting. One informant used the term “*de-individualized*” to describe photograph J. Others were somewhat more positive, and identified some homelike features. Another informant added in reference to hominess and the photograph J that the main feature of an homelike, architectural space was the possibility to subdivide into minor spatial entities.

### **12. Features representing an institutional environment**

The two photographs U and V embodied specific, spatial features that led the informants to perceive them as purely institution-like. In particular, photograph U generated solely negative connotations: it was perceived as a setting from an institution. Specifically, it was described as evincing a cold, dead, de-humanized, gray, sterile environment; its austerity induced fear. The design of the ceiling was perceived as being un-homelike, and the very thought of being confined to a bed and having to look up at such a ceiling was utterly repugnant to the informants. Architectural spaces like the corridor, the culvert, and the large indoor spaces for various uses were linked with photograph U. The negative associations conjured up by photograph V focused on its architectural design. The architectural forms within the motif were perceived as being sharp and representing an edge. The informants identified these associations with a public building or institutions in general. This was particularly so for the grand, exterior staircase. Despite this, two informants with a background in architectural training stated that the modern architecture pictured in photograph V implied a positive, future-oriented space for aging.

## Discussion

The present study is explorative. Few Swedish or European studies with a similar focus were identified during the preparation of this study. Still, the question of appropriate, architectural space for aging has generated interest both in Sweden and North-America (Almberg, 1997; Brent, 1999; Marsden & Kaplan, 1999; Paulsson, 2001, 2008; Paulsson & Husberg, 2008). The final research material has allowed for a comparison of the data generated by the sample of twenty-seven informants. This fact has facilitated a degree of triangulation which can support valid conclusions (Yin, 2003). It is likely that the findings are biased due to the Swedish culture, specifically concerning the context of a suburban municipality in the vicinity of a large city. Nevertheless, this study helps us to understand how decision-makers in a suburban municipality perceive the appropriate, architectural space for an aging society.

The study has implemented a research method—the Photolanguage© method—that produces individual discourses on appropriate space for the aging population, and an individual, preferential ranking of photographs which displays various architectural space. As presented in this paper, the informants associated homelike features with the following concepts: a certain scale of building; the design of individual architectural elements; the formal shape of the building, and its location. Similar results were achieved in a North-American study, where the perceived hominess in facilities for assisted living was explored by the use of photographs (Marsden & Kaplan, 1999). Furthermore, the informants in the present study preferred motifs involving nature, in particular those with a combination of architecture and landscape configurations. This finding is also consistent with past research in environmental psychology using photographs (Joye, 2007). The informants disliked photographs which incorporated either an unrecognizable motif or sharp, edge-like, architectural forms. Regarding the different motif settings in the photograph compilation, this finding vouches for the prospect-refuge-theory, established in previous research (Appleton, 1975).

None of the informants in the study perceived themselves as old, although in some cases the length of an informant's professional experience indicated that he or she had attained or was near to retirement age. Thus, aging can be seen to be an integral part of life and existence, more than just a mundane moving through time: to age is to explore the individual gift of personal characteristics (Messy, 1992). This fact supports an overall conclusion that concerns the relation between aging and the built environments—chronological age is of little signification on a personal level, but of major concern for societal, health planning for the future, aging society.

Architecture can be viewed as a field of practice that is located at the intersection of four spatial dimensions: private space versus communal space, and the concretization of space versus the conceptualization of space (Cold, Dunin-Woyseth, & Sauge, 1992). These relationships call for an evaluative approach in order to distinguish between appropriate and inappropriate architectural space (Rönn, 2007). Such an assessment is an integral part of the architecture profession, and is sharpened by the iterative act of first creating architectural space, and then evaluating the built environment. It is tacit knowledge best described as *the enlightened eye* (Eisner, 1998). The presented findings are relevant for this type of assessment, and as input for the creative work of architects and those working in affiliated design-professions.

In the present study, the informants stressed the aesthetic dimension of architecture and built environments. This extent of familiarization with the architectural space has been indentified by several sources as an important means for successful aging in place (Haak, Dahlin-Ivanoff, Fänge, Sixsmith, & Iwarsson, 2007; Hurtig, Paulsson, & Schulz, 1981; Rosel, 2003). Based on the findings, architectural space ideally forms an existential and spatial framework within which various aspirations of self-development can be fulfilled (Lapierre, Bouffard, & Bastin, 1997; Norberg-Schulz, 1971). In this sense, this study contributes to a deeper understanding of architectural space and its relation to aging and age-related issues. It is our belief that the findings are credible, legitimate and transferable to similar situations involving architectural space and aging generally in a Western, cultural context (Maxwell, 1996; Onwuegbuzie & Johnson, 2008).

This study aimed to identify notions about the appropriate, future-oriented habitat for an aging population, and to determine empirical facts. The presented empirical findings suggest that both discursive, and photographic approaches are necessary to fully understand the spatial implication of aging. The results of this study lend support to an overarching conclusion that the appropriate habitat for aging in the future society must exploit the aesthetic and sensuous dimension of architecture. However, further research is needed to substantiate this hypothesis.

## Abbreviations

The following abbreviations of Swedish official authorities have been used:

The Administration for Social Welfare and Health (ASWH), (in Swedish Socialförvaltningen).

The City Planning Office (CPO), (in Swedish Stadsbyggnadskontoret).

The Committee for Social Welfare and Health (CSWH), (in Swedish Socialnämnden).

The Municipal Assembly (MA), (in Swedish Kommunfullmäktige).

The Municipal Executive Office (MEO), (in Swedish Kommunstyrelsen).

The National Board of Health and Welfare (NBHW), (in Swedish Socialstyrelsen).

The Senior Citizens Council (SCC), (in Swedish Kommunala Pensionärsrådet).

The Swedish Association of Architects (SAA), (in Swedish Sveriges Arkitekter).

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## Author Biography

The author is architect SAR/ MSA, a member of the Swedish Association of Architects, and PhD Fellow at the School of Architecture, Royal Institute of Technology, KTH in Stockholm, Sweden. Mr. Andersson graduated from the KTH in 1990. As a practitioner, he has worked on residential architecture including buildings intended for frail people of all ages, and on offices and hotels, and has performed various design tasks. He commenced PhD studies in 2003, and after a short stint as a Building Permit Handling Officer at the City of Stockholm, he continued this project in 2007, focusing on architectural space for elderly and frail people. Mr. Andersson is in the final phase of preparation for his doctoral thesis the subject of which is architectural space for dependent seniors in Sweden, and, which is an extension of a previous licentiate thesis. This two-step procedure is characteristic of Swedish technical universities. The doctoral thesis is due for publication later in 2010.

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## Endnote

<sup>1</sup> The open architectural competition "Flottiljen—Future-Oriented Habitats for the Elderly" was organized by the municipality of Jaerfaella (in Swedish municipality of Järfälla kommun).

<sup>2</sup> The entrant "The Flowery Meadow" was conceived by the Danish architecture firm GPP Arkitekter A/S, Aarhus, Denmark.

<sup>3</sup> The documentation consisted of administrative documentation, comprehensive plans, detailed development plans, policy documents, programming documents, and other material related to the competition.

<sup>4</sup> The jury consisted of nine members: the ASWH, two chairs; the CPO, one chair and the MEO, one chair. Furthermore, two jury members were political representatives from the MA, representing the two largest political parties. Two jury members were assigned by the Swedish Association of Architects, (SAA), and one supplementary member was assigned by the (ASWH). The competition secretary was a representative of the SAA, who organized the jury sessions and was responsible for writing the jury report. Two working committees assisted the jury in assessing the entrants. One committee consisted of six members who represented three national organizations in defense of the elderly people's rights, and elected members of the Senior Citizens Council (SCC). All of these representatives were interviewed. Additionally, two politicians from the Committee for Social

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Welfare and Health participated, but they were not interviewed. The second committee consisted of five members, two of which were municipal experts on real estate and building management. These two were interviewed. The other three members represented nursing research, research in architecture (the author of this paper) and an eldercare entrepreneur. These members were not interviewed.

<sup>5</sup> The sections were: (1) introduction to the interview (anonymity and confidentiality); (2) background questions; (3) organizational facts; (4) key issues in the brief; (5) care and architecture for senior citizens; (6) a photograph compilation on homelike versus institution-like environments; (7) the competition brief itself; (8) the jury assessment; (9) the municipal preparation for the realization of the special housing in the winning entrant; (10) the programming document for the realization of the winning entrant; (11) the consultation process during the remodeling of the winning entrant; (12) concluding questions.

<sup>6</sup> Due to the author's earlier involvement in the competition process, informants identified as key informants, i.e. jury members and members of the two working committees, were interviewed by the author and associate professor Magnus Rönn, the School of Architecture, KTH, supervisor of the project.

<sup>7</sup> This refers to photographs E, N and O. The main conclusion from this study was that a photograph was not chosen based on its motif, but rather on the connotations that details within the motif generated.

# The Pedagogy of Place: A Practical Approach to Engaging with Urban Design Lessons beyond the Studio.

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## Abstract

The distinction between various quantifiable and qualitative interpretations of *place* across academic and professional disciplines of the built environment presents a challenge to educators seeking to engage students with a balance of theory knowledge and practical skills for meaningful urban investigation. This paper examines a pedagogic framework developed in response to this challenge. By integrating abstract and experiential methods to study the city, the framework includes a series of teaching, learning and assessment methods that link phenomenological *place* theory with evidence-based activities for *place-making* in city spaces.

Using qualitative and anecdotal feedback from a collaborative project involving undergraduate architecture and visual [graphic] communications students in Belfast, Northern Ireland, the paper discusses the project outcomes, evaluating some of the methods and the tools used to educate architects and designers for better skills to understand urban issues beyond the classroom.

Keywords: architecture, visual-communications, urban design, pedagogy, phenomenology, public space, place, placemaking, experiential learning, Belfast.

## Introduction

In an increasingly urbanised global society, the role of architects in the processes that shape and make cities is more complex than ever. Ongoing issues include 'design' versus 'procurement', more diverse professional teams and debates over educating future professionals with a balance of theory knowledge and practical skill to deliver quality *places* (Jenkins, et al, 2005). From the many examples of poor quality spaces in contemporary cities, there is a need to revisit what is advocated in theory for the design of cities and the reality of what is often created. Writing about this disparity, after a 15-year study of public spaces in New York and other major cities, William H. Whyte (1988:109) observed that:

"[It] is difficult to design a space that will not attract people. What is remarkable is how often this has been accomplished."

Whyte, like his European counterpart Jan Gehl (1971), carefully observed the interactions of people with other people and with their surrounding environments in 'real-time'; documenting the influence of design, the presence of visual clues, activities or other elements that could help explain why some city spaces attracted people while others did not. These studies provided evidence in Whyte's search for the "basics" (1980:101), his concept of those qualities that "enrich the experience of city spaces, turning them into *places*."

To improve the relationship between the practice and pedagogy of architecture and urban design, the challenge for research is to harness those qualities of *place*. The difficulty is that these qualities are not always explicit, but as Whyte noted (1980:58), can appear "as much psychological as physical." This raises more questions about whether architectural research could help understand and translate lessons from the city back into the education of future designers and planners, as well as allied professions, policy makers, the public and all others who may positively influence development in the built environment.

To consider this question, this paper presents research on an interdisciplinary pilot project run jointly by the Departments of Architecture and Visual [Vis-Com] Communication at the University of Ulster [UU] in Belfast, Northern Ireland during September 2009 to May 2010. The research evaluates the project's pedagogic framework, its core structure, process and main outcomes, which combined general educational theory and methods with specific theory and tools for urban or architectural design.

This question of pedagogy versus practice in architecture has been growing arguably since the Enlightenment while debates about how to address growing cities came to the fore in the wake of the Industrial Revolution. This paper begins therefore at the start of the twentieth century, before the “new” profession of town planning split from architecture, affecting both of their associated educational systems. In 1915, Geddes forewarned of a split in his treatise, *Cities in Evolution*; advocating an alternative to traditional aesthetic or technically aligned training. Geddes (1915:298) proposed combining the social art of architecture and the “emerging” science of planning with what he referred to as *the study of civics*, the study of “the life and working of the city.”

In pedagogic terms related to architecture, urban planning and design, this paper revisits Geddes’ and Whyte’s definitions of *civics* and *basics*; interpreting both as referring to the experiential, phenomenological, and measurable qualities of cities at the same time. This forms the basis for an investigation of design pedagogy that addresses *place* as a theoretical construct of the “ideal” city and as evidence-based activities associated with making or shaping “actual” cities. The research also combines literature from a broader scope of pedagogic theory that calls for greater *alignment* (Biggs, 2003) between teaching, learning and assessment activities, as well as the use of more relevant methods that promote students’ development of independent skills for *active learning*, *reflection* and *critical thinking* (Kolb, 1984; Krathwohl, 2002). The pedagogic model discussed in this paper has developed from these precedents and further exploration will be required for future refinement.

Within the context of the pilot study with undergraduate students, the developing pedagogic framework considered the balance between traditional reading and lecture based activities alongside active, collaborative teaching, learning and assessment tools outside the classroom environment. In practical terms, this addressed the skills future designers need for working with communities, other professions and government to improve the outcome of architecture and urban design projects. It further aimed to challenge preconceptions about working in urban environments, especially neglected areas of existing cities.

To prepare to undertake activities requiring interaction between staff, students and outside participants in public and to collect data for the analysis, the project was assessed for a health, safety and ethics risks though UU’s Research Governance and Ethics Review Panel,

and relevant statutory authorities. After the project, conclusions were drawn from the data collected, primarily anonymous qualitative surveys and anecdotal feedback from the students and staff, professionals, local government representatives and members of the public who took part in different stages of the process.

### **Belfast: Context & Partnerships**

With the UU Schools of Architecture, Art and Design located in Belfast city centre, their context provides a rich backdrop for research addressing neglected urban environments. Despite its own particular, violent ethno-political history over the last forty years, Belfast’s situation as a post-industrial port city of approximately 200,000 inhabitants offers opportunities to tackle more universal problems the city shares with others around the world. These include the disconnection caused by past decisions on planning, roads and other transport infrastructure, the loss of traditional industry and inner residents. Significantly, the city retains a very compact core, easily crossed on foot, with distinct areas of high quality Victorian and Art Deco buildings and pedestrian friendly streetscapes. These are in close proximity to areas of economic and social deprivation and physical blight for direct comparison.

The project study is one of the latter examples of neglect where recent development pressure and a 1980s retail mall, more than the past decades of violence, led to extensive demolition and loss of independent trade. These sites remain undeveloped or as surface car parking alongside the remnants of Victorian terraces and a once vibrant market (Fig. 1). The area is northwest of the city’s established Central Business District [CBD] and south of UU’s Belfast campus, a 5 to 10minute walk from the city’s symbolic centre at City Hall.

Fig. 1: Sample of Belfast study area (Author)



The focus on this particular area evolved from an approach to the University in 2009 by a group of local independent traders and government representatives seeking assistance with their efforts at staving off further destruction and promoting regeneration proposals for the area instead. The photographs in Fig. 2, taken ten years apart from the same location in the study area, illustrate the challenge. They show the typical extent of lost streetscape, poor quality public space, cut-off streets, blank walls and a lack of positive activity.

Fig. 2: Streetscape: Ca. 2000 & 2010 (Author)



Carrying out a project in this area presented a joint opportunity for Architecture and Visual Communications. Both departments share strategic aims about pursuing the social art of design through place-specific projects – buildings, landscape, urban design or visual and graphic interventions. The agreement to work with local groups outside the University was on the basis that the assistance meant student-led investigations without a particular agenda. For students this was an opportunity to have a real impact with their work. The project was therefore titled *What's Wrong with This Place?: Urban Research Belfast* as an invitation to the participants to question the perceptions and preconceptions about the area's neglected appearance, as well as explore the untapped potential beneath that surface.

## Pedagogic Framework

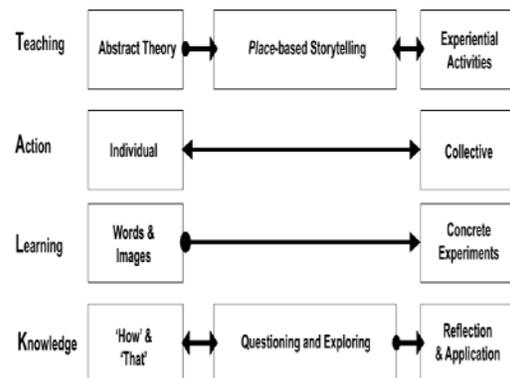
To develop the pedagogic model for these investigations, the review of educational practice, discourse and precedent described previously raised questions about the correct balance of outreach versus more traditional studio projects. The validity of abstract studio based methods, derived primarily from the French Beaux Arts Academies and British practice of pupillage, has long been challenged as contributing to an image-conscious “silo” mentality by focusing too much on individual ideas or technical ability over spatial experience, and promoting a fascination with uniqueness over developing the skills to “learn” from everyday life (Schon, 1987; Boyer and Mitgang, 1996; Morrow, 2000; Scobey, 2002).

As an alternative to the potential isolation of studio-based paper projects, interactive methods offer a practical approach that has been adapted into this research to test their potential to help students to:

- put the abstract study of the qualities of *place* into practice, combining the art and science of urbanism.
- engage in community-based design activities
- develop greater criticality about their own experiences in the city and
- gain empathy for the needs and vision of local communities

By amalgamating the various teaching and learning approaches through a series of test configurations, the current pedagogic model emerged as shown in Fig. 3 below. Its four strands of Teaching, Action, Learning and Knowledge (T.A.L.K.) encapsulate the aims of the process to engage students with learning and interacting outside the classroom. Three general steps work across the strands moving from abstract to experiential application, with some steps relating in both directions.

Fig. 3: Pedagogic model. T.A.L.K. (Author)



The strands work together toward learning outcomes that shift away from a reliance on individual image-based Design scenarios alone, toward more collective working, experiential activities and experiments that are meant to encourage reflection and eventually independent application of the abstract ideas in practice. The place-based storytelling steps apply to investigations undertaken for architecture, urban design or visual communications projects.

The collective aim for this study was to bring students away from their comfort zones, working with each other, with different disciplines and with members of the local residential and business community, built environment professionals and government representatives. Through this collaborative, participatory and evaluative framework, the overall goal was to help students understand urban environments, not just by describing what they see but learning to objectively explore beyond their preconceptions and become influential “story tellers” (Marris, 1990) in their own way. If successful, they might not only develop new skills as more iterative and holistic designers, but might begin to have greater self-awareness and confidence to transfer these skills into their ongoing education, and future careers.

### **A sense of place**

“Architecture is bound to situation. Unlike music, painting, sculpture film and literature, a construction (non-mobile) is intertwined with the experience of a place.” (Holl, 1991: 9)

Beginning in September 2009, the first teaching and learning activities were run within the design studio, combining historical background on the study area with more peer-led discussion aimed at demonstrating ways to communicate abstract ideas to others. The aim here was to avoid formal lecturing but still allow for teaching and learning on the main concepts of *place*. A series of well-know published texts was used to establish a knowledge base of phenomenological theories about *place* and improve students' associated vocabulary.

*Genius Loci* (Norberg-Schulz, 1979) for example, was selected for its influential adaptation of Heidegger's complex metaphysical philosophy of *dwelling* and *being* for architectural education. Norberg-Schulz's use of concepts like *earth and sky* and *spirit of place*, in relation to architecture, have become part of a standard teaching lexicon.

His specific reference to other influential texts such as *Image of the City* by Kevin Lynch (1961), also introduces important theories about defining structures in urban space that aid [human] orientation, which have particular relevance to the current project research.

Other important required reading included:

- Bloomer, Moore and Lyndon's *Body, Memory and Architecture* (1977),
- Rasmussen's *Experiencing Architecture* (1962),
- Holl's introductory essay in *Anchoring* (1991:9-12)
- Zumthor's "A way of Looking at Things" in *Thinking Architecture* (2006: 7-28).

*Body, Memory and Architecture* introduces the phenomenological poetics of Bachelard (1969) and the related sensorial perception theories of J.J. Gibson (1966). This sets out the explicitly humanist framework that significantly distinguishes perception between passive receptors and haptic senses, which actively seek out new information through adventure and experimentation.

*Experiencing Architecture* offers in-depth lessons about innate human abilities to engage with the physical world, and relates to the separate education theories about *active learning* noted earlier. Rasmussen's mix of everyday examples provides an accessible narrative meant to help students use similar references from their own experience of the built environment.

Finally, Holl and Zumthor's work was selected as contemporary examples from practicing architects who have established international careers with a mutual focus on phenomenology in their conceptual un-built projects and research as well as their writing and testing through practice. Holl in particular is very explicit about the influence of phenomenology on his architecture (Yorgancioglu, 2010), especially the translated writings of the philosopher Merleau-Ponty (1962). Zumthor's own writing about his architecture offers an equally accessible description of the connections from his practice to the phenomenological experience in his own memories.

These selections are varied enough in complexity for undergraduates so that they may be of use to students of varying knowledge or interest in the subject. They were also intended to show students how words, while not replacing actual experience of *place* or architecture can be used to tell a convincing “story” about specific environments and constructions, which can aid design.

During the one-day discussion session, working in small groups, students were asked to share and document their reactions and understanding of the themes in each reading. This session also introduced students to the workshop format as an informal information gathering method, which they would be asked to use themselves in the next activity outside of studio.

### Active experience research methods

“When you study a place and chart it and map it, you begin to acquire a proprietary right in it. You do not reason this. Obviously, you have no such right. But you feel it. It is your place. You earned it.” (Whyte, 1980: 110)

To move the teaching and learning from paper to testing of the principles discussed, in live scenarios, a number of field investigations were planned, inspired by the methods used by Whyte and Gehl. These required students to interact directly with people outside of their controlled academic environments. This type of socially active investigation has been referred to as *participatory action research*, “a way of creating knowledge that involves learning from investigating and applying what is learned to collective problems through social action” (Park, 1992, cited in Rios, 2006: 49-50).

Three additional case study precedents for these investigative activities were also considered; NY based Project for Public Spaces’ *Placemaking* training (2005), the London based Architecture Foundation’s participatory *Road Shows* (2000) and a previous community-led “live” research project in Northern Ireland that also involved students of architecture from the University of Ulster (McQueen et al, 2008).

The above preparation raised the following new questions for this research:

- How do you develop the confidence in young students of design to take over a street or a space and experiment, or consult more effectively with local communities and the public prior to any attempts at imposing design ideas?
- How do you gather information from the public - formally, behind a camera, clipboard or microphone, or informally with more social activities?
- How can the qualitative activities of investigation by individual students be structured within an evaluative framework for staff and researchers to collect relevant data and draw conclusions?

Two primary activities were subsequently developed and implemented during a weeklong series of joint events in February 2010.

### Passive versus Activated Space: Mobile Urban Experience Labs [MUELS]

The first activity outside of the studio took inspiration directly from Whyte’s notion of “triangulation” (1980: 94). Whyte used this term to describe “the process by which some external stimulus provides a linkage between people and prompts strangers to talk to each other as though they were not.”

Although Whyte was primarily observing the effects of existing objects, sculptures, performers or even particular views from a given space, this project used a two-stage activity combining observation with direct interaction and experimentation through the invention of the **M.U.E.L.** or **Mobile Urban Experience Lab**.

The design, construction and then intervention using the MUELS first involved a studio based team project for architecture students, with graphic design input from Vis-Com students. The MUEL acronym refers to the brief given to each team to design a temporary movable object based around a particular human sense, adapted for testing out different aspects of perception around the city. The proviso was that the object should be constructed from readily available or recycled materials, that it would be ‘wheeled’ out of the studio to various locations to interact with “people on the street.”

Over a two-week period, students designed and built each one of the following named MUELS at full scale:

- Captured View Finder -selected visual experience
- Urban Pin-hole Camera - indirect visual experience
- Urban Ear - indirect aural experience
- Urban Veil - distorted visual/aural
- Urban Cactus - tactile/haptic experience
- Shadow Motion Machine - direct visual experience

Once completed the use of the MUELS combined with an observational mapping and questionnaire activity, based upon Project for Public Spaces’ “Place Performance Evaluation Game (PPS, 2005),” to gather information and then test-out the differences between passive and then activated city spaces.

Students spent one morning mapping activities and movement patterns in empty spaces within the study area, while also interviewing members of the public. The following day, with the MUELS transported to the same

locations as the previous day's observations, they experimented with what happens when you place a new object designed to elicit reactions from passersby into the formerly empty spaces.

Students were asked to consider:

- How does that object or series of objects define and change the nature of the space around it?
- Can it change perceptions and make people, even unwittingly, more aware of their urban surroundings – to notice a view, to pause and interact visually, verbally or kinaesthetically?

Architecture and vis-com students completed this activity together. The "Capture View Finder" for example, shown in Fig. 4 below, took the form of a simple "phone box" shape that allowed a choice of views to be opened up from inside. In different locations the aim was to encourage people to stop and enter, choosing a view that they most often walked past without paying much attention.

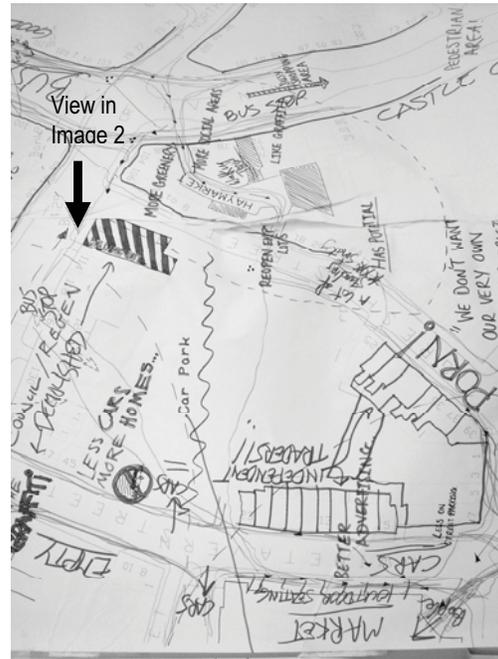
Fig. 4: A MUEL in Belfast. (Author)



The student groups documented all activities with film and photography, as well as gathering all the feedback and mapping data onto a single large format map of the

area (Fig. 5) to be used to communicate their findings back to the public and local groups.

Fig. 5: Students' mapping data (Author)



### Workshop and Exhibition:

For the final stage, students worked in one of the 'empty' spaces, using the example of the Architecture Foundation's Road Shows, which temporarily transformed derelict spaces into something more positive. Working with local business owners, empty shop units were 'loaned' to the students in an open-air precinct called the Haymarket Arcade. Students and staff cleaned up the empty units and, over four days, transformed them into an exhibition of artefacts and graphics (including the large-scale mapping studies, documentary film and slide shows, visioning models and sculptures, graphic booklets and posters showing information about the area, created by vis-com students). Access to the units was provided in return for the project work to improve the outlook of empty spaces. All artefacts installed were allowed to remain in-situ as long as the units were unoccupied for commercial use.

Students and staff then organised a workshop within the study area, in a former industrial space used by an artists' collective. A public opening event followed for the exhibition, as an opportunity to share their findings and

visions with each other and members from local business community, the public and government.

During the workshop, staff and students introduced the project, presented the results of their studies, invited guest comments on the area's development proposals and participated in an informal discussion on the theme of "What's wrong with this place?" The discussion raised challenges to all involved with the area's future to make positive changes based on the lessons of what has been done poorly in the past.

As a finale, the opening evening event held for the public exhibition in the open space of the Arcade, provided students with a goal for their work as well as an opportunity to gather feedback. The event was publicised with flyers, a press release and projected slideshows onto derelict buildings nearby. As a centrepiece the students installed their MUEs and incorporated one into an illuminated central "social hub". A few local traders took part and used the event as an opportunity for impromptu discussions of their own in the exhibition spaces (Fig. 6).

Fig. 6: Haymarket empty. Transformed unit, an impromptu meeting place. (Author)



## Evaluation

How do we know if the project was successful?

Both the workshop and exhibition event allowed structured qualitative feedback questionnaires to be distributed to participants and visitors (collection was at anonymous drop points). The events were kept very informal. Unlike more traditional 'town-hall' type formats these methods allowed for verbal and written feedback to be gathered from locals, fellow academics and professionals who may not otherwise take part in formal workshops or interviews.

Architecture and design, however, unlike say mathematics, presents more difficulty in the short-term evaluation of pedagogic research. It is not usually possible to ask a single question or complete an equation to conclude whether or not the methodology used has a better or worse influence on the outcome, in this case the students' learning and skills development. For architecture especially, this evaluation can be a cumulative process over projects, semesters or years.

## Pedagogic lessons

Reviewing with the qualitative feedback from surveys returned, the initial analysis shows students had a more positive reaction to projects where abstract concepts combined with experiential activities. This contrasts with feedback from faculty, including the author's early presumption that the abstract readings and paper projects – with their freedom and poetic nature – would be seen as a more 'fun' and valuable tool. The implication for future studio situations is to avoid teaching of abstract concepts in isolation from concrete projects although the balance requires further research.

Some broader observations include:

- For more abstract ideas sessions, peer-led small group formats, rather than tutor-led discussions only, benefited the depth of ideas exchanged.
- Active methods were logistically trickier to organise, especially in 'empty commercial spaces'. Stakeholder, landlord and local authority timescales did not always fit in well with semester format or class-time schedules of students and staff.
- Outdoor activities were weather dependent and required flexible planning in short-term intervals.
- With planned activities, especially outside the classroom, an explicit end goal, like the exhibition, was necessary to keep students engaged.

### **Anecdotal Feedback**

An alternate evaluation of the project came from speaking with participants and students during the events themselves.

For students in the workshop for example, trying to elicit discussion as a group resulted in little interaction. However, when one student was asked to speak about an image of their intervention projected onto a screen (to tell the story behind it), they were able to speak about their apprehension going into the area, the observations they made, the people they spoke to and the ideas that resulted in their site-specific temporary sculpture.

"I went through the quarter – it was terrible... barbed wire, padlocks, broken windows...I was terrified, but then I met John, he told me stories about the 'good old days' of Smithfield." Vis-Com student.

An architecture student's work, back in the studio, showed evidence of a clear impact. Having resisted the abstract activities from the beginning and struggled in studio to produce more than shallow graphic project responses, the student was asked instead to produce a documentary film of his understanding of the site, with some Vis-com input. The result was a poignant mix of observation, graphics, interviews and music, edited to capture a much deeper connection with the area's character and people. This particular student's design work and participation in studio underwent significant improvement. The interpretive film was also awarded a student prize at the 2010 All-Ireland Symposium on the Built Environment, held in Belfast.

The assessments from stakeholders, local authority and members of the public who took part is ongoing and the partnerships formed have provided a good foundation to continue this research and work outside of the University in the future. A local government representative gave the following feedback of the work together so far:

"[The project] provided a concrete connection between the businesses in the area and your students which I feel will be far reaching and sustainable..."

Anecdotal reactions from the public may, for now, be best summed up by this comment from a local resident:

"They were talking about it down the pub."

### **Conclusion: The Urban Narrative**

A key feature of student engagement 'with this place' through this particular pedagogic framework was how the students seemed to become aware of the narrative(s) associated with the urban environment. For many, these may not have been apparent from a traditional studio approach.

In the case of visual communication or architecture, narrative may come directly from people's stories or equally from existing or "lost" buildings and other history, from existing graphics, typography or graffiti; all give clues to less obvious cultural character or any 'territorial' issues. During the visual and verbal documentation, and through on-site design experiments, students reported on the 'folklore' they gathered; shared memories, which they noted as contributed to their sense of *place* as much activity and physical space. This awareness could contribute to a more holistic and humane design sensibility. Narrative, therefore, or the qualitative value of urban storytelling may be the more important output from the pedagogic framework.

The acknowledgment of the narratives can also be interpreted as a validation of the teaching methodology's aim to elicit and evaluate higher levels of critical thinking on the "social life of urban spaces" and fostering skills for understanding from within rather than as an outsider. As a test case for good practice in social engagement, the method of using experiential activities to informally engage with "everyday lives" and learn from everyday activities does appear to help students get beyond preconceived ideas and find out "what's the story" about real issues. As Bartholomew and Locher conclude from their own separate pedagogic research (2007:2): "Narratives provide structure for understanding how the world operates."

Since the project's completion there has been new interest in collaboration from UU's MA course in Public Art, suggesting wider interdisciplinary lessons are possible. Longer-term studies of the current tools and pedagogic approach are still required, with additional research and interpretation needed from further qualitative and quantitative data. In the meantime, from this pilot, the anecdotal evidence suggests the process of engaging students is worth additional investigation. It remains to be seen if the value of the pedagogic framework extends beyond this small study to improve long-term skills for communication with people of the city and, by doing so in practice, helping shape more quality social *places* for people in our cities.

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# Experimental Building Programs in Germany: Focusing Culture Through Policy

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## Abstract

This paper examines Germany's federally funded experimental building programs as cultural determiners and transformers. An analysis of studies and reports to sponsors of the past twenty years brings to light that from the urban environment to the architectural object, both tangible spatial objects and the process of their creation have become part of a culture of building that can successfully be guided through direct intervention. The paper concludes with suggesting further policy areas where this process can be implemented.

## The process of focusing culture

Germany has a long tradition of experimental building programs. Starting in the 1920s with social questions of providing housing for the masses and technical ones of how to get there, the focus in recent decades has turned to urban and suburban settlement patterns, sustainable building practices and ecologically sound living concepts – paradigms that have become critical in other European countries and the United States as well. Recent research programs have continued to examine building at both the social and technical level: community planning goals and sustainable community design linked with energy efficiency and the use of experimental construction techniques.

Much of this research has been publically funded, with calls for proposals and reports to the sponsors providing a record of research aims and outcomes. From the 1957 *Interbau* housing projects planned for Berlin to the multitude of projects sponsored today, the German government has financed a series of systematic

programs for experimental housing and urban design with a focus on user comfort and cost efficiency, with extensive efforts being made to tailor urban patterns and building practices to accommodate specific demographic patterns. Current research funded by the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) under the auspices of the new program *Zukunft Bau* (Future Building) includes energy efficiency in buildings, new concepts and prototypes for zero- and plus-energy houses, new materials and techniques, building quality, technical standards, and building code legislation. The sum of these investigations points to Germany's quest not only for a betterment of construction and building types, but also for a new attentiveness to the built environment in a quest to enhance Germany's identity as a culturally and technically advanced nation. While the idea of using sponsored research and publically funded building programs to shape cultural perceptions has usually not been expressed as such by the initiators of these research agendas, the mounting body of programs points to possibilities beyond just providing housing or urban facilities for the population. For the sponsors, the question of *how* cities should be structured, *how* transportation should be arranged, and *what forms* of housing should be built for the population has become a question of socio-cultural management as much as a charge of practical implementation.

Whereas earlier projects sought answers to specific spatial and architectonic questions, by 2001 the German government had recognized the potential connection between individual building programs and their larger social implications. The result was a systematic program to research the question of *Baukultur in Deutschland*, a term that may loosely be translated as an examination of culture and building practices, both with regards to housing and urban design.<sup>1</sup> In 2004 the term was made part of the federal building code, with *Baukultur* becoming a mandatory point of consideration when developing any sort of master plan.<sup>2</sup> Part of the ensuing policy assessments encompassed results from the program *Experimenteller Wohnungs- und Städtebau* (Experimental Housing and Urban Design), abbreviated ExWoSt, which as early as 1988 had begun to consider innovative solutions to housing and urban design questions through their potential as socio-political forces. With the newly established focus on *Baukultur*, research projects began to consciously

regard housing and urban design as a cultural translator and determiner.

Specific projects within ExWoSt show how policy has been used to fund and thus fuel cultural change. From 2001-4, for example, five model projects in the research area *3Stadt2* (3City2) attempted to link community groups with public-private partnerships. The projects were as much a search for new process tools and forums as they were a quest for specific design and planning results. The research area *Stadtumbau West* (Urban Rebuilding in West Germany), funded from 2002-7 and encompassing 16 city projects, examined what planning instruments – such as design competitions, workshops, media projects, and citizen-group involvement – were integrated into various planning measures and with what results. A study found that the examined means created or strengthened city identities, enhanced communication on a local level, and linked research questions to financial investments.<sup>3</sup> Broader in its focus was the research area *Städte der Zukunft* (Cities of the Future), which took place from 1996-2003 with four projects. Proposing a strategic plan for new urban patterns, the program provided guidelines and definitions for sustainable living and created a network of goals and criteria for measuring the success of their implementation.<sup>4</sup> The research area *Öffentlicher Raum* (Public Spaces), begun in 2003, presented a typology of public spaces that examined traditional and newer functions of public urban space such as public spaces in contrast to privately-owned “public” spaces such as shopping malls. This research area has also looked at the use of unintended public spaces, such as parking lots, and the question of how virtual spaces such as the internet are taking on some of the functions once found in physical spaces.

The authors of a study examining projects that focused on *Baukultur* noted that the government’s own internet portals, containing extensive information and documentation of all projects and results, were part of the information package that was altering how citizens perceived changes in the built environment.<sup>5</sup> In regarding *Baukultur*, process became an important factor in measuring success. The government was greatly concerned not only with *what* was produced, but more importantly *how* it was produced, and in addition to examining the results of case studies, commissioned at least two surveys that analyzed the

effectiveness of methods used to develop paradigms for architecture and urban design.<sup>6</sup> The importance of steering both the means and the end is reflected in the terminology used, as studies refer to “instruments” that are to be applied to shape both process and product. A document commissioned by the federal government and published in 2005 analyzes these “instruments” as program, procedure and process, communication and mediation, and funding programs, with further methods required for evaluating the built quality of the objects.<sup>7</sup>

With its focus on *Baukultur*, Germany has attempted to make an invisible concept visible. Although the idea of using “tools” and “instruments” to “steer” culture may seem overly technocratic, the recognition that the built environment does not merely happen through a reliance on market forces already indicates the sense of responsibility the government feels towards helping to shape landscapes, urban forms, and even the type of housing available to its citizens. Examining and understanding the forces that operate to shape the built environment is the first step in recognizing the potential for directing the process and the built result. The question of *Baukultur* has gone beyond German policy inquiries to include international comparisons. With many projects in Germany tapping into a combination of funding sources that include European Union, national, state, regional and municipal funds for both planning and implementation, the interplay of what these actors hope to achieve has become a question worth asking. As one publication resulting from a state-sponsored workshop addressing the question of *Baukultur* in the context of urban design put it, “Building culture begins at the level of the design brief [...] Who is responsible for formulating urban design assignments for today’s world?”<sup>8</sup>

An example of how this question has been answered can be found in the proposals for Halle-Neustadt, a vast new town adjacent to the older city of Halle in the former East Germany characterized by cheaply-built and faceless Soviet-style prefabricated housing blocks and now challenged by a population exodus that has left much of the housing stock vacant. The problem of “shrinking cities” is common in the former GDR to the point that the government has sought solutions through a program called *Stadtumbau Ost* (City Conversions in Eastern Germany), begun in 2002 and jointly sponsored by the federal and state govern-

ments. The winning solution proposed for Halle, a project named *Kolorado*, proposed linking the Neustadt area to the older city of Halle and diversifying the large and faceless Neustadt quarter by dividing it into several districts, each with its own identifiable identity or theme.

Halle-Neustadt's original plan, developed in the early 1960s, followed typical Soviet-style urban ideas of a spatial and infrastructure system based on allotments. Halle-Neustadt was to be an independent community next to the existing city of Halle. The urban structure offered was a carpet of administrative units, a field of so-called cells of which each provided housing and daily infrastructure such as kindergartens and schools for 10,000 – 20,000 people. Most of the housing was in the form of mid-rise and high-rise slabs with five, six or eleven stories. Although central infrastructure, such as a town hall, was part of the original plan, funding problems led to a situation where such infrastructure was built only years after the housing was completed, if at all.<sup>9</sup>

After the unification of East and West Germany in 1990, Halle-Neustadt was made a part of Halle, and much of the housing stock was sold off to private investors. The city retained ownership of parks and other open spaces and infrastructure such as schools, libraries, and public transportation. Poor economic prospects and opportunities for other housing types, including single-family homes, led many residents to move from the area, however, so that Halle-Neustadt's population shrank from a high of 95,000 before 1990 to 50,000 by 2006. Adding to the population change was a demographic shift, as East Germans had less children and those with children sought alternatives to the high-rise slab apartments. Halle-Neustadt found itself with a population whose average age was considerably higher than when the city had been planned, leading to predictions that when the now large number of elderly residents began dying off, there would be a further increase in vacant apartments, leading to a further downward spiral in the ability to finance and thus provide essential infrastructure services.

The new capitalist economy introduced in 1990 encouraged developers to place shopping and commercial centers in and near Halle-Neustadt, thus providing retail infrastructure missing in the socialist-style city.

Commercially driven, these complexes were developed as car-dependent centers, and their suburban-mall type offerings have eclipsed Halle-Neustadt's traditional pedestrian shopping zones – a problem typical of, although not limited to, the former GDR. A first decision was thus made to better connect Halle-Neustadt with the older town of Halle through a new streetcar line, to provide access to the older town center.

In 2001 the city passed a new urban development plan for Halle-Neustadt, which divided the city into several districts. The areas around the center were to be retained for housing, while the peripheral areas were to be either restructured or dismantled, leading to a contraction of the physical city itself. Because of the variety of property owners and thus financial stakeholders in Halle-Neustadt, lawsuits soon followed, which put implementation of the master plan on indefinite hold, while individual developers continued to determine the building agenda of the city. The city turned to the Stadtumbau Ost program to find a solution.

The *Kolorado* plan developed by the offices of Raumlabor-Berlin in 2001 thus began with a procedural problem. The project's first aim was to get things moving again, with a second aim quickly put forth: find processes by which the affected community could identify and express their positions and concerns. *Kolorado's* answer was a series of activities designed to highlight Halle-Neustadt's "open future". Citizens were invited to activities that allowed them to provide input into the concrete planning process. The framework for this process was designed to be flexible enough to react to changes proposed through citizen input, with the population able to inform both planning goals and the process of seeking them.<sup>10</sup>

*Kolorado* foresaw dividing the city into much smaller units in order to facilitate planning. Twenty-four large-scale owners had stock in Halle-Neustadt's housing, and the smaller planning areas meant that there would be less owners in each individual parcel and thus less parties that had to reach consensus. The parcels were created through analyzing and layering various matrixes, such as street and park networks, infrastructure, and important points and ensembles, overlaid by a newly established pathway that was to provide a continuous recreational area. The smaller units also

meant that planning mechanisms, such as competitions, workshops, or charrettes with community groups could be implemented as needed without individual measures becoming unwieldy. The new focus on perceived connections between urban ensembles and structures and their potential as spaces for actions and activities made it easier to engage lay people in the planning process.

Diversifying Halle-Neustadt called for creating new, local identities, a process that very much depended on working with residents. The division of the city into small, sometimes overlapping units allowed work to progress in one area independently of any other areas – a type of “master plan” that relied on a process manager and a patchwork of planning ideas ultimately coming together as a whole. For example, if a housing block were slated for demolition, the residents of that division would be called together to create a communication forum. The following types of questions would then be addressed: Are further demolitions planned in the same area? Could the space be used in a different way (is there a need)? How does the standard of living in the quarter improve with the demolition? Who can use the empty space created by the demolition? What overall concept does the demolition address? Who is affected, and who should be involved? Throughout this process, the process manager moderated the flow of communication. Initiatives such as art, theater or sports festivals and temporary “planning academies” become part of the program and influenced the surrounding urban fabric. The charrette-type of forum was designed to strengthen local characteristics, test new identities and further acceptance of the planning results, as local stakeholders took on responsibility and involvement.

The *Kolorado* project for Halle-Neustadt has been lauded as an example of planning for the people with the people, and marks an instance of facilitating the involvement of local residents in what threatened to be an otherwise politically fraught and tedious planning and design process. The exact planning results were not predictable, which was not surprising as the focus was on the process, and the series of mechanisms used to gather information, allow citizen participation, and disseminate information about the results. Through participating in the decisions, the populace not only changed the culture of design and building, but also quickly became accepting of that changing

culture. In the case of Halle-Neustadt, it was the citizen-participants themselves who were largely responsible for formulating the urban design assignments before them.

The questions tackled in Halle-Neustadt reflect to a large extent what Germany’s federal government is asking in its broader urban mission, and express the country’s concerns for its future. Among such concerns are how to make cities more attractive for families, how to better tie public transit into urban structures, how to provide for an aging population, and above all, how to integrate it all. Added to these cultural questions are a slew of more technical issues such as building for climate change, with increased energy efficiency, or with more sustainable materials and methods, all of which become part of the question of *Baukultur* once we realize that the social questions can only be addressed through the physical means at our disposal.

A strong research focus in Germany, and one related to the question of urban planning and design, continues to be the question of how to house the population. Related to the question of building to better accommodate families in a nation that is plagued by a low birth rate – women in both West and East Germany now have 1.3 children on average, with only half of all college-educated women having more than one child<sup>11</sup> – much of the research has centered around the single-family home as part of an effort to offer more attractive and affordable housing options for traditional families. Such concerns are not new, but reflect federal policy priorities that stretch back to at least the Second Housing Law of 1956, a piece of federal legislation that favored owner-occupied, single-family housing over multi-family homes to encourage nuclear family households and to “root the populace to the soil”.<sup>12</sup>

Currently funded research has continued these policies in a new way, as it combines the social program of single-family housing with the technical one of reducing Germany’s energy consumption and carbon footprint through making the new generation of homes extremely energy efficient. The technical research has been augmented with studies examining the marketability of different types of housing. One federally-funded study by Weeber and Weeber<sup>13</sup> examined twenty-five model projects that have made urban

forms of the owner-occupied single-family home more available to broader segments of the population, in an attempt to persuade families to choose urban settings over a move to the suburbs. Part of an overall push to make cities more attractive to families, the projects covered are designed to appeal to better-situated households who have typically sought more spacious quarters and access to nature in the suburbs or in rural areas. Touting ideals such as “individually determined urban living,” and “urban living with the quality of life of the detached, single-family home,” the study lists house types as “urban villa”, “house-in-a-house”, “loft” and “penthouse”. Process is a major focus of this study, as the authors determine what methods are most efficient for bringing about the desired result. Organized client-groups and advisory boards form the basis for a more professionalized relationship between client and architect, one in which the client has a strongly organized voice within the building progression. The study lists life close to the central city as very desirable, but cites a parking spot on the property as close to the home as possible as an important criteria for house buyers. Further reflecting on the question of urban life and transportation, the study cites that a short commute to work increases the quality of life as it allows more time for family and recreation, but points out the economic effect is negligible in Germany, as generous mileage allowances for the commute by car remain tax deductible.

### **Car-free communities**

In its search for a family and elder-oriented, high-tech, ecologically conscious society, the German federal government has been remarkably silent on an important question that deals both with long-term urban design and planning and lifestyle decisions, namely, the continued prevalence of the individually owned car. To be sure, mass transit is a major concern in Germany and other European countries, with the German government having sponsored major studies on exemplary transit practices that increase the willingness of the population to use public transit – both for the commute to work or school, and for running errands on a daily basis.<sup>14</sup> There is common consensus that most cars spend a great deal of time parked, and that parking, especially in an urban context, takes up space that could be used otherwise. Yet the leap to restructuring the cultural question of mobility and transportation seems to be elusive.

Germany boasts several high-profile car-free communities, yet sponsors have been special-interest groups and housing enterprises in conjunction with local governments. The federal government’s lack of leadership is perhaps not surprising when one considers Germany’s strong auto industry. The Volkswagen group, including Volkswagen, Audi, Skoda, Seat, Bentley, Bugatti, Lamborghini, and Scania, has made Wolfsburg a company town, while Daimler-Benz is a major employer in Stuttgart, as is BMW in Munich. German automobile manufacturers produced over 5.5 million cars in 2008,<sup>15</sup> to a tune of €330.881 million (approx \$450 billion).<sup>16</sup> The industries are an important part of the German economy, and despite an increased commitment to more ecologically sound transportation through investments in developing more energy efficient vehicles and motors that use alternative fuel sources, the industry remains dependent on selling vehicles geared towards an individualized form of transportation. One’s own car is marketed as a major factor in individual expression and quality of life. Added to this is Germany’s strong infrastructure for a car culture. *Autobahns* are modern and equipped with a network of pleasant rest stops, while train service, though comfortable and efficient, has become more and more expensive over the years, making even Germany’s relatively high gasoline prices seem reasonable by comparison. Commutes to work remain tax deductible, with mileage rates covering gasoline, insurance, and depreciation of the car itself. There is thus little incentive to forego the car for either long-distance travel, or in many cases the trip to work.

Within urban communities, higher population and building densities, and the question of parking begin to paint a different picture. Here, public transportation is a necessity, and its enhancement as a way of improving urban quarters has been part of a widely strewn research area covered through the program *Vernetzung im Verkehr zu Verbesserung von städtischen Quartieren* (Creating Transportation Networks in Order to Improve the Quality of Urban Quarters). The program has examined how to improve problems associated with a car culture such as air pollution and a lack of adequate parking, yet does not go so far as to question the view that individual transportation is a given policy direction. Only eight of the thirty projects examine the problems associated with an inadequate public transportation system.<sup>17</sup>

When looking at the broader picture, the contradictions between the economic interests of the auto industry and the ecological and quality-of-life interests of the population remain in the shadows, with Germany's strong car culture continuing to play into the equation. That the federal government has funded research on zero or plus-energy houses without linking such research to a strong program to examine how the inhabitants can move beyond the walls of those houses in a more ecologically responsible manner is a matter of exploration for future policy direction.

Despite the lack of federal involvement, the idea of car-free housing developments in Germany has a long history that began with the first wave of ecological thinking in the 1970s, as cities built expansions to increase their housing stock. One of the first such communities was Langwasser, an area to the south of Nuremberg that began development in the 1950s as a conventional housing estate, with the car-free segment Langwasser P constructed between 1978-87 to house a population of 3,300. The 14-hectare site eliminated cars from its core area and provided facilities for them on the edge of the estate, an approach that was seen as revolutionary for a time when car ownership implied status, and conventional planning paradigms foresaw private cars to be parked very near individual dwellings. Urban planners in Nuremberg made use of a special amendment to the legal regulations of the Bavarian traffic law (*Straßen- und Wegegesetz, Sondernutzungssatzung*), rescinded in 1987, which allowed the building of pedestrian precincts in residential areas. Previously, such areas had only been allowed as pedestrian shopping zones.<sup>18</sup>

Langwasser P did not require residents to forgo owning a car – the community was simply configured to provide an innovative solution for their parking. Parking lots were located 150-200 meters from the apartment blocks, and paths between the two were roofed over. Carts and dollies were provided to transport heavy loads. Daily shopping facilities were located within the community, and public transit stops were located nearby. Green spaces were carefully planned to provide a variety of spaces for the residents, locating children's play areas close to homes but not in areas where playground noise would be a problem. Overall, studies report that the residents continue to view the increased quality of life as compensation for longer walking distances to their cars.<sup>19</sup>

Car-free housing projects have become a European phenomenon, but are often the initiative of private groups, such as private housing associations. Support at a government level comes in various forms – in the case of Bremen-Hollerland, another early car-free project that was initiated in 1992, the municipality received support through the European Union, which partially took over the costs of a “moderator” who coordinated the project, met with interested parties, took over publicity efforts, and documented the process. Bremen-Hollerland was the result of a political compromise that allowed a large meadow of outside Bremen to be divided into a nature preserve and an area for a new housing estate providing 210 apartments and row houses. Because of the proximity to the nature preserve, the concept called for a strong ecological identity, including watershed management and traffic reduction. With the help of a project manager who found interested parties, a grass-roots community organization was formed to explore the modalities and advantages of a car-free neighborhood. Bremen-Hollerland has one parking lot at the edge of the estate, used for cars held by a local car-sharing service, handicapped-access vehicles, and visitors. The reduced dependence on cars has been described as an “integrated energy-saving system,” as it considered housing and transportation in the greater context of how people living in the estate would organize their daily lives.

Despite a well-thought through approach, the builders of Bremen-Hollerland had trouble selling the homes. The area, which was only 5 km from the town center, was perceived as too isolated, and a planned rail connection never materialized. Added to this, a local economic downturn prevented many families from purchasing a new home. Nevertheless, Bremen-Hollerland continued to serve as an impetus for other projects that aimed to reduce the dependence on cars.<sup>20</sup>

Many more car-free housing projects have sprung up in Germany and other countries of Europe since the early 1990s. Recent German projects include: Bremen-Grünenstrasse, Freiburg-Vauban, Hamburg-Saarlandstrasse, Kassel-Unterneustadt, Munich-Kolumbusplatz, Munich-Riem, Münster-Gartensiedlung Weissenburg, and Tübingen-Französisches Viertel / Loretto Areal, with further projects planned in Berlin and Cologne. A project in Halle was realized through restructuring an existing area. Initiators of

these projects have in almost all cases been municipalities in conjunction with one or more citizen groups. The projects in Bremen and Berlin were initiated by citizen groups, while the project in Tübingen was initiated by the city alone. A small project in Karlsruhe – 13 detached single-family homes – has been funded in part through federal funds provided by the ExWoSt project *Kostengünstiger Qualitätsbewusster Neubau* (Cost-Efficient, Quality New Construction). The program itself was not aimed at producing car-free housing areas, but rather satisfying the desire for families who wished to live in a detached single-family house at an affordable price.<sup>21</sup> In addition to the decision to produce a car-free complex – which was limited to planning no individual parking on the properties – the potential to integrate offices into the homes was designed to allow a flexible work-life balance for the owners.

In the broader quest for *Baukultur*, questions remain: *how* should cities be structured, *how* should transportation be arranged, and *what forms* of housing should be built for the population? There is no doubt that the mechanisms the federal government has designed to establish programs, procedures and processes, communications and mediation, and funding programs, have done much to change the culture of building in Germany. The country has established itself as a forerunner in the area of energy research and environmentally conscious lifestyles, and it has explored new ways of achieving citizen involvement in the planning process. Yet much potential remains for exploring the integration of these questions in order to incorporate social and technical factors with the political and economic dynamics that are so much a part of urban and building design today. Writing from an American context, James Kushner argues that if cities were to cease imposing an obligation on housing developers to finance the automobile infrastructure, developers could market both car-based and car-free housing, and consumers would be able to understand the true costs of automobile ownership, the improved site environment, the lower housing costs, and the benefits of adopting a pedestrian lifestyle.<sup>22</sup> This is the type of big-picture thinking that is required for permanent and sustainable change.

The multitude of federally-funded projects in Germany – and the areas where such projects are lacking – have pointed a way to use experimental building pro-

grams to influence not only what is built, but also to generate creative means of finding the way in a process that results in society's investment in writing its own cultural codes. Far from a centrally-determined planning process, the paradigm used involves setting long-term planning goals while allowing flexibility for expansion, improvement, and implementation. The result, transferrable to other cultural contexts, is an integration of legislative, spatial and technical factors that in their interplay shape the society we choose to build.

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Note: All quotes from German source texts have been translated into English by the author.

<sup>1</sup> Bundesamt für Bauwesen und Raumordnung. *Baukultur in ExWoSt – Ein Verständigungsversuch*. Bonn/Leipzig [online publication], 2004.

<sup>2</sup> Paragraph 1.6.5 in the federal building code, available at <http://dejure.org/gesetze/BauGB/1.html> (3/15/2010).

<sup>3</sup> Baukultur in ExWoSt, 2004, 5.

<sup>4</sup> Bundesamt für Bauwesen und Raumordnung. *Städte der Zukunft: Kompass für den Weg zur Stadt der Zukunft*. Bonn [online publication], 2004.

<sup>5</sup> Baukultur in ExWoSt, 2004, 7.

<sup>6</sup> See Baukultur in ExWoSt, 2004. See also: Greiff, Diefenbach, Wullkopf, Schlussfolgerungen für eine auf zukünftige Fragestellungen ausgerichtete Bauforschung, unpublished manuscript, 2005.

<sup>7</sup> Bundesministerium für Verkehr, Bau und Stadtentwicklung / Bundesamt für Bauwesen und Raumordnung. *Best Practice/ Die gute Praxis 05: Building Culture and Urbanism in Germany and Europe*, Research Project commissioned by the Federal Office for Building and Regional Planning on Behalf of the Federal Ministry of Transport, Building and Housing, Working Document, 2005.

<sup>8</sup> Best Practice/ Die gute Praxis 05, 4.

<sup>9</sup> See Bader, Markus and Christof Mayer. "Kolorado Neustadt: Aktive Diversifizierung und situative Praxis im Stadtumbau." *Informationen zur Raumentwicklung*, No. 3/4 (2006), 179-189.

<sup>10</sup> Best Practice/ Die gute Praxis 05, 36-7.

<sup>11</sup> Statistisches Bundesamt, *Geburten in Deutschland*. Wiesbaden, 2007.

<http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Publikationen/Fachveroeffentlichungen/Bevoelkerung/BroschuereGeburtenDeutschland,property=file.pdf> (3/15/2005).

<sup>12</sup> "Das Volk mit dem Boden verwurzeln" was a stock phrase in the literature of the time.

<sup>13</sup> Weeber, Hannes and Rotraut Weeber. *Eigenheimqualitäten in der Stadt*. Stuttgart / Berlin [online publication], 2004.

<sup>14</sup> Bundesministerium für Verkehr, Bau und Stadtentwicklung / Bundesamt für Bauwesen und Raumordnung. *Nachhaltiger Stadtverkehr und benachteiligte*

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*Stadtquartiere: Gute Praxisbeispiele für Europa*. [Online publication], 11/2007.

<sup>15</sup> Verband der Automobilindustrie, <http://www.vda.de/de/zahlen/jahreszahlen/automobilproduktion/> (3/15/2010).

<sup>16</sup> Verband der Automobilindustrie <http://www.vda.de/de/zahlen/jahreszahlen/allgemeines/> (3/15/2010).

<sup>17</sup> Bundesministerium für Verkehr, Bau und Stadtentwicklung / Bundesamt für Bauwesen und Raumordnung. *Vernetzung im Verkehr: Gute Beispiele der Verbesserung von städtischen Quartieren*. Bonn [online publication], 2008, 94-5.

<sup>18</sup> <http://www.eaue.de/winuwd/177.HTM> (3/15/2010).

<sup>19</sup> "Nuremberg (Nuremberg): Car-free living in a large-scale estate." <http://www.eaue.de/winuwd/177.htm> (3/15/2010).

<sup>20</sup> Viets, Renate. "Autofreie Wohnquartiere oder reduzierter MIV – Konzepte und Probleme bei der Umsetzung" <http://www.lpb-bw.de/publikationen/forum6/forum6i.htm> (3/15/2010).

<sup>21</sup> Best Practice/ Die gute Praxis 05, 46-7.

<sup>22</sup> Kushner, James A. "Car-free housing developments: towards sustainable smart growth and urban regeneration through car-free zoning, car-free redevelopment, pedestrian improvement districts, and new urbanism." *UCLA Journal of Environmental Law & Policy*, vol. 23 no. 1 (2005), 3.

# Individuality in Place-making at End-of-Life: Gerontopia

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## ABSTRACT

Focusing on the individuality of human beings in end-of-life settings, this paper seeks to elevate the discussion on meaning of place through design. Commonly, designers' concern for function, form, and space is in designing for the average user in aggregate. Useful social research provides a broad theoretical backdrop relating to environments and aging. Unfortunately, little work exists that can be extrapolated for the uniqueness of individuals engaged with their environment during the process of dying. Yet, in hospice settings, the power of place is tremendous.

This paper addresses approaches in studying place using reported data from three previous qualitative studies completed by the author. For hospice patients, the deathbed is where the individual exerts preferences and desires for a wide range of connectedness to their environment. Beyond meeting functional requirements, symbols of individual history and connectedness imbued with meaningful personal treasures empower identity and belonging. Deathbed settings are enhanced with opportunities for individual control and preferences that enable independence and contentment. Furthermore, these deathbed places are saturated with options for multiple sensory feedbacks that calm, comfort, and reassure.

The weighted personal value of place is captured in the author's term *Gerontopia*—the place where we want to grow old and die. Coined from the Greek roots *geron* referring to "old age" and *topia* meaning "a place", a Gerontopia is characterized by individual preferences and choices for highly individualized and familiar environments

which meaningfully unite personal lives to place. Designers are well equipped to work with individuals as optimal, ideal places are visualized, romantic aesthetics are contemplated, and meaningful places are created.

Promoting place-making into design practice begins with listening to the voices of patients and caregivers. The words at first are ineffable and idiosyncratic impressions, individual imaginations, and personal interpretations to describe meaningful inhabitation. At some point, the images become "concretized" as Norberg-Schulz explains basic properties of existence become "visible" as a concrete, local situation.

A graphical place-making model is illustrated for future research and practice. The model reflects social research theory and maps individual characteristics throughout the life span where meaning of place takes central stage. Specifically, the model graphs the following:

- Individual competence and fit with environment (Pastalan, 1982; Lawton and Nahemow, 1973),
- Cultural/personal/social makeup of an individual (Altman and Chemers, 1980; Canter 1997),
- Change during the life span (Lawton and Nahemow, 1973; Canter 1997),
- Level of meaning and connectedness to place (Tofle, 2009; Tofle and Park, 2009), and
- Variation of lifespan slopes.

Utilizing both objective and subjective perspectives, the thinking and the feeling, the designer's modus operandi is enhanced in creating meaningful places for end-of-life. The combination of these perspectives seeks to capture the essence of *Gerontopia*—the place where we want to grow old and die.

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## INTRODUCTION

Focusing on the individuality of human beings in end-of-life settings, this paper seeks to elevate the discussion on meaning of place through design. Individual meaning of place tends to follow a designer's concern for function, form, and space in designing for the average user in aggregate. While there is useful social research in designing for aging adults, little work exists that can be extrapolated for the individuality of the dynamic aging and dying process when place-making plays a powerful role.

Utilizing both objective and subjective perspectives, the thinking and the feeling, the designer's *modus operandi* for creating end-of-life settings can be enhanced. The combination of these perspectives seeks to capture the essence of *Gerontopia*—the place where we want to grow old and die.

### **Background Perspectives and Inquiry**

#### **1. Paradigms of social research to understand people in aggregate.**

Social science research examines people in aggregate who inhabit and use the spaces of architecture. Work traditionally referred to as "environment and behavior research", utilizes three environmental adaptation paradigms that are helpful in understanding meaning of place: environmental adaptation, opportunity structure, and sociocultural (Canter, 1997). The first, *environmental adaptation* is exemplified in the well established competence-press model initiated by Lawton and Nahemow (1973). That is, the more vulnerable people are with failing health and low competence, the more impact or *press* the environment has on them. The five domains of competence (Lawton and Nahemow, 1973) are: biological health, sensory-perceptual functioning, motor skills, cognitive skills, and ego strength. Competence is described as the theoretical upper limit of a person's capacity to function. Environmental press refers to the demands placed on a person. Adaptation level is where press is in balance for a particular level of competence.

This work stems from the earlier work of Kurt Lewin's (1936) conceptualization of the person-environment interaction and optimal aging:  $B = f(P, E)$  where behavior is the function of both the person and the environment. In the competence and environmental press model, behavior is a result of a person with a particular competence in an environment of a specific press level. Behaviors exist on a positive-negative continuum and are observable with the behaviors and affect levels.

The impact of an environmental press is greater as personal competence diminishes. Commonly, the competence-press model provides good justification for functional accommodations in the environment to compensate for low competence. That is, designers specify practical prosthetic

equipment and design architectural modifications for functional and sensory disabilities. As a criticism, the competence-press model is less helpful in addressing meaning and cognitive parameters of how an environment can contribute to a person's quality of life.

The second paradigm described by Canter is *opportunity structure* with a focus on the

options for action that the environment makes available and how people can select or manipulate settings to make possible those patterns of behavior, or styles of life, to which they aspire (p. 112).

Symbolic interactionism (Blumer 1969; Herman and Reynolds 1994) embraces the importance of meaning in one's environment and the symbols that are used for the purpose of communication. A criticism of symbolic interaction theory is the trap where styles get substituted for substance.

The third paradigm recognized by Saegeret and Winkel (1990) is *sociocultural* where

The person as a social agent seeks and creates meanings in the environment... The paradigm...explicitly recognizes that environmental meanings and actions are not solely individual constructions (p. 452,465).

An example of a broadened sociocultural perspective on meaning of place is the Altman and Chemers (1980; *Culture and Environment*) framework. Their model includes:

- (1) environmental outcomes (built environment, homes, farms, cities);
- (2) environmental behaviors and processes (privacy, personal space, territoriality, crowding);
- (3) environmental cognitions (perception, coding, memory, judgments);
- (4) environmental orientations and world views (cosmology, religion, values, norms);
- (5) natural environment (topography, climate, flora, fauna). (p.10)

Again examining people in aggregate, but in a dynamic view of time, Pastalan (1982) describes the Loss Continuum Model where aging is viewed as a progressive series of losses that reduces one's social participation. There is a shrinking of the environment with age and losses in health. In young adulthood individuals may be healthy; later life is marked with increasing physical decline; and the greatest physical limitations are among those who are home bound or receiving institutional care.

These three social research paradigms provide the context of aging and environment. Rather than designing for the average user in aggregate, the challenge is to design for individuality where place can be rewarding and empowering.

## 2. Aging, place-making, and changing individuals.

Over the course of a life span there are usually multiple moves to different houses and geographical locations. Nearing late life, some elders wish to “age in place” by making house modifications. In the best of situations, there is a good “fit” (Lawton and Nahemow, 1973) between them and their residence. The component of change over time is embraced in Lawton’s *competence-pressure model* and helps to explain the aging process with increased disabilities and a growing reliance on the environment. How rapid the afflictions and disabilities occur in the life span are, of course individual and happen at different chronological ages.

From protective crib to the deathbed, over the course of the life span from early childhood to frail elderly, the demands of the environment vary widely. People not only experience changes in their buildings and in themselves, they also experience the struggle to accommodate the complexity of these changes happening simultaneously. When a person experiences disabilities in ambulation and sight, ideally their environment can be adjusted to compensate. When individuals have disabilities and they are without resources to make environmental changes, their competence in performing activities of daily living are impeded.

Because of actual or anticipated problems, individuals may choose to relocate because of a combination of exacerbating reasons—economic security, family crisis, a desire to move closer to family and support services, and comfort (Oswald, Shilling, Wahl, & Gang, 2002; DeJong, Wilmoth, Angel, & Cornwell, 1995). When there is not this good “fit,” relocation can be seen as a result of push and pull factors. According to Gonyea, for example, push factors are “the life events or circumstances that loosen an individual’s attachment to his or her current residence and lead him or her to consider relocation” (2006:563).

Just as buildings change use and change occupants, experience adaptations, and become dilapidated, people change in the type and intensity of activities they can perform, their financial and health capacities, aspirations, and attachment to place. When individuals relocate, the process of place-making also begins again. Place attachment is a process, not frozen in time, but evolves over time and takes on meaning at different rates for different individuals. It is our individual accumulated experiences that create place attachment during a life span.

## Gerontopia

### 1. Approaches in studying place: Outsideness and insideness

*Outsideness.* Two approaches to studying place are “outsideness” and “insideness” (Seamon, 1979; Buttimer, 1977). The outsider’s view is a detached observer and the insider’s view is grounded in everyday experiences. Using what could be called an outside perspective, Canter provides a framework built on the theory that place experience combines individual, social, and cultural processes in the *facet theory* to quantitatively test hypotheses about place experiences.

Evaluation of places are the products of assessing how the components of places combine to help people achieve a variety of objectives.... (T)he acoustics of a concert hall might be hypothesized as being the best predictor of the evaluation of most other aspects of the place.... It would be identifiable from an empirical structure that revealed variables that had high average correlations with all the other variables. The fundamental hypothesis here is that there will actually be variables that have a high average correlation with many other aspects of evaluation, rather than there being a lot of separate groupings of intercorrelations. ...these variables are likely to be central to the configuration as well as having a conceptual centrality to the experience of that place. (Canter, 1997:137-138).

*Insideness.* Designers are more educated in creating environments than in facilitating meaning in them. They are generally more adept at the objective thinking required in modifying functional inadequacies than being in touch with an individual’s subjective feelings and interpretations of how the environment could meaningfully enable and empower connectedness.

As human beings, we have a level of understanding that at times can be powerfully meaningful. We are aware of places at moments of significant life defining events. We can remember the specifics of where we learned to ride a bike and had our first kiss. A residence can be the embodiment of joyful memories providing comfort throughout life and in the dying process. In a recent study of the author’s, when a 91 year old woman was asked what she was most proud of, she said,

Well of course I’m proud of my children, but I’m really proud of this house where I have lived since I was married just after War II...this is where I raised my children and it’s still a wonderful place for me now that I’m old. My bedroom is where I want to die—it would be a good ending.

In the last stages of life, family members often use photos and memorabilia of meaningful places to remind loved ones of pleasant experiences and emotions. A dying person eventually loses consciousness and awareness of their environment. If the patient is fortunate to have loving family and caregivers nearby, awareness of the environment

continues to be important to them to carry out the wishes of their loved one past the time when a person is conscious. As in symbolic interactionism, the meaning of one's life can be exhibited in the environment and its symbols serve the purpose of communication. Symbols are useful to patients and also to visiting family and friends to tell life stories as trophies, portraits, and newspaper articles communicate life's benchmarks.

Being able to interpret the core of an individual's aspirations for the deathbed is what one would like throughout one's life—an intimate place which is familiar, comfortable, and nurturing. Hospice individuals and family members are in the unique situation of planning the place of the deathbed. In the process of this decision making, emotional connections to a setting and the "spirit of the place" matter to a hospice patient.

*Genius loci* refers to a location's distinctive atmosphere, or spirit of place. The term is derived from Roman mythology where *genius loci* was the protective spirit of a place. The spirit of the place where a hospice patient may choose to die has profound implications for place-making and is studied as phenomenology. Christian Norberg-Schulz's *Genius Loci: Towards a Phenomenology of Architecture* says...(poetry) concretizes basic properties of existence.

'Concretize' here means to make the general 'visible' as a concrete, local situation. In doing this, the poem moves to the opposite direction of scientific thought. Whereas science departs from the 'given', poetry brings us back to the concrete things, uncovering the meanings inherent in the life-world (1979, p. 10; Norberg-Schulz, 1963).

From the inside perspective, a poem can capture the sounds, sights, and nostalgia of personal preferences:

When I am old, I will dwell at the windowsill.  
Near a family genealogy—photos, pillows and pearls.  
Recall history as nostalgia; sweeten knowledge that was suppressed; regenerate legend for the hereafter.  
The lessons of life are best remembered while rocking in a creaking rocking chair.  
Telling folktales, swaying back and forth. life is simple, life is predictable.  
From past to present, from present to past. I know this place, I call it home.

When death comes close, I still want to dwell at the windowsill.  
Too weak to chew an apple, a knowing caregiver scrapes the pulp with the round of a spoon to feed.  
Like mother scraped, when I was sick, like I scraped for my babies, before teeth.  
Respiration labored, words slurred, caregivers take a feverish hand.  
The illumination now darker, oxygen more scarce.  
Begin and end in the horizontal bed. Alpha and omega: birth and death.  
Glorious and savage rites. And the capricious globe whirrs.  
I know this place—where death comes, my eyes will close. My last home. (Brent, 1999: p 63)

Ralph (1976) argues that places have meaning in direct proportion to the degree that one feels inside that place. Insideness has the deepest experience of place involving an unself-conscious immersion in place. It is the empathic insider, according to Buttner (1977), who is best able to mediate between people who live in places and those who plan for those places.

## 2. *Connectedness for individuals in end-of-life care.*

Substantial differences exist between states and the number of people who die in hospitals, private housing, and nursing homes. According to the Center for Gerontology and Health Care Research (2004), nearly 50 % of Americans who died from chronic illnesses in 2001 died in the hospital, 23% died at their house, and 23.2% died in a nursing home.

Anticipating one's end of life, hospice patients and their family members are challenged to plan the place of death. Last Acts (2002), a coalition of more than 400 organizations, recommends facilitating a patient's death in his or her preferred location. The priority given to preferred location reflects the end-of-life movement empowering patients and families to control the decision-making process in preparing the physical setting where death occurs for terminally ill patients.

Healthcare providers and volunteers serving as trained hospice caregivers were interviewed by the author. Original data was collected and reported in qualitative studies of (1) elders in long term care (Brent, 1999), (2) hospice caregivers in institutional and private dwellings (Tofle, 2009), and (3) comparisons of hospice caregivers in private dwellings in the U.S. and Korea (Tofle and Park, 2009). Hospice patients and caregivers described the ideal place for dying by associating it with places where they experienced delight, comparing it to places travelled, analyzing attributes of both the private dwelling and institutions, arguing for a place that afforded closeness to loved ones and pets.

Focusing on hospice patients and their caregivers, individuals exert preferences for the place where they would like to be in that last stage of life. The meaning of this connectedness assumes a wide range of possibilities. In the qualitative study of hospice caregivers, the strong desire for connectedness was demonstrated in:

- Connecting with the outside world (telephone, email, Skype, favorite music, television, radio, video-taping)
- Connecting with nature (windows and balconies with natural light and a view, plants, protective pets, linens air-dried outside, snow and falling rain, garden, flowering plants from bulbs decades old from family, flowers fresh picked from garden)

- Connecting with people (visiting with friends dropping by and helping with chores, mail delivery, family routines, journal writing, singing & reciting poetry with family, “Skyping” for visual connection, watching neighborhood passersby and children building snowmen from window)
- Connecting with home (being part of holiday celebrations and traditions, privacy, freedom to do what you want)
- Connecting with memorabilia giving identity (acknowledgements of a rich life lived—sentimental gifts from loved ones triggering memories, hand-stitched patchwork quilt of childhood dresses, heirloom linens, photographs of loved ones and places travelled, souvenirs, legacy journals, art, cards, valentines, beauty queen crown, wedding ring & jewellery, trophies)
- Connecting with spiritual transcendence (sunsets, rainbows, candlelit meals, view to nature, religious materials, burning incense) (Tofle, 2009).

Hospice caregivers gave examples of how the environment empowered. Specific examples were organized by themes of meaning, control/preference, and sensory perception as described below:

- Meaning. Pets and family members curled up and snuggling with patient on hospital bed, “altars” with religious items, heirloom blankets and pillowcases, out-of-season Christmas trees with decorative wrapped presents....
- Control/preference. Operable windows for fresh air, dictating letters, audio-video taping, keeping “legacy journals”, speaker telephone and boom box with favorite music, the disguising of a make-shift potty, being able to sleep without being disturbed....
- Sensory perception. View to the outdoors; photos and plants, stroking the fur of pets, listening to others play piano, being able to cry, moan, and scream without being heard by neighbors ....

In a follow-up study of hospice caregivers in Korea, similar results were found with some differences in cultural expression. End-of-life care was in dense Korean apartment high rises and connection to nature was achieved by going to an apartment’s balcony, individuals preferred to sleep on the floor, and the smell of burning incense contributed to the comfort of the dying individual.

### **3. Elevating the meaning of place in end-of-life care through design.**

Unlike those of us who may not choose our final place, terminally ill individuals and their family members are faced with wrenching questions of where that last place will be located and what it will be like. For a small number of individuals, the purpose-built hospice facility is an option for end-of-life care. Hospice architects Scott and Valins (1999) considered quality of life such as windows with a view; acoustics to facilitate reflection, spiritual meditation, and intimate discussion; surfaces that facilitate posting joyful family photos; close connections to nature and aromas of home cooking; patient control of daylight and music; and other patient-driven choices and means of control that relate to privacy and independence, sensory stimulation, and connections with family and friends. More recently, Verderber and Refuerzo offer illustrations of existing hospice facilities with case studies and narratives confirming the positive role of the purpose-built hospice in *Innovations in Hospice Architecture* (2006).

Beyond function, space, and form, interior designers and architects give emphasis to the subjective and achievable goals of aesthetics. The natural environment contributes to realizing the goals of aesthetics and is often associated with having the ability to comfort and transcend. In addition, Kaplan (2009) argues that nature contributes to well being:

There is a substantial body of research that has shown the role that natural environments can play to offset such mental fatigue; many studies have also shown that such natural settings need not be large, nor is it necessary to be physically situated in them. Even a few trees in the view from the window can make a substantial difference in well being and behavior (page 2).

The terms *place identity*, *sense of place*, and *place attachment* are described by Kopec (2006) in making the argument that interior designers and architects can facilitate meaning of place and place-making. When people incorporate a place into their larger concept of their own identities or sense of self, they achieve place identity. When people have a level of comfort and feel of safety associated with a place, it translates to a sense of belonging and people can achieve a sense of place. When people form an emotional bond with their immediate social and physical environment, they achieve place attachment.

Unfortunately, for most hospice patients, purpose-built hospice facilities are unavailable and place-making is left up to patients and their families. In this process of place-making, all the issues of the designed environment come into play. Patience, communication, ability to afford individual requests, and the level of support from family and friends contribute to place-making.

More than the parameters of function, form, and space, discussion is often trumped by emotional considerations.

Utilizing both objective and subjective feeling, the *modus operandi* for end-of-life settings can be enhanced.

The combination of these thinking and feeling perspectives seeks to capture the essence of *Gerontopia*—the place where we want to grow old and die. Coined from the Greek roots “geron” referring to old age and “topia” meaning a place, they are characterized by individual preferences for highly individualized and familiar environments which meaningfully connects personal lives to place. Designers are well equipped to work with individuals as optimal, ideal places are visualized, romantic aesthetics are contemplated, and meaningful places are created.

Gerontopias are not listed as most beautiful homes or prototypes to be built. Gerontopias do not have checklists with vintage memorabilia or catalogues of best fixtures and furnishings to specify. Promoting place-making into design practice begins with listening to the voices of local users. At first the words are ineffable and idiosyncratic impressions, individual imaginations, and personal interpretations to describe meaningful inhabitation. The words may focus on what is their impression of a pleasant setting, aesthetic beauty, and emotional fulfilment. At some point, the images become *concretized* as Norberg-Schulz explains basic properties of existence become “visible” as a concrete, local situation.

Beyond identifying the characteristics of where one would like to grow old and die, a graphical model of Gerontopia is provided for future research and practice. The *Lifespan Model: Place Connectedness & Competence* is unique in that it reflects a way to map the characteristics of individuals as follows (Figure 1):

- *Individual competence and fit with environment* (Pastalan, 1982; Lawton and Nahemow,1973). Slopes are illustrated as plotted curves for three individuals A,B, & C.
- *Cultural/personal/social makeup of an individual* (Altman and Chemers, 1980; Canter 1997). Individuals’ characteristics are illustrated as disks.
- *Change during the life span* (Lawton and Nahemow,1973; Canter 1997). The x axis represents time from birth to death.
- *Level of meaning and connectedness to place* (Tofle,2009; Tofle & Park,2009). The y axis represents connectedness through knowing as conscious appreciation of place.
- *Variation of lifespan slopes.* Gerontopia is achieved with ideal place connectedness, competence, and “good fit” between person and

place during the life span as represented by an upward slope for individual A. In this ideal situation, modifications are achieved, competence is good, and memories of place connectedness continue to accumulate. Alternatively, variations of downward slopes represent “poor fit” between person and place for individuals B and C when modifications are not made, competence declines, and connectedness to place diminishes with time and eventual death.

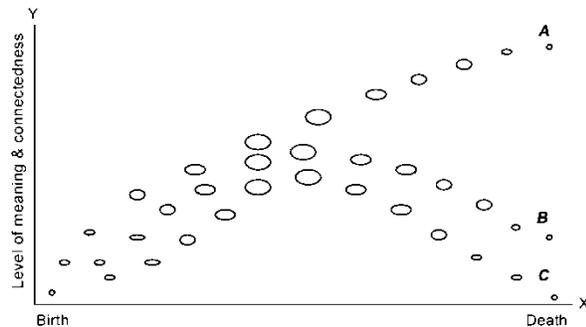


Figure 1: Lifespan Model of Place Connectedness and Competence

The ideal situation is our best hope. In this case, the places where individuals want to grow old and die evolves over time with new experiences. While there are declines in health with aging, the environment adapts to be supportive and the individual continues to be aware, appreciate, conscious of, and connected to the environment that nurtures, enables, and empowers.

The worst situation represents our greatest fears. In this case, individuals experience health declines with aging but the environment fails to be supportive and individuals find themselves alone in residences that are empty, devoid of any positive symbols or benchmarks from their life, and television noises ineffectively fill the emptiness of the housing space.

### Conclusions

Demonstrating that hospice settings benefit from the power of place, this study suggests a close relationship of the design of place, connectedness, belonging, and competence thereby framing future research with this design strategy. Furthermore, the formulation of Gerontopia can be a construct operationalized by identified variables. Beyond meeting functional requirements, an argument is made to emphasize individual history and connectedness imbued with meaningful personal treasures that empower identity and belonging. These settings may be enhanced with opportunities for individual control and preferences that enable independence and contentment. And, they may be saturated with multiple sensory feedbacks that calm, comfort,

and reassure. Architects, interior designers, caregivers, and patients themselves are challenged to elevate the meaning of place by grasping its individuality and the notion of Gerontopia—where we want to grow old and die. Stressing

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the individuality of aging and dying, ultimately, the real designers are the dwellers themselves. As Heidegger says, dwelling is the essence of being, humans dwell in place.

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## PRESENTATION SESSIONS | **SOCIAL / CULTURAL**

Session Three

Moderator: Leonard R. Bachman



## Slum Fictions: De-delimiting Place in Nairobi

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*Today we start to realize that true freedom presupposes belonging, and that 'dwelling' means belonging to a concrete place.<sup>i</sup>*

– C. Norberg Shultz

The global proliferation of slums urges us to reconsider the way we think about 'place' in architecture. What does Juhanni Palasmaa's nostalgic sound of rain on his tin roof<sup>ii</sup> 'mean' to a resident of Nairobi's Kibera, one of Africa's largest slums, where such events create a deafening white noise resulting in flooded streets and homes, sickness, and even a rise in crime? How can the poetic voice of weathered materials and patina capture the imagination of one ceaselessly surrounded by a recycled and deteriorating world? The condition of the slum is arguably more closely linked to notions of non-place<sup>iii</sup> as a vessel for social mobility, yet it is most often indented and discussed as a physical 'place' with definitive geographical boundaries and hard urban edges. Provoked by Saskia Sassen's informal borderlands and fragmented topographies, this essay examines the use of 'place' in the context of our rapidly urbanizing world, and particularly in Nairobi. The 'environmental character' of place, as Norberg-Shultz phrases it, is not considered here as solely the physical makeup of that space, nor as exclusively linked to subjective memory. Instead, place is considered here as a complex fictional construct, formed from our tendencies to compartmentalize spatial and human relations in order to better understand them. Yet this kind of fictional 'place' ultimately undermines the role of the slum as an integral component of our urban networks and perpetuates strategies ultimately denying slum dwellers the sense of 'place' they are entitled to.

### 'Nairobi, that is not a place'

To consider 'place' as it relates to informal settlements presents a peculiar prompt, as both 'place' and 'slum' are inherently problematic terms. As Tim Cresswell writes, "[despite the] general enthusiasm for the study of places there is very little considered understanding of what the word 'place' means."<sup>iv</sup> It is often paired with its even vaguer sibling, space, in an ongoing discussion of how the ubiquity of space can morph into place through time, interaction and memory. A worthy discussion of the relationship between the two exceeds the scope of this essay; however, it is important to be mindful of it in relation to informal settlements. Space, for Yi-Fu Tuan, can be considered as a resource that "yields wealth and power when properly exploited,"<sup>v</sup> and David Harvey has similarly insisted, for decades, that we be mindful of the spatial implications of capitalism, noting the difference between "place-bound feudal powers" and the urban "labor power in space."<sup>vi</sup> Harvey's linking of place with the feudal system and peasant labor, resonates with John Berger's observations of the relationship between the peasant laborer and the land on which they worked, the cyclical patterns of time and activities specific to their 'culture of survival'.<sup>vii</sup> This frames the familiar schism between rural/pastoral and urban/industrial conditions, where 'place' is linked intimately to the natural rhythms and processes of the landscape while the city is characterized as a disconnected aggregate of capital in an existential vacuum. In Kenya, these sentiments are seemingly amplified. Beyond the Marxist position of Harvey's 'spatial fix', we might consider the following anecdote by Dr. Rob Campbell of Montana State University describing a conversation with a Kenyan colleague named Leketari during the 1980s.

...I had one evening told him that I was heading back to Nairobi - we were both working for a biologist in the Maasai Mara...Not missing a beat, he said simply - "Nairobi, that is not a place." Context is, of course, everything. And it'd require a much longer response to consider what he meant. He'd been to Nairobi, but he certainly wasn't from Nairobi. He grew up in the Naibor Keju area of northern Kenya, near the town of Wamba. His world was and is one of cattle keeping, wet seasons, and dry seasons - following the grass and the rain. For Leketari that was a place - the confusion, chaos, anonymity, and emptiness of Nairobi stripped it, I think, of its 'placeness'.<sup>viii</sup>



Figure 1 – Nairobi’s Kibera with Slum Upgrading project in background

Leketari’s sentiment is not uncommon in Kenya where ‘place’, like its enigmatic sibling ‘home’, is inextricably tied to birth and burial customs, evidenced in the highly publicized legal dispute over the location for Nairobi lawyer S. M. Otieno’s interment in 1987.<sup>ix</sup> His rural Luo clan claimed he must be buried in Western Kenya, their lawyer arguing that if not buried in his home village alongside his placenta, “the spirit of Otieno would haunt his Luo family.”<sup>x</sup> Otieno’s widow, Virginia Wambui, countered that Otieno was a modern Kenyan who spent most of his life raising a family in Nairobi, owning properties in various locations, and whose lifestyle was culturally diverse. Hence, he should be buried in Nairobi, where he lived and worked. Wambui’s plea ultimately fell short as the clan claimed victory, with such tensions over burial location persisting today.<sup>xi</sup>

This essential link between Kenyan identity and the land, as illustrated by the Kikuyu aphorism that ‘people are land, land is people’, further extends to labor. In Jomo Kenyatta’s detailed account of his Kikuyu roots, he states that, “As agriculturists, the Gikuyu people depend entirely on the land. It supplies them with the material needs of life, through which spiritual and mental contentment is achieved.”<sup>xii</sup> John Lonsdale further notes that the “modern experience of urban labor and slum-dwelling has lent a new note of anxiety” to Kenya due to their long history of working on and with the land.<sup>xiii</sup> It can be deduced that, as

in many global cultures, such sentiments remain in the Kenyan foreground,<sup>xiv</sup> yet it would be shortsighted to exclusively link ‘placeness’ in Kenya to an existential bond between human and soil. To be ‘sons of the soil’, and Lonsdale argues it is always sons, depends on a patriarchal sociopolitical framework, ‘place’ reinforced by generations of established social and gender hierarchies. Lonsdale further argues that gender roles play a significant role in Kenyan perceptions of urbanization where the city “is treacherously female territory,” due to its historical protection of rural women fleeing from oppression.<sup>xv</sup>

Thus, while it is futile to attempt to circumscribe the notion of ‘place’, ‘belonging’, or ‘home’ in Kenya related to these essential factors, it becomes at least partially understandable why Nairobi might be described as ‘not a place’, by a rural Kenyan (Leketari) reflecting on his country’s ongoing modernization.

### Safe Places, Slum Fictions

With this in mind, we return to the issue of ‘placeness’ in Nairobi in terms of social segregation and differentiation. Related to Harvey’s sentiments towards gated communities, Cresswell writes that place as “a secure bounded community” is often positioned against what Harvey calls the “uncontrolled vectors of spatiality...against fluidity and flux which are portrayed as threatening.”<sup>xvi</sup> The

emphasis on security and place echoes both Tuan<sup>xvii</sup> and Bachelard,<sup>xviii</sup> with Don Mitchell further noting that our post-9/11 society has accelerated the shift towards exclusionary 'place' as Manhattan rids itself of 'undesirables'.<sup>xix</sup> Meanwhile, Mike Davis ends his comprehensive discussion of the global slum with an even more ominous take on the future of our cities based on class segregation.

With coldblood lucidity, [war planners] now assert that the 'feral, feudal cities' of the Third World – especially their slum outskirts – will be distinctive battlespace of the twenty-first century. Pentagon doctrine is being reshaped accordingly to support a low-intensity world war of unlimited duration against criminalized segments of the urban poor.<sup>xx</sup>

The numerous gated communities in suburban Nairobi clearly highlight such hardened borders between rich and poor, a utopian ideal entrenched during colonial times. Commenting on Nairobi's claim in tourism brochures of being a 'pleasant place', Robert Neuwirth notes the underlying reality for the majority of Nairobi's inhabitants is that they "will never be part of that city."<sup>xxi</sup> Yet internal segregation, as a form of exclusionary territorial behavior, is also on the rise in the slum as Kikuyu, Luo and Luhya have been increasingly dividing their territories into clan-based enclaves, establishing new borders within Kibera.<sup>xxii</sup> These constructed 'places', Lonsdale argues, have less to do with local protection against globalization or crime, than "against the daily inequalities, the unpredictable inclusions and exclusions by which their states decide who is to gain from global linkages, and who bear their local costs."<sup>xxiii</sup>

Place, as here linked to security, identity, and politics, is worthy of further consideration. As Davis concludes, the hard line between the poor and the rich has intensified. Yet given that territorial behavior forms the grounds for progressive and/or exclusionary politics, Harvey insists that place, when seen as a *social construct*, can help us understand emerging, or perhaps evolving, notions of difference and otherness. In the collective strife against imbalanced distribution of opportunity depending on one's ethnic affiliations, many Nairobi slum dwellers seek their 'well-being' in the comfort of 'places' linked to their rural 'homes', this process of territorialization further securing the role of the slums in mediating between the urban and rural. This is an essential point that J. O. Ocho has emphasized - the slum dweller is neither 'at home' nor 'in the city'.<sup>xxiv</sup>

Thus, if 'place' is indeed considered to be primarily a *social construct* as Harvey argues, what does this mean in the context of the slum and why is this important for architectural discourse? Most architectural attention towards the slums has focused on creating 'places' *in* the slums. Such interventions perhaps hope to capture the physical 'placeness' of the slum, or inject new 'placeness' into it, by directly improving the 'quality' of the built environment, a worthy effort not to be disregarded here. There is undoubtedly an urgent global crisis demanding prompt attention and architecture has the capacity to directly improve these conditions. But we must also be mindful that, as Marie Huchzermeyer points out, there are limitations to strictly focusing on the physical conditions. For instance, slum upgrading projects, which NGOs such as UN-HABITAT have admirably embraced alongside their governmental allies, are often increasingly desired by the middle-class and eventually become unaffordable for the people they were designed for.<sup>xxv</sup>

Yet while 'place' clearly transcends physical space, how it is described and fabricated can also be problematic. Filip de Boeck has colorfully posited, using Congo's Kinshasa as an example, that colonialism not only physically altered the 'placeness' of African countries, but also constructed a sense of 'place' that was never there to begin with. He describes how this process of misrepresentation creates a "fault-line between representation and reality so characteristic of the problematic place of 'place' in the colonial and postcolonial periods."<sup>xxvi</sup> Today, this rupture arguably persists in the misrepresentations of the modernizing African city. The images of slums such as Kibera are projected to the developed world through NGOs, government organizations, and, more recently, by researchers and even tourists. Residents of Kibera jokingly claim that there are more people in Kibera trying to help than there are people living there.<sup>xxvii</sup> Photojournalists such as Jonas Bendiksen offer colorful and ethereal photos that suggest 'placeness' in various slums, including Kibera;<sup>xxviii</sup> films such as *Slumdog Millionaire* (2008) and *City of God* (2002) bring slums to DVD players around the globe; in architecture we witness digital renderings of proposed solutions and critique the appropriateness of slum-upgrading schemes that were so adamantly opposed, in earlier decades, by architects such as John Turner and John Habraken.<sup>xxix</sup>

But this kind of slum representation and discussion only further moulds the slum into a 'place', as a fictional geography delineated from the city through its economic

disparity and physical degradation. In our fascinations with the dynamics of the informal city as 'the other', as Koolhaas has alluded to,<sup>xxx</sup> we begin treating the slum as a site for intervention, myriad efforts organized to heal the slums' social, economic, and physical wounds, while documenting these shocking landscapes of informal human congestion. One must assume, or perhaps hope, that such efforts and accompanying representations are intended to raise awareness towards improving the living conditions in slums, but we must also be mindful of the tendency for these representations to turn into spectacles, consumed from the safety of more comfortable 'places'. Jane Rendell has similarly questioned artistic fixations on dilapidated urban environments by asking, "[is] this a vision that only someone removed from the realities of living in these poorly maintained environments could afford to have?"<sup>xxxi</sup>

And this is precisely the problem. By fixating on the fabricated slum image as a defined 'place' overshadows its actual 'placeness' as a complex *social construct* defined through its myriad networks and interactions. It categorizes the slum as an urban enclave with rigid boundaries no different than those of the gated communities. Whether rich or poor there is evidenced a certain comfort, and in some cases necessity, in packaging people into such identifiable categories – socially and spatially. For instance, UN-HABITAT has used a satellite image of Nairobi with the slums colored in bright red while the golf courses are accentuated in bright green. While this is clearly intended to expose the perversity of imbalanced land distribution between the haves and have-nots, and it broadly succeeds in this effort, it also further concretizes the slum as a physical 'place'. NGOs committed to improving the slums require such a delineation of what is considered a slum before they can decipher how to improve it. Yet tellingly, UN-HABITAT writes that, in 2002, despite the numerous ways of identifying a slum, a United Nations Expert Group Meeting recommended that its definition be, "restricted to the physical and legal characteristics of the settlement, and excluding the more difficult social dimensions."<sup>xxxii</sup>

But what if we instead forget these physical and legal characteristics and look precisely at the slum as a multifaceted network of interaction? Sassen has offered this very approach. Let us recall Harvey's positioning of 'place' against the 'fluidity and flux' of 'uncontrolled vectors of spatiality'. It is precisely such 'uncontrolled vectors' that Sassen treats as 'analytic borderlands'.

In constituting [slums] as analytic borderlands, discontinuities are given a terrain of operations rather than being reduced to a dividing line...A topographic representation would capture the enormous discontinuity between the places and built environments of each informal economy and the financial or design district in a city, and fail to capture their complex economic interactions and dependencies.<sup>xxxiii</sup>

Sassen here employs 'place' to describe the slum as a topographical representation, yet astutely observes that the delineations between slum and city are ceaselessly penetrated. Her position thus deflects slum discourse, if we can call it such, towards Manuel Delanda's assemblage theory, for instance. Delanda employs Deleuzian notions of assemblage [wholes characterized by relations of exteriority] to discuss 'social ontology' in relation to cities which he describes as "assemblages of people, networks, organizations, as well as of a variety of infrastructural components, from buildings and streets to conduits for matter and energy flows..."<sup>xxxiv</sup> The city as an assemblage, is defined by Delanda as processes of territorialization, which is intimately linked to Harvey's 'exclusionary territorial behavior', and deterritorialization, the former stabilizing the identity of the assembly, the latter destabilizing it.<sup>xxxv</sup> Tellingly, he writes that "Not acknowledging the hybrid nature of social mechanisms can be a source of misunderstanding and mystification in social science."<sup>xxxvi</sup>

We might similarly conclude that not acknowledging the hybrid nature of the slums is also a potent source of misunderstanding in architecture. Kibera residents rarely refer to their residences as homes and when asked what slum dwellers would do if there was a distant location where a factory could provide housing and a job, the answer is: "They would run to that place."<sup>xxxvii</sup> Evidently, as Norberg-Shultz asserts, dwelling, in an existential sense, demands a concrete place, which for slum dwellers means a right to be in that place without the fear of eviction and uprooting. There has been much debate over Peruvian economist Hernando De Soto's position that issuing property rights to slum dwellers will link them into the capitalist system and offer them a sense of belonging,<sup>xxxviii</sup> a process that has gained some momentum in certain countries.<sup>xxxix</sup>

It is possible that land title could immediately affect one's perception of 'place' in the slums. For instance, long-term infrastructure improvements have arguably had such impact on 'place' through Rio's Favela-Barrio Project.<sup>xi</sup> But regardless of whether universal land tenure will ever broadly manifest, or be of any benefit to slum dwellers who are inevitably tempted to turn their newly acquired property assets into unprecedented short-term capital, is not the primary issue here. Furthermore, until such programs are initiated in Nairobi, which does not appear imminent, the slums themselves are not 'places' for the vast majority of the people living there (the original Nubian settlers, long-term residents, and resident slumlords perhaps being the exceptions). Instead, like Marco Polo's description of Despina in Calvino's *Invisible Cities*, they are vessels - utopian vessels - to take them from their rural homes to the unknown wonders of prosper in the great Kenyan city.

When the camel driver sees, at the horizon of the tableland, the pinnacles of the skyscrapers come into view, the radar antennae, the white and red windsocks flapping, the chimneys belching smoke, he thinks of a ship; he knows it is a city, but he thinks of it as a vessel that will take him away from the desert, a windjammer about to cast off, with the breeze already swelling the sails, not yet unfurled, a steamboat with its boiler vibrating in the iron keel; and he thinks of all the ports, the foreign merchandise the cranes unload on the docks, the taverns where crews of different flags break bottles over one another's heads, the lighted, ground-floor windows, each with a woman combing her hair.<sup>xii</sup>

The imagery of Calvino's city is relevant in a couple of significant ways. First, the slum as a vessel for social mobility is a potent metaphor to keep in mind. But secondly, Calvino's vessel is not described in isolation, as lost somewhere at sea. The image of the vessel emerges through the description of the ports, the cranes that activate the ship and enable its purpose, the goods to be exchanged, and the 'places' for social interaction so important for urban commentators such as Lefebvre.<sup>xiii</sup> Without describing the surrounding network of the ship, there would be little to say.

Too often in architectural discourse we interpret the slum vessel as if it were simply a 'place'. We want to design better engines for the ship, upgrade the interior to make it more comfortable, or patch the holes in its sails so they

look and function better. However, this fixation on 'place' overshadows the transitory function of the vessel, its connecting points, and the various mechanisms that activate it. Related to the urban landscape, Lefebvre argues that "...the housing question has for it and its representatives concealed the problematic of the city and the *urban*."<sup>xiii</sup> We might say the same thing about the slums. As designers, we must transcend this myopic approach to design and instead question how we can optimize the very mechanisms that activate the slum, weaving it more effectively into the city by understanding the systems of economic and social exchange already there. Hence, the most sustainable solution to alleviating the increasing challenges of the slums through architecture may not be in the slums themselves but rather in redesigning, or perhaps rewiring, the networks they are already engaged with. We must not only improve the space of the vessel (e.g. slum upgrading) but also improve the systems that can pull people from the slums through various strategies including incremental capital acquisition and skills training.

Design has this capacity. Architect Teddy Cruz has already accepted Sassen's challenge through his work on the Tijuana/San Diego border in new and promising territories for architecture. Cruz is interested in the "landscapes of flows: of manufactured goods and people seeking employment to the north and the surplus goods and remittances to the south."<sup>xiv</sup> John Beardsley describes his work as extending the analysis of boundaries "between the formal and informal to the international frontier."<sup>xiv</sup> We see similarities to Sassen in Cruz's following position about housing:

Housing can even be a neighborhood economic engine; it can be a site for the production of new social and cultural relations spawned by pedagogical programming carried out at the scale of the community. In other words, housing cannot be understood in a vacuum. It must be viewed as a relational tool.<sup>xvi</sup>

Furthermore, he describes the shift in design where architecture can engage with the issues of social mobility linked to slums.

This is what I consider to be the political in art or architecture: not the production of political architecture, but the construction of the political itself, towards an architecture of social relevance.

This begins by asking questions: Who owns the resources? Whose territory is this? In other words: the exposition of an institution's mechanisms in order to show how it operates. My aim is to open up institutions, turning its mechanisms into material to be reconfigured.<sup>xlvii</sup>

Others are taking similar approaches. In Rio, slum-upgrading projects aim to preserve the existing urban networks while rebuilding them.<sup>xlviii</sup> Meanwhile, as one of the rare 'social architects' working in Nairobi, Ronald Omyonga is working with architecture programs at Montana State University and Jomo Kenyatta University of Agriculture and Technology to further develop the idea of more 'holistic' housing strategies that can supply the immense gap in Nairobi's lower-middle class housing market while employing people living in the slums. The designs of these houses consider existing incremental loan structures and introduce both monetary and material payment structures through the design of the housing components. Combined with affordable plots of land and designs for incremental habitation (based off of earlier wet-core schemes), such developments are designed to empower slum dwellers, not exploit them. While the intervention may not be directly in the slums, it has the long-term potential for employment and skills training which are more valuable, desirable, and sustainable, than any architectural handouts in the slums.

As cities continue to explode in the twenty-first century alongside increasing economic disparity, architects must refocus their efforts on meaningful solutions to the challenges ahead. If we remain focused on designing for 'place' as simply a sensorial bond between us and our surrounding landscapes (natural and/or built), we will divert past the social premise for the term and ultimately minimize its potential for architecture. Our profession, and the training of architects for this century, benefit from visionary leaders like Cruz and Omyonga who understand that architecture must become more socially relevant, and this starts with an entire re-think of what the city can be – a well-designed ship with well-designed docks, cranes and pubs, all facilitating its primary function - mobility. If we reach for these aims we may have a chance to help emancipate existential 'place' for the majority of inhabitants on this planet who are presently denied it.

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## Notes

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- <sup>i</sup> Christian Norberg-Shultz, "The Phenomenon of Place," in *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995*, ed. Kate Nesbitt (Princeton Architectural Press, 1996), 425.
- <sup>ii</sup> Juhanni Pallasmaa, Lecture on "Home and Existential Homelessness: Rootedness and Alienation in Architecture," (University of Dundee, January 23, 2008).
- <sup>iii</sup> Auge recognizes that there is ultimately no such thing as a non-place yet he posits non-place as a dialectical condition linked to place in our 'globalized' context. Non-place is often referred to in architecture in relation to Auge's discussion on ubiquitous space – airports, shopping malls, etc. See Marc Auge, *Non-Places: An Introduction to Supermodernity* (Verso, 1995).
- <sup>iv</sup> Tim Cresswell, *Place: A Short Introduction* (Blackwell, 2004), 1.
- <sup>v</sup> Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (University of Minnesota Press, 1977), 58.
- <sup>vi</sup> David Harvey, *Spaces of Hope* (Edinburgh University Press, 2000), 24-25.
- <sup>vii</sup> A chapter in *Pig Earth* colorfully describing the slaughtering of a cow no longer productive for the family and re-placed in her stall by a younger one is tellingly called 'A Question of Place'. See John Berger, *Pig Earth* (Vintage, 1979), 3-6.
- <sup>viii</sup> Personal email, March 3, 2010.
- <sup>ix</sup> See Patricia Stamp, "Burying Otieno: The Politics of Gender and Ethnicity in Kenya," *Signs* 16, no. 4 (1991), and April Gordon, "Burying Otieno Revisited," *Journal of Women in Culture and Society* 20, no. 4 (1995).
- <sup>x</sup> Laura DeLuca, "Burying S.M.: The Politics of Knowledge and the Sociology of Power in Africa," *PoLAR* 17, no. 2 (2008): 138.
- <sup>xi</sup> See Kepher Otieno, "Millionaire's Burial Stopped Again over Gravesite," *The Standard* (2008), <http://www.standardmedia.co.ke/InsidePage.php?id=1143998074&catid=159&a=1>.
- <sup>xii</sup> Jomo Kenyatta, *Facing Mt. Kenya* (Vintage, 1965), 22.
- <sup>xiii</sup> John Lonsdale, "Soil, Work, Civilisation, and Citizenship in Kenya," *Journal of Eastern African Studies* 2, no. 2 (2008): 306.
- <sup>xiv</sup> Miller and Yeager write that "being landed ranks very high among Kenyans' social and economic priorities and will figure centrally in personal aspirations for years to come." See Norman Miller and Rodger Yeager, *Kenya: The Quest for Prosperity*, 2nd ed. (Westview Press, 1994), 94.
- <sup>xv</sup> Lonsdale, "Soil, Work, Civilisation, and Citizenship in Kenya," 309.
- <sup>xvi</sup> Cresswell, *Place: A Short Introduction*, 56.
- <sup>xvii</sup> Tuan writes that "Place is security, space is freedom." Tuan, *Space and Place: The Perspective of Experience*, 3.

<sup>xviii</sup> Gaston Bachelard, *The Poetics of Space: The Classic Look at How We Experience Intimate Places* (Beacon Press, 1994), 6.

<sup>xix</sup> See Don Mitchell, *The Right to the City: Social Justice and the Fight for Public Space* (The Guilford Press, 2003).

<sup>xx</sup> Mike Davis, *Planet of Slums* (Verso, 2006), 205.

<sup>xxi</sup> Neuwirth p.70

<sup>xxii</sup> Lonsdale, "Soil, Work, Civilisation, and Citizenship in Kenya," 305.

<sup>xxiii</sup> *Ibid.*: 312.

<sup>xxiv</sup> Oucho writes that "[labor] migration is largely temporary, involving circulation and reciprocity between urban areas and dividing families into two geographically separate households...migrants intercede between rural and urban areas, endeavoring to make the best of both worlds." J. O. Oucho, *Urban Migrants and Rural Development in Kenya* (University of Nairobi Press, 1996).

<sup>xxv</sup> Marie Huchzermeyer, "Slum Upgrading in Nairobi within the Housing and Basic Services Market: A Housing Rights Concern," *Journal of Asian and African Studies* 43, no. 1 (2008): 26.

<sup>xxvi</sup> *Ibid.*, 249.

<sup>xxvii</sup> Personal Interview, Nairobi, July, 2009.

<sup>xxviii</sup> Jonas Bendiksen and Christina Larson, "Planet Slum," *Foreign Policy* (2009), [http://www.foreignpolicy.com/articles/2009/11/03/planet\\_slum?page=0,1](http://www.foreignpolicy.com/articles/2009/11/03/planet_slum?page=0,1).

<sup>xxix</sup> See John Turner, *Housing by People* (Pantheon Books, 1976), "Squatter Settlement: An Architecture That Works," in *Housing and Dwelling: Perspectives on Modern Domestic Architecture*, ed. Barbara Miller Lane (Routledge, 1968), and John Habraken, *Supports: An Alternative to Mass Housing* (Urban International Press, 1972). Ivan Illich has similarly argued for this kind of self-invested sense of dwelling. He sees the need to build one's own dwelling as an existential human need. Housing as a commodity, he argues, "decays from the day it is ready to use." See Ivan Illich, "Dwelling: How to Tell a Resident from an Inhabitant," *CoEvolution Spring* (1984). For the reverse argument see Davis' chapter titled "Illusions of Self-Help," *Planet of Slums*, 70-94, and Herbert Werlin, "The Slum-Upgrading Myth," *Urban Studies* 36, no. 9 (1999).

<sup>xxx</sup> Kollhaas describes his incentive to study Lagos as a "...forced encounter with something I really didn't know anything about – Africa, which I was always intrigued by but I never had felt the kind of closeness that I feel, for instance, for North America, so I felt embarrassed that there was this world I didn't understand." Bregtje van der Haak, "Lagos: Wide and Close," (2003).

<sup>xxxi</sup> Jane Rendell, *Art and Architecture: A Place Between* (I. B. Tauris, 2006), 89.

<sup>xxxii</sup> UN-HABITAT, *The Challenge of Slums: Global Report on Human Settlements 2003* (Earthscan, 2003), 12.

<sup>xxxiii</sup> Saskia Sassen, "Fragmented Urban Topographies and Their Underlying Interconnections," in *Informal City: Caracas Case*, ed. A. Brillembourg, K. Feireiss, and H. Klumpner (Prestel, 2005), 84.

<sup>xxxiv</sup> Manuel Delanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (Continuum, 2006), 6.

<sup>xxxv</sup> *Ibid.*, 12.

<sup>xxxvi</sup> *Ibid.*, 24.

<sup>xxxvii</sup> In 2009 the architecture program at Montana State University embarked on a journey to Nairobi, Kenya, to initiate a research project focused on the present housing crisis linked to the slums, and primarily Kibera, one of Africa's largest slums. This was one of our questions posed at a meeting with community representatives arranged by Eric Makokha from a local organization called Shelter Forum.

<sup>xxxviii</sup> See Bruce Mau and Institute without borders, *Massive Change* (Phaidon, 2004), Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (Basic Books, 2000), and "The Missing Ingredient: What Poor Markets Will Need to Make Their Markets Work," *The Economist* June (1994).

<sup>xxxix</sup> According to UN-Habitat reports, "many countries are beginning to provide residents with access to land tenure and services." See John Beardsley, "Improving Informal Settlements: Ideas from Latin America," *Harvard Design Magazine* 28 (2008): 32.

<sup>xl</sup> Lu Peterson writes that the \$600-million project, benefitting 160 slums, converted the Morro da Formiga area of Rio into one reminiscent of "the small cities on the slopes of Greece or Italy..." Lu Peterson, "Interventions for the Socio-Urban Integration of the Favelas of Rio De Janeiro," *Harvard Design Magazine* 28 (2008).

<sup>xli</sup> Italo Calvino, *Invisible Cities* (Harvest 1972), 17.

<sup>xlii</sup> For Lefebvre the notion of *oeuvre* captures the essentiality of social interaction in urban space. He writes, "The ideal city would involve the obsolescence of space: an accelerated change of abode, emplacements and prepared spaces. It would be the *ephemeral city*, the perpetual *oeuvre* of the inhabitant, themselves mobile and mobilized for and by this *oeuvre*." Henri Lefebvre, *Writings on Cities* (Blackwell, 1996).

<sup>xliii</sup> Lefebvre, *Writings on Cities*, 146.

<sup>xliv</sup> See John Beardsley, "Border Crossings: Living Rooms on the Border/Manufactured Sites Estudio Teddy Cruz," *Harvard Design Magazine* 28 (2008): 62. See also Teddy Cruz, "Two Headed Journeys; Border Walls, Border Cities, and the Two-Headed Trojan Horse of Tijuana," *Thresholds* 20 (2000).

<sup>xlv</sup> Beardsley, "Border Crossings: Living Rooms on the Border/Manufactured Sites Estudio Teddy Cruz," 62.

<sup>xlvi</sup> Teddy Cruz and Caleb Waldorf, "Learning from Tijuana," *triplecanopy*(2009), [http://canopycanopy.com/7/learning\\_from\\_tijuana](http://canopycanopy.com/7/learning_from_tijuana).

<sup>xlvii</sup> *Ibid.*

<sup>xlviii</sup> Conde and Magalhães write that "Whatever the city, its charter involves more than a physical location – beyond the streets and buildings, urban environments are built defined by the use made of them, by the traces left of past usage, the social relations and symbolical practices they elicit." Luiz Paulo Conde and Sergio Magalhaes, *Favela-Barrio Project: Rewriting the History of Rio* (Viver Cidades, 2004), 7.

## **A Quest for Visualizing the Data through an Inquiry on Alternative Household Types**

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### **Abstract**

This paper tackles the social and spatial needs and expectations of non-traditional alternative households (lone-person households, single parent families, dinks and house sharing friends) as the neglected actors of the built environment in Turkey and Istanbul in particular. The proposed research model makes use of both qualitative and quantitative methods in a dialectical relationship so as to obtain methodological triangulation. Such a mixed method, which allows taking advantage of diverse data collecting techniques and instruments (a short questionnaire, semantic differential scale, semi-structured interview, photo interview, field notes, photos and sketches), requires experiments on analyzing and displaying the data. At this point, architecture provides a basis to enhance different ways of data visualization, especially the qualitative one. This paper puts a special emphasis on data display techniques.

Built environment in different scales -ranging from domestic to city scale- is a space of relations and activities and the formation of place depends on these two concepts. Different household types define different relations and activities, so the ongoing trend of considering the nuclear family a standard design input in Turkey should be reassessed. This research relies upon the idea that non-traditional alternative small households in Istanbul might introduce different dynamics to the use of space and carry out the potential of interrogating current space organizations. Noticing such details might orient decision making in design to the production of a more flexible built environment that satisfies the needs and expectations of different user groups, including alternative and small household types.

### **Introduction**

Architecture as a field of research has both advantages and disadvantages. As a multi-faceted discipline in contact with various fields (such as sociology, human geography, archeology, philosophy, engineering and etc.), it has the potential to borrow research strategies from other

disciplines and to mix different methods. On the other hand, it is hard to dominate the whole research literature. The vast amount of choice it offers can result in the lose of control or the misapplication of methods. Nevertheless, architecture seems to be an experimental area open to innovative ideas on research, ranging from the development of research strategy to data gathering, analyzing and displaying processes. Designed to be a mixed method research, this study aims to make use of the experimental potential of architecture in relation with various disciplines.

Exploring the socio-spatial needs and expectations of non-traditional alternative households (lone-person households, single parent families, double income families without kids (dinks), and house sharing friends) in Istanbul, the paper is structured in two parts: The first part focuses on the definition of the research problem by elaborating the situation of alternative households and current housing stock in Istanbul. It is strongly believed that, to manifest the historical and contextual basis of the problem will clarify the need for a research on the 'others' of the built environment. The second part on the other hand, explains the research strategy, its contextual framework and methodology putting a special emphasis on data display techniques. The methods used for data visualization are exemplified through some findings.

### **Part 1: Definition of the Research Problem**

#### *Alternative Household Types in Istanbul*

In his article 'Nontraditional Family Forms', Elenaor D. Macklin (1980, p. 905) defines the non-traditional as: "All living patterns other than legal, lifelong, sexually exclusive marriage between one man and woman, with children, where the male is the primary provider and ultimate authority." Nowadays, the number of people who choose such an alternative living pattern has been increasing rapidly, and definitions that express the new household types and new living patterns have emerged.

Without a doubt, as the households in all geographies diversify, in addition to the common needs and expectations of the households worldwide, they would also bear some unique needs and expectations emanating from the dynamics, and dwelling culture of their respective 'place's. Within this context, Istanbul is a metropolis with unique assets due to its household size of 3.6 even at the end of the 19<sup>th</sup> century, the relative large number of non-family groups and the urban development dynamics experienced via existing economic and political conditions. A research by Alan Duben and Cem Behar (1996) shows that the inhabitants of Istanbul were the first to use

considerable birth control, they had the lowest fertility rates and late age of marriage in the late 19<sup>th</sup> century compared to the rates in other Muslim cities. The 1907 census in Istanbul reports that the nuclear family comprised 40% of all the households and 37% of the Muslim population, which is rather low in respect of today's statistics<sup>1</sup>.

Despite the high age at first marriage, the rate of marriage in Istanbul has always been high. The family/household structure used to become complicated and conflicting due to the effects of a cultural structure in which family bonds were strong (Duben and Behar 1996). The dwellings of Istanbul were rather fluid spaces that congregated and separated according to the changing needs, with their varying dimensions and composition over the years (Duben 2009). It could be stated that Istanbul still maintains this asset and thus has a different social structuring than the Western metropolis. Even though life conditions and the communication technologies in the globalizing world isolate the individuals, it is observed that especially in times of crisis the family members living separately tend to bunch up and that the family bonds are mostly stricter than they are in the West. However, the insufficiency of the social support mechanisms is believed to be one of the important reasons of this strong solidarity. It could be assumed that this situation creates a vicious circle. Due to the political system that continuously underlines the importance of family bonds and the related protracted development of social support mechanisms; the individuals seek to overcome hard times with family solidarity. Despite this dependency in families, the demographic data show that the household size in both Turkey and Istanbul gradually decreases. Cigdem Kagitcibasi (1998) developed the 'emotional interdependence' model to explain the contextual and familial changes that take place in societies dominated by dependency culture due to socio-economic developments. This model is founded on the assumption that individual and group family could co-exist.

According to the report by TUSIAD (1999, p.18), "*the demographic transformation in Turkey has almost been completed. Demographic transformation is the period in which high birth rates and high death rates are taken over by conscious birth control and decrease in death rates*". The first indicator of a completed demographic transformation is the rapid decline in birth rates. In Turkey, the birth rate since 1945-50 dropped from 6.9% to 2.7% in 1993. In line with this rapid decline in fertility, it is expected that the total fertility rate (TFR) in 2025 would be 1.61 children born to a woman (TUSIAD 1999). Verifying this projection the TNSA 2008 data report that the total fertility rate in Istanbul is 1.78 and 2.152 in Turkey by the year 2008 (Yavuz and Türkyılmaz 2009). The comparison between 1998 and 2008 shows that the rate of never-

married woman in cities increased from 27.7% to 31%, the rate of married dropped from 69.1% to 65.2%, the rate of divorced increased from 1.5% to 2.3% and age at first marriage increased from 21.3% to 22.3% (HIPS 2010). On the one hand, living alone occurs as a personal choice, on the other hand, with the increase in divorce rates the number of single parent families increases, and with the effects of economic conditions more people choose to reside together without marriage or kinship.

Stating that the amount of small households in Turkey has increased since the 1960's 'in absolute terms and proportionally', Murat Balamir (1996) furthers in his article 'The Other of the Housing System: Small Households' that whereas the rate of one-to-three person households in urban areas has gone up to 35% in 1990, it would be approximately 40% in 1996. "*The number of one-person households in urban areas has duplicated every ten years. This growth is twice the increase rate observed in the other household groups*" (p. 523). Whereas the average household size is 4 in Turkey, in every 4 dwelling out of 10 (40%) there are less than four people (TNSA 2003). The comparison of the household size profiles by neighborhood in 'Istanbul Metropolitan Area: Social and Economic Indicators 1990-2000', yet-to-be-published urban atlas by Murat Güvenc, demonstrates clearly the diminution of the size of households by neighborhoods in Istanbul, spreading from the center to periphery in a decade.

#### ***Current Situation of Housing for Alternative Small Households in Turkey***

According to the 2000 general census, the number of rooms per housing unit in Istanbul does not change in proportion to the household size. Regardless of the size of the household, the most common type is three-room housing unit, followed by four-room and two-room housing units. This indicates a serious problem. Because although four-person households were still the majority (693.998) in 2000 census, one-person households reached 161.860 and two-person households increased to 403.314 (SIS 2000). As the discussion on the extent to which building stock is suitable for the contemporary family and life style continues, the alternative and mostly small households strive for finding housing by reducing the criteria to a minimum and without any expectations of environmental and social support.

The inclusion of demographic factors among factors that determine the urban housing need in Turkey in the development plans and reports of specialization commission took place only in the Third Five Year Development Plan (1973-1977). The conclusion section of the report by Tugyan Dinc (1978) emphasizes the

necessity of arranging housing production in relation to household structure, household size and number of rooms in present housing stock.

Balamir (1996) draws attention to the rapid decline in the small housing stock and the unavoidable rise of three-to-four room housing units. The ordered and proportional production between 1965 and 1975 turned upside down after 1975. Yet, especially in big cities, the rent of one-to-two room housings are higher than three-to-four room housings. Although it seems to be due to the scarcity of small units, this situation is now permanent. The construction industry still did not realize the importance of production of small housing units. Hereof, Balamir (1996) points out to the conditionings. Deeply rooted traditions and some norms in the society have defined normal 'family' and 'households', and the small households identified with some inconvenient behavior are conceived of as threatening (Balamir 1996).

Beyond the disturbed balance between the household size and housing unit size, the meanings attached to the houses and the living environments of alternative (and mostly small) households both by themselves and other people, and their space use patterns diversify inevitably. Although household type is as effective as socio-economic status differences and culture in diversifying the use of space, it is still an overlooked subject in Turkey.

Different household types use the same houses, neighborhood and urban space each in their own ways, and attach different meanings to built environment. For instance, a lone-person household may tend to render the domestic space multifunctional and flexible, whereas two house sharing friends might have well-defined private and social areas in home. Semra Aydın (2004) states that, meaning functions as an interface that defines the relationship between the dwelling and the user. Dwelling includes a layering of meanings by the shared values. In Istanbul, despite the diversifying households and newly emerging values, the housing units become increasingly the same. Dwelling is a phenomenon that by definition necessitates the continuous interdependence of qualitative and quantitative values. What matters is the experience in the dwelling, and hence, it should be questioned the extent to which these experiences could diversify in a standardized housing stock. Especially since a few decades, some housing concepts such as residences and lofts are adopted from foreign cultures and countries for marketing purposes that address high-income groups under the disguise of 'innovation'. It would be proper to point out the lack of experiment and experience in alternative solutions. The uniformity of the present housing stock in Istanbul does not allow non-traditional small

households to make choices and satisfy their expectations. Therefore, it is significant to explore the diverse needs and common denominators of varying household types in that it bears a potential for presenting new design criteria.

## **Part 2: Research Strategy & Data Display**

This research primarily seeks to answer how the dynamics of metropolitan life (in Istanbul) impact and diversify dwelling culture, and how the transformations that could be read through the concepts attachment, privacy, flexibility, fluidity and temporariness influence the interaction between the alternative small households and the socio-physical system in all the three scales: Istanbul, neighborhood, and domestic space.

From an ideological perspective, the study embraces critical theory in that it tackles the transformation of the relationships between the different scales of the built environment and the non-traditional households as the alternatives of the smallest social institution, the nuclear family. Hence, it may function as a tool for self-questioning for the individuals that participated in the study (Creswell 1998). It is believed that, understanding the physical (spatial), social, and emotional needs and expectations of the often-neglected but crucial actors who also participate to the constitution the social and systematic relationships in the society is particularly significant.

The research adopts an inductive and interpretive approach, and it is designed as cross-sectional and exploratory. The research is formulated in a way that would grasp, even for only once, both the linear and cyclical temporal experiences (past experiences, current satisfaction and expectations for the future) within the life cycle of the individuals.

It is unattainable to share in this paper, all the findings and results that are obtained by a data gathering and analyzing process built upon the main concepts of the multi-scaled and stratified contextual framework of this research. Thus, rather than a broad discussion of the findings, this paper concentrates on the research strategy and visualization of data. After introducing the contextual framework and methodology of the research, the techniques of data display will be exemplified through findings on the chosen concepts.

### ***Contextual Framework***

Shelley Mallett (2004) underlines that home is a space inhabited by family, people, things and belongings where particular activities and relationships are lived. "Home is a 'socio-spatial system' that represents the fusion of the

physical unit or house and the social unit or household” (p. 73). Therefore, the basic forms of social relationships and institutions occur and reproduce themselves in this physical environment. The physical aspects of home -location, design, size, etc.- render different forms of relationships and activities possible or limit them. A comprehensive examination of home should not overlook the interaction between place and social relationships. Likewise, Ozan Karaman (2004) states that space could only be conceptualized correctly by means of the relationships it entails, and thus, a process-based perspective could be possible only if ‘place’ is considered as relational. The review of the human-environment and household studies with a viewpoint that considers place the basis for human interaction and communication generated the foundation of the contextual framework of the present study: Psychological processes, physical environment and temporal qualities described by Carol M. Werner, Irwin Altman and Diana Oxley (1985), and three categories of socio-physical system (place, activities and relationships) defined by Toomas Niit (1993).

Brigitte Franklin (2006) criticizes the environment-behavior studies for neglecting the institutions and organizations of the society and proposes a very inspiring, three-layered contextual framework -composed of structure, actor and representation- that would incorporate them into the actors that shape the built environment. However, it is not possible to claim neither the existence of a built environment oriented towards alternative households nor these actors being prominent in Turkey. Therefore, the study at this phase primarily focuses on the non-traditional alternative households (their evaluations, perceptions, meanings they attach to and use of space) who represent only one group that is effective in shaping the built environment. Nevertheless, it could not be neglected the necessity to expand this study so that it would cover the other actors in the society (institutions, architects, developers, etc.).

What follows is the proposed contextual framework for explaining the interaction of people (as households alternative to the nuclear family) with the built environment (Fig. 1). The relationships, activities and place definitions of the alternative households are examined by means of the concepts attachment, privacy, flexibility, fluidity, and temporariness which are believed to be suitable for questioning the transformation of dwelling culture in the 21<sup>st</sup> century metropolises.

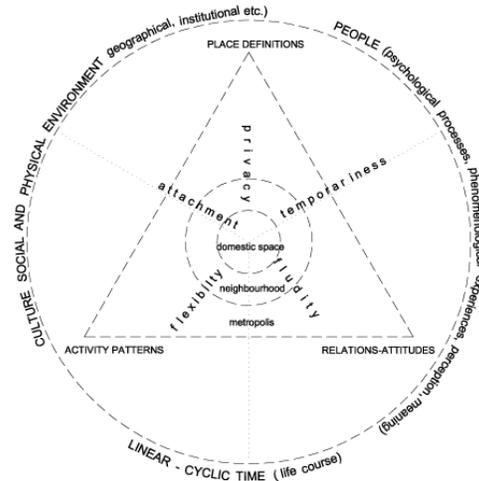


Figure 1: Contextual framework

### Research Methodology

The research model of this study makes use of both qualitative and quantitative methods in a dialectical relationship so as to obtain methodological triangulation. The data collection instruments are a short questionnaire, semantic differential scale, semi-structured interview, photo-interview, field notes, sketches and photographs.

The stratified and purposeful sample is composed of four sub-groups (lone-person households, single parent families, dinks and house sharing friends). 5 households from each group with the total number of 20, comprising 30 household members formed the sample.

First, each participant answered the short questionnaire, which included questions on personal information, closed-ended questions on significant subjects that might enable triangulation and multiple-choice questions about activity patterns. Then, the interviewer posed some questions to understand the past and present dwelling experiences of the participants, rather than focusing on certain concepts. Subsequently, the semantic differential scale was applied to evaluate the degree of satisfaction and attachment in all three scales of the built environment (Istanbul, neighborhood, and domestic space). When disparity was observed, more profound questions were directed to the participants to reveal the underlying reasons. Data collection proceeded with the semi-structured interview with questions grouped according to the concepts of the contextual framework of the research. The interviews took place in the houses of the participants. Each and every member of all households (ranging from one-to-three)

participated in the research. Both the interviews and the photo-interviews were made individually in order to avoid the possible exterior influences.

The researcher, as a participant observer, took notes on how household members used the domestic space, their attitudes towards the visitors and other general impressions. Moreover, sketches of the houses were drawn in order to facilitate the application of photo-interview technique, which expects from the participants to answer questions by taking photos and to explain the reason for taking them.

*A Quest for Visualizing the Data*

The variety obtained by using multiple methods in data gathering reflected itself also in the analysis and the display of the findings. In addition to the quantitative evaluation of the questionnaire and the semantic differential scale, the method chosen to analyze the qualitative main body of data was content analysis. The initial activity of content analysis, data coding, was executed in a general framework by introducing some pre-categories and themes and new codes were added to the list in process. Finally, the data were reorganized within the system derived from coding and thematic coding to achieve specific themes.

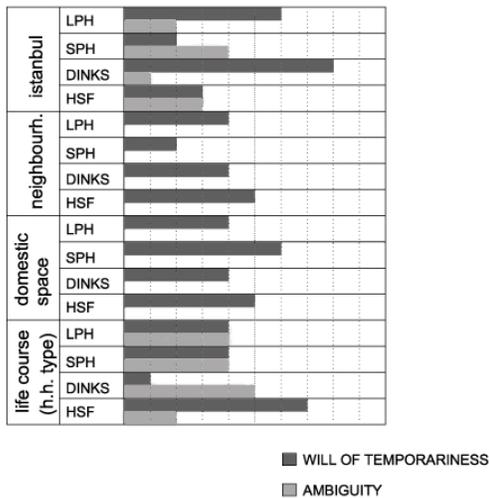


Figure 2: Will of temporariness according to household types

One of the main concerns of this study was how to comprehensively visualize and present the data collected with different techniques and required diverse methods of analysis for each concept that helps question the interaction of the alternative household members with the

built environment. For instance, the chart above compares the will of temporariness of different household types in three scales of the built environment and life-course (Fig. 2).

From this chart, however, it is not easy to notice the interactions between modalities of two categorical variables, the household type and the scale of the built environment. Correspondence analysis allows the visual discovery and interpretation of these interactions. 'It is a statistical visualization method for picturing the associations between the levels of a two-way contingency table' (AIACCESS 2009). The label 'correspondance analysis', in French 'analyse des correspondances', is a term associated with the work of Jean Paul Benzecri (1992) where the term correspondence denotes a 'system of associations' between the elements of two sets (Bee-Leng Lee 2010). Diane Phillips (1995) claims Pierre Bourdieu's 'Distinction' as the 'locus classicus' of sociological correspondence analysis. Bourdieu (1986) used this analysis technique to provide a detailed illustration of his thesis that the determinants of taste, cultural discrimination and choice lie in the possession of two forms of capital, economic and cultural. Since correspondence analysis pictures the associations between the row categories and the column categories in the same space, it is easier to conceive the data and to interpret it (Fig. 3).

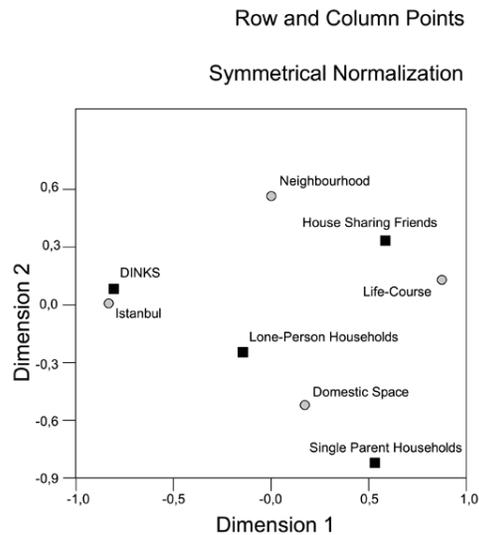


Figure 3: Correspondance analysis of will of temporariness

The visualization of the data from the 'Correspondence Table' by using the graphic technique developed by Jacques Bertin (1981) makes it more legible to recognize the over representations in the dataset (Fig. 4). What matters in this technique is not quantity. It is believed that this technique would be useful and explanatory for presenting the knowledge obtained from the qualitative studies that are conducted with few samples.

Scale	IST	NEIG.	HOUSE	LIFE-COURSE	% IN TOTAL
Hhtype					
DINKS	53,3	36,4	28,6	8,3	32,7
LPH	20	9,1	14,3	16,7	15,4
SPH	6,7	9,1	21,4	16,7	13,5
HSF	20	45,5	35,7	58,3	38,5
TOTAL	100	100	100	100	100
	28,8	21,1	26,9	23,0	100

Figure 4: Graphic representation of will of temporariness

Figure 3 and 4 make some of the themes about temporariness clearly legible. They show that the DINKS think about inhabiting Istanbul temporarily and leaving the city more than the other household types. The data gathered by the in-depth interviews reveal various reasons such as economic difficulties, lack of leisure time for interests or the self, fatigue, search for peace and nature, security concerns, and passing the senior years in the hometowns that lie behind this need. The groups that consider the least 'being temporary' in Istanbul, or in other words the ones willing to live permanently in Istanbul, are single parents and house sharing friends. The interviews show that the metropolitan life enhances the sense of freedom especially for the single parents, who are mostly women. The single parents are also the group that is willing to move to another house. They underlined their problems related to the dwelling size due to the economic problems they face. House sharing friends avoid having relationships with their neighborhoods because of fear of prejudice and they mostly think of moving to another neighborhood. In terms of life-course (and especially in terms of household structure), house sharing friends believe that they are experiencing a temporary period.

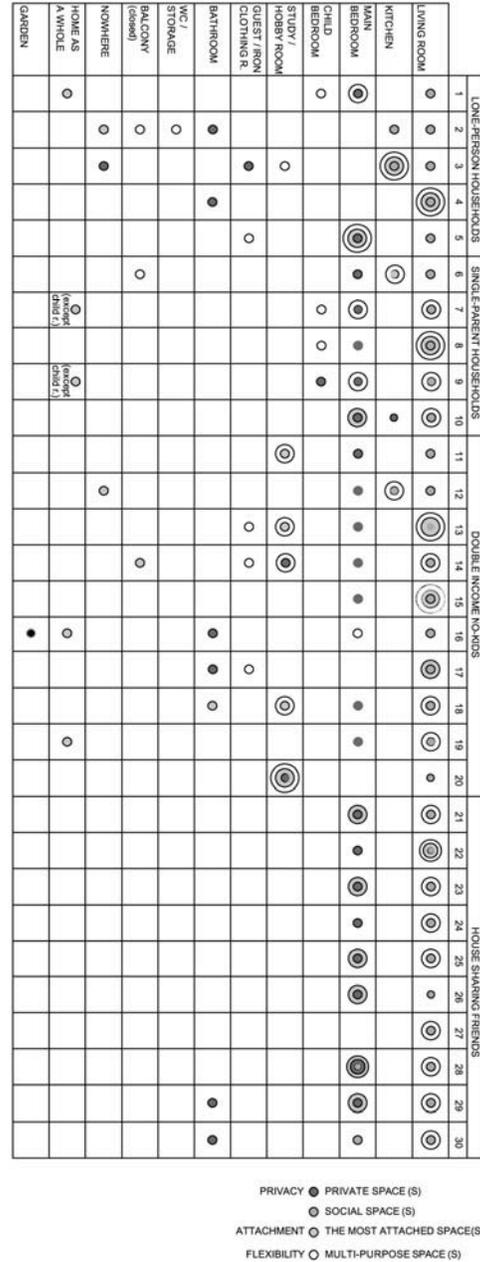


Figure 5: Scale and space depended comparisons among themes (privacy, attachment and flexibility)

One of the important goals of the research was to understand what kind of differences exists in terms of use of domestic spaces and meanings attached to them among different household types. Thus, the aim was to make a table that would enable a comparative evaluation of the

concepts (attachment, privacy, flexibility) in relation to the domestic spaces. The above chart (Fig 5) is prepared by overlapping the spaces described as the most private, social, flexible and as the ones that generate the most attachment according to the household types.

It shows how the symbolic meanings attached to the domestic space and the aim and pattern of uses diversify by each household type. Many interpretations may be done depending on this chart. A major one is that, the boundaries of the rooms seem to be strictly defined both functionally and symbolically for house sharing friends. Living rooms are the social and multi-purpose places, whereas bedrooms are the places of privacy and attachment. On the contrary the lone-person households use the whole domestic space more flexibly and attach further meanings to each space beyond general agreements.

Photo interview was one of the techniques used for data gathering. This method required participants to answer certain questions by taking photos that enabled them to see their homes through the visor. In addition, the data gathered by this technique incorporated participants into the research with all their senses, beyond verbal participation, which in turn enhanced the visual character of the data display <sup>2</sup>. Participants also explained why they had taken the photo of 'that particular place/corner/furniture' and their answers were coded.

Among findings of the photo-interview two of them come into prominence. One is that, the desire for privacy at home could cause some spatial expectations that vary according to the household types. For example, especially for the house sharing friends, an entrance door directly to the common space, thus the lack of an entrance hall conflicts with the privacy expectation and causes annoyance. The other one is that, the idle or non-functional spaces become a source of anxiety for the lone-person households (Fig. 6).

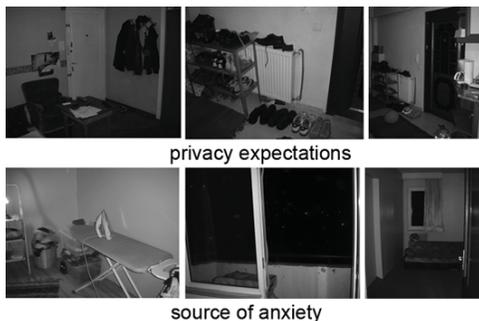


Figure 6: Foto-interview findings

## Conclusion

As it is well known, social research that examines people who inhabit and use the spaces of architecture serves for design research which focuses on the processes of shaping and structuring of places. Built environment in different scales is where relations and activities take place. The findings of this research help explain the relationship of alternative small households with the built environment. Although the findings of the research indicate the appropriateness of the concepts (attachment, privacy, flexibility, fluidity and temporariness) chosen to explore the place definitions, activities and relationships of alternative small households, some appeared to be more dominant in certain scales (metropolitan, neighborhood and domestic) for certain household types. However, what is critical is the significance of the household type as a considerable factor, with its potential to contribute to the transformation of dwelling culture. All four household types display both common and diverse needs and expectations concerning the three scales of the built environment.

Yet, people are involved in various household types in the course of their lifetimes. Hence, design of the built environment - both the city comprising the housing stock, and the housing units - should accommodate such diversity and flexibility. The ongoing trend in Turkey of considering the nuclear family a standard design input should be reassessed. The findings of this study emphasize the need for housing alternatives in Istanbul that allow for local values in a globalizing world and introduce non-traditional households as potential actors in the housing market.

## Notes

1 According to (SIS, 1995), this rate in 1985 in Istanbul was approximately 60%. A more recent data of TUIK (2010) show that 63 % of the population in Istanbul is married (with or without children) by the year 2008.

2 This technique is inspired from the method employed by Dumreicher and Kolb (2006) within the scope of the 5-year research program, SUCCESS (Sustainable Users Concepts for China Engaging Scientific Scenarios). The SUCCESS project asked the participants, selected by a group of social scientists, to take photographs from their villages that reflect their personal opinions, and then to recount the topics of the photographs during the interview session. Photo-interviewing corresponded to the active, participatory process that generated data for photograph and text analyses. However, this research used photo-interview technique as a secondary data gathering method and asked the participants to reply some questions by taking photographs and to provide reasons for photographing that particular 'place'. Hence, the technique employed proved to be goal-oriented and controlled.

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## Urban transects

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Developed within the framework of a French interdisciplinary research program<sup>1</sup> and a design studio Master's program of the Grenoble School of Architecture's entitled Architecture, Cultures of the Senses and the Environment<sup>2</sup>, we have explored the notion of the "Urban Section" as a meeting-point between global environmental issues and situated, atmospheric qualities of space, as experienced through spatial practices. This initial idea was to develop the capacity of the urban section as a mode of representation allowing for the articulation of components of the urban milieu that are almost always considered separately from one another; built objects, the sensory realm and social practices. It was developed in the form of an exploratory, applied approach concerning specific environmental preoccupations; rising summer temperatures in the city of Grenoble (2007-2010) and the handling of solid waste in the city of Sao Paulo (2009-2010).

### The city represented in section

Defining sensory interactions in situations experienced in a give moment and a given place, the notion of *architectural and urban ambiances*<sup>3</sup> places the

connection between the user of space and the ecological rapport that he/she maintains with the world with respect to crucial issues about urban life and habitation. The atmospheric dimension is revealed in all its importance from points of view of both spatial analysis and project design. Certain conventions of graphic representation used by architects and urban planners offer possibilities for the difficult task of representing ambiances. Where the specific complexities relating to ambiances seem to resist representation in plan, pushing towards confusing juxtapositions of layers, sections can actually prove useful. Paradoxically, plan view does not easily allow for a positioning of the viewer "up in the air" in order to consider air as an integral part of spatial design. On the other hand, the section places the viewer face to face with the architectural volume, a receptacle of light and air, and allows for an understanding of the capacity of the building-envelope to modify or to determine climatic quality. The section can also express a diversity of interior conditions of ambiance and of relations of interior to exterior space.

The architectural section is habitually offers a static representation of volume, frequently expressing the constructive techniques of a building envelope and the built components that give order and functionality to its inner spaces. Used as an observational or analytical tool, it of what could be called a clinical viewpoint. At the same time, it has a potential for offering a more evocative, animated view of the space represented; the figuration of a "fill" of extra-architectural objects and/or of a more or less rich synchrony of practical gestures. Two sweeping, well-known examples of this capacity are offered by Charles Garnier's section and three-dimensional models of the Paris Opera, and by Richard Rodgers' Madrid Airport Terminal.

In a notably different way, since the late eighteenth century, representational approaches of geographers, geologists and, somewhat later, urban and landscape architects have developed a different conception of the drawn projection of a linear and planar cut. One notable example of a method of analysis and observation drawing on this tradition in the natural and human sciences is of course Patrick Geddes's "Valley-Section", which places particular emphasis on the "synoptic" potential of such drawings<sup>4</sup>, offering a broad typology of forms of human settlement and society that had emerged

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<sup>1</sup> Nicolas Tixier (dir.) et alii, *L'ambiance est dans l'air. La dimension atmosphérique des ambiances architecturales et urbaines dans les approches environnementalistes*. Research contract PIR Ville et Environnement – CNRS – PUCA, 2008-2009. In collaboration with members of the UMR CNRS n°5194 PACTE, and the Department of Public Health of the University São Paulo. In association with the Urbanisme Service of the City of Grenoble and the Agency for Environmental Protection of the City of São Paulo (CETESB). The project is still under way (2008-2010). [www.pirve.fr](http://www.pirve.fr)

<sup>2</sup> The first sections were conceived within the framework of the research and education project *Chaleurs urbaines*. [www.grenoble.archi.fr/chaleursurbaines](http://www.grenoble.archi.fr/chaleursurbaines).

<sup>3</sup> Concerning the notion of ambiance, cf. for exemple Jean-François Augoyard's article «L'environnement sensible et les ambiances architecturales», in *L'espace géographique*, n°4, 1995 or, more recently, «Ambiance(s), ville, architecture, paysage», in *Culture & recherche*,

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n°113, décembre 2007, under the direction of Anne Laporte and Nicolas Tixier.

<sup>4</sup> Cf. Helen Elizabeth Meller, *Patrick Geddes: Social Evolutionist and City Planner*, Éd. Routledge, 1993.

of long historical periods around the potentials offered by different natural milieus. It is important to note that this projection was “synoptic” not only in the sense that it summarized historical development but also in that it pointed to inter- or trans- disciplinary perspectives perhaps even broader than those that the German Geographer Humboldt had imagined in the first half of the 19th Century when he first drew the geographical section that would suggest the Valley Section idea to the Scottish urbanist. The drawing clearly if implicitly reflects the often highly evocative monographs and the systematic interweaving of disciplinary perspectives that Geddes developed in the form of his “thinking machines”.

Perhaps surprisingly, Geddes’ drawing remains highly schematic, its potential barely explored; it remains so today<sup>5</sup>. Reintroducing Geddes’ Valley Section into the discussions of Team Ten (and thus into architectural discourse) in the early sixties in a modified form reflecting contemporary concerns about city form, Alison and Peter Smithson reaffirmed the pertinence of both its specifically geographic and its more broadly interdisciplinary dimensions, though without developing its potential any further than Geddes himself had.

One idea further exploration of the potential afforded by Geddes’ conception of the geographic section might be to open it up to more directly to narrative fragments concerning urban life similar to those he collected in view preparing his civic surveys and, in so doing, to emphasize the full sensory and experiential richness linked to common spatial practices. Including in such sections the figuration of built space using convention architectural means might well contribute to this extension of the section’s metonymic capacity, that is its ability to tend towards narrative, despite its inherently static character. Favoring evocation, such an approach would not necessarily present a rigorous or exhaustive character and might not reflect the object of any one discipline in particular; on the contrary, the choice of elements to be expressed along the cut of the section would need to be selective, stressing emblematic “moments” in the meeting between architectural, sensory and social dimensions, between public and private realms, between mobilities constructed objects, etc. A more distanced perspective might also include readings of historical layers comprising the place, or the programmatic configurations it contains.

Such a conception of the urban section might extend its usefulness well beyond that of the classically drawn,

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<sup>5</sup> This hypothesis was explored in the project *Chaleurs urbaines* which preceded and inspired the present one.

dimensioned street-profile. In so doing, it might contribute to the interweaving and /or confrontation between diverse conceptions of space that has become indispensable for processes of urban design.

### From section to transect

Since the beginning of the 20<sup>th</sup> century, walking has occupied a place both in the methodology of investigation on cities and as the fundamental mode of practice of urban space in itself. Among the well-known works on the subject to which our work refers is Jean-François Augoyard’s *Step by Step* of 1979 which propose a ground-breaking analysis the rhetorical dimension of walking<sup>6</sup>. Since the 1990’s, Jean-Paul Thibaud has developed the method of the “commented walk”, according much importance to the sensory components and technical aspects of the walker’s experience<sup>7</sup>. Following on the work of these two authors, many researchers have developed modes of analysis concerning everyday experience of walking in the city and a variety of means of representing their results, notable using photography, video and sound-recording techniques<sup>8</sup>. As interesting as many of there are, all seem more useful for analysis than for practice as they give little attention to the relation for architectural form, or to geographical context.

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<sup>6</sup> J.-F. Augoyard. *Pas à pas, Essais sur le cheminement quotidien en milieu urbain*. Paris : Éd. du Seuil, 1979. We could of course also insist on the importance of the writing of K. Lynch et al on the perception of city space by the walker and the motorist and, from the same period in France, the works of the writer Georges Perec, or those of the sociologist Pierre Sansot. Each developed in his own way a direct relation between ways of seeing, of hearing, the act of walking and modes of description of urban space from an immediate, “engaged” perspective. Cf. an article on “attempting to describe” by Georges Perec. Jean-Paul Thibaud, Nicolas Tixier, “L’ordinaire du regard”, in *Le cabinet d’amateur*, Toulouse, Presses Universitaires du Mirail, n°7-8, décembre 1998, pp. 51-57.

<sup>7</sup> Michèle Grosjean, Jean-Paul Thibaud (dir.). *L’Espace urbain en méthodes*. Marseille, Parenthèses, 2001.

<sup>8</sup> Cf. for example the territorial readings (through “mental maps”, “embarked observation”, “interviews conducted with map in hand”, “work sessions”) realized by Jean-Michel Roux around a stretch of highway, itself a veritable transect through the valleys of the Loire en France. Cf. *Runninghami*. Winning competition project of acoustic modification realized by Pascal Amphoux and leading to a design concept for a system of acoustic protection, DDE Loire, May 2005, currently under design, with F. Brogini (architect), N. Tixier et JM Roux (territorial analyses), L. Fachard (lighting designer), P.-Y. Nadeau (acoustician).

The term “transect” is used by geographers to signify a form of field observation unfolding along a straight line. It implies giving attention to the superimposed layers constituted by the life-forms and inanimate matter, and to the succession of spatial conditions and relations that these constitute in, spaces that the line cut through. Thus, in the first instance, the transect is not a mode of representation but rather of exploratory protocol that can give rise to a diversity of graphic or discursive explorations among the most obvious of which is the section-drawing. Though open to surprises and digressions, the posture of the walking observer that it implies is predetermined and more or less selective. Unlike the *flâneur*, the inquisitive nature of the transect walker leads him or her into particularly direct bodily engagement with the “terrain”, as he or she *go through, cut across, jump over, go under etc.*

In effect, the idea itself of the transect goes back to the eighteenth century figure, the *arpenteur* or surveyor; often a scientist by training become surveyor-cartographer. No better example of such a figure could be imagined that that offered by Thomas Pynchon’s epic novel *Mason and Dixon*<sup>9</sup>, a fictitious account of astronomer and surveyor’s experiences during the years in which they traced the almost uninterruptedly straight line bearing their names that was to provide borders for a number of American states. The novel of course goes far beyond the pretensions of the kind of urban transect of the kind we propose. What is the same however is the constant openness to hesitation between the disciplined precision of clinical observation and an attitude much more open to the distraction provoked by a seemingly endless succession of extraordinary personal, social and natural situations encountered along the line.

The transect as method or mode of experience was described by the *Situationists* in Paris and then practiced in recent years by both the group Stalker around Rome. In France, the *artiste-promeneur* Hendrick Sturm, equipped with a geo-localisation apparatus, narrates the life of certain neighborhoods in Marseille using visual as well as discursive means, willing engaging in transgressions of normative spatial conventions in order to... *go and see.*

Our initial working premise to develop a form of urban transect allowing for a mode of observation situated somewhere between the measured section and a walk whose purpose is to discover explore the sensory

richness of a place; a *parcours sensible*. Having actively sought out meetings and experiences offered by a place, the idea was to develop a hybrid mode of representation, mixing graphic/ discursive techniques associated with both of these. Emphasizing the potential of architectural drawing to express the atmospheric dimensions of space, incorporating selected fragments of narrative where they could be found, the transect is thus redefined as a exploration of sensory experience and the spatial practices out of which they emerge, presented in such a way as to inform the design-process.

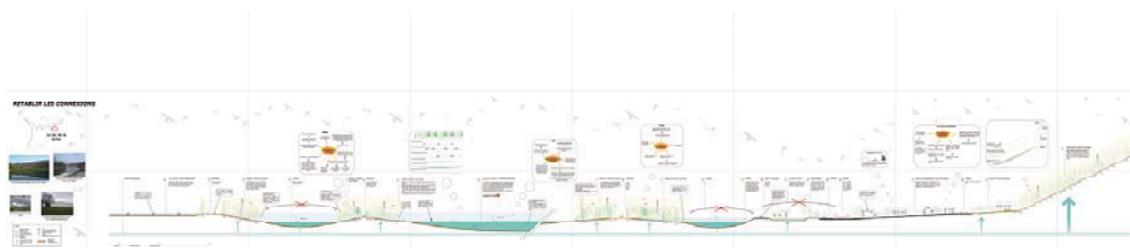
The approach acknowledges that fact that there is an important though often implicit rapport between ambiances and the expression of the uses and meanings of space in the contemporary architectural section. While the nineteen-seventies the notion of ambiance was being intensively explored and defined by Augoyard and others, architects like Reyner Banham and Cedric Price were asserting that the fundamental role of structure as a definer of architectural space and form had been definitively displaced by concerns of envelope and interior climate control. At more or less the same time ideas emerged about atmospheric quality as the definer, in and of itself, of habitable interior and exterior space, thus severely reducing or even eliminating the need for architecture.

Current architects such as Philippe Rahm have defined similar positions on atmosphere as architecture; of the discipline thus expanding its horizon of possibilities for “living use” while shedding the “burden” of its expressive and representational dimensions.

For our part, we have remained close to the expansive definition of the social realm as “physical like nature, narrative like discourse, and collective like society. In deploying elements of both the broad historical narratives of a city and the private “insignificant” stories of inhabitants and users, notably those concerning spatial qualities relating to atmosphere, can urban transects help designers to understand and to take into account relations between urban ambiances and environments? This question was first addressed in a master’s level design studio we directed at the ENSA at Grenoble. The research being presented here constituted a second phase of exploration on the drawing of “urban climatic sections” in which the initial ideas received further development. The design-studio and seminar component of the work will continue into the 2009-2010 academic year; work on sections will continue with a new emphasis given to use of video as a means of registering the field experience of the walked transect.

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<sup>9</sup> *Mason & Dixon* is Thomas Pynchon’s fifth novel, published in 1997, 773 pp. New York: Henry Holt & Company.



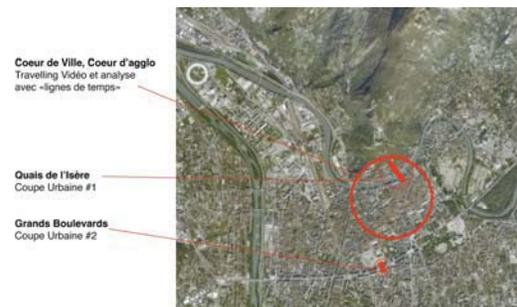
*Urban sections « Summer Heat in the City » Master's Studio of 2007-2008, under the direction of S. Melemis and N. Tixier. (original size : just over 4 meters in length)*

### Urban Transects : Field Protocol and Graphic Sections<sup>10</sup>

The first questions to be addressed involved the choices of terrain and the precise paths the transects should cut across them. After some discussion, the decision was taken to focus on areas presenting contrasting climatic characteristics. The first was a portion of the historic centre, with its narrow winding streets and stone constructions of an average of four of five storey's, situated along the Isère River across from a steeply climbing urbanized mountain face called the Bastille.

The city's broad, mid-twentieth century boulevard and the mostly concrete residential buildings of eight storey's on average that line it served as a second terrain.

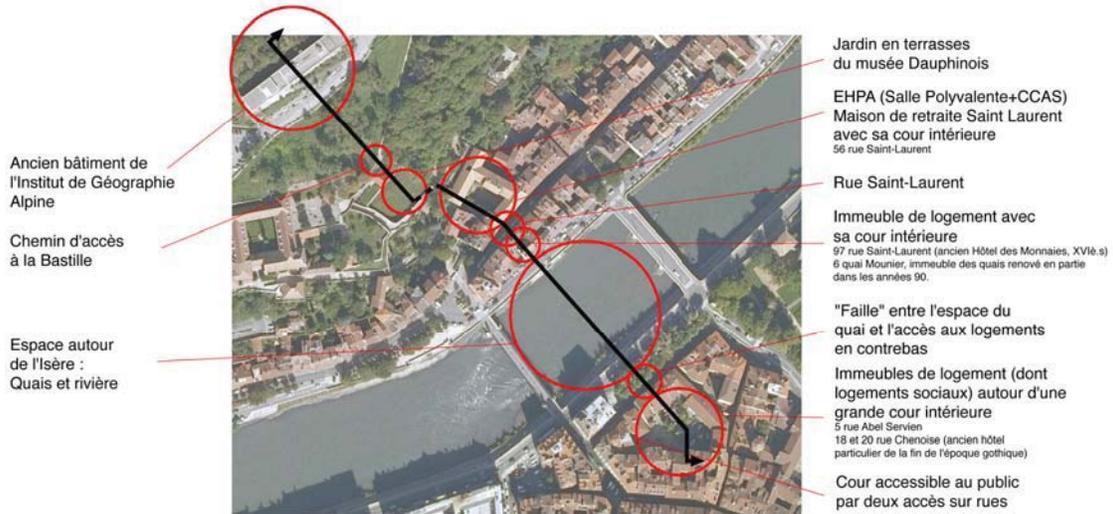
In addition to the obvious contrast in terms of urban form and the resultant differences of indoor and outdoor summer ambiance, these sectors were chosen based on the fact that both were sites of important urban design projects, one of which was recently completed (the city's third tramway line had recently been installed in the middle of the boulevard) and the design of the other, concerning the banks of Isère, only recently begun.



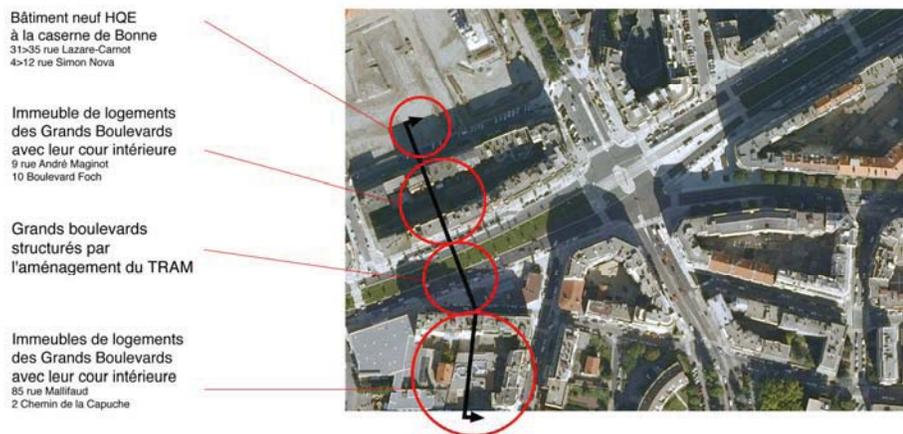
*Sectors Selected for Study in Grenoble*

<sup>10</sup> Section drawings : Zoom (Naïm Aït Sidhoum, Pierre Bouchon Cesaro, Thibaut Candela) + Laure Brayer + Damien Masson.

## COUPE URBAINE #1 : LES QAIS DE L'ISERE



## COUPE URBAINE #2 : LES GRANDS BOULEVARDS



*Grenoble sections*

Once the transect lines had been determined, the field observation started; perceptible differences in terms of wind, shade and warming from sunlight etc. were noted at different times of day. Measures of ground temperature were regularly taken. Typical built components engendering typical characteristics of thermal ambiance were identified and described; narrow streets with their particular wind-effects, shaded interior courtyards, apartments with sloping roofs oriented to the

south, the spaces and micro-conditions of the urban boulevards etc. Often dramatic differences in ambiance were discovered and described. The meeting between these elements and the movements of our own bodies and those of people spontaneously met in the urban spaces combined to produce effects that we attempted to identify and characterize both through bodily sensations and the ways we and others attempted to describe them in words. This material essentially

provided the basis for the sections that were subsequently drawn.

Noting the street names and the numbers of the buildings the transect crossed, we consulted the building permits in the City Archives in order to obtain the necessary information to draw measured sections. The drawings helped us to plot the precise course of the section (and for example to discover that at one point it cut directly across the swimming pool of a fitness club), and also provided information about an interior courtyard that we were unable to obtain access to. Though in this instance we did not choose to do so, the initial drawing of the section could have allowed us to resituate the transect in order to have it follow the most interesting path possible.

The encounter with the site conditions allowed us to repose the problem of how the section might be drawn. In what sense might we be able to get beyond a primitively empirical, purely descriptive attitude to the places? How might we construct meaningful « clusters » of information and narrative concerning specific points along the way? Might it be possible to have too much or too little of one kind of quantitative data, an excess or poverty of narrative content? How might the quantitative data (on ground and *ambient* temperatures, wind currents, light levels and movements etc), be best represented graphically? What place should be given to « expert » and « vernacular » modes of knowledge about climate? In handling such knowledge, was it absolutely necessary to observe the rule of using only situated commentary?

Finally the gathering of material was carried out in the following way:

#### **Quantitative aspects:**

We started by collecting available quantitative information from the Urbanism Bureau of the Grenoble Region (Agence d'Urbanisme de la Région Grenobloise - AURG). This include radiant temperatures of ground surfaces recorder using infra-red aerial photographs. These average levels are accurate to within a distance of thirty meters.

Having studied this information, we then took our own # measurement *in situ* during sunny summer weather. Using a thermometer and a thermal camera we measured ambient temperatures, and the radiant temperatures related to ground-surface. This provided gave us an image at of "micro" scale that the AURG data did not.

#### **Qualitative aspects:**

Interviews were conducted in a « semi-directed » fashion with city technicians and professionals, and with users/inhabitants; the people interviewed were aware of our research interests but then manner in which they responded to issues of summer climate were left largely open for them to decide.

A principle of sampling was applied: the initial intention to interview precisely the people whose dwellings were represented in the section. We thus contacted these people by telephone. Confronted with the reticence of many people to be interviewed, we often had to seek out people living nearby in what we assumed to be similar conditions. These included not only people living in the area but also neighborhood associations, business owners, residents of retirement facilities and passers-by, etc. The resultant interviews revealed practices and minor invention intended to attenuate the effects of very high temperatures and humidity and gave an evocative image of the differences and similarities among people's experiences.



*Discussion around the section – Interview, April 19<sup>th</sup> 2009*

#### **The conducting of the interviews:**

Several printed documents were brought to the interview: the initial version of the measured section, an aerial photograph indicating the path of the transect and three aerial photos at different scales (the neighborhood, the Greater Grenoble, and that of its situation in the valley between three mountain-ranges). We encouraged people to make notes directly on the section. With each new meeting, the interviewers evoked certain elements raised by in previous discussion in order to identify the ones which could be considered « recurrent », and in order to discover link different people's narratives together around common ground. Many people experienced difficulty in understanding the section and were timid about drawing; the recurrences were thus most frequently encountered in the discourses.

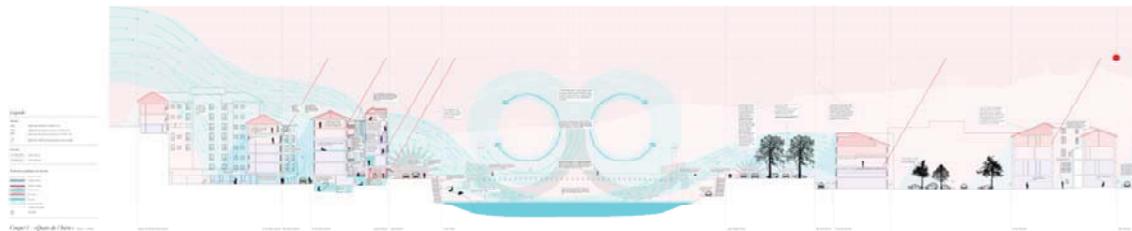
**Graphic transcription of the material collected:**

Given the diversity of content and of “registers” of knowledge – professional, scientific, everyday – encountered in the interviews makes it difficult to define the knots or threads of meaning that would tie them together. At the same time, it is in this very potential for connection, and perhaps a some kind of discursive hybrid, that the promise of the approach lies. The problem is rendered still more difficult by the need to situate the narratives collected spatially; to take into account what people point out as they speak, and the ambiance in which they are situated as they do. We were interested in by the potential of the sections to “situate” what was said in the richest and most telling way possible. Doing so poses numerous problems having to do with the way distinguishing (graphically) different

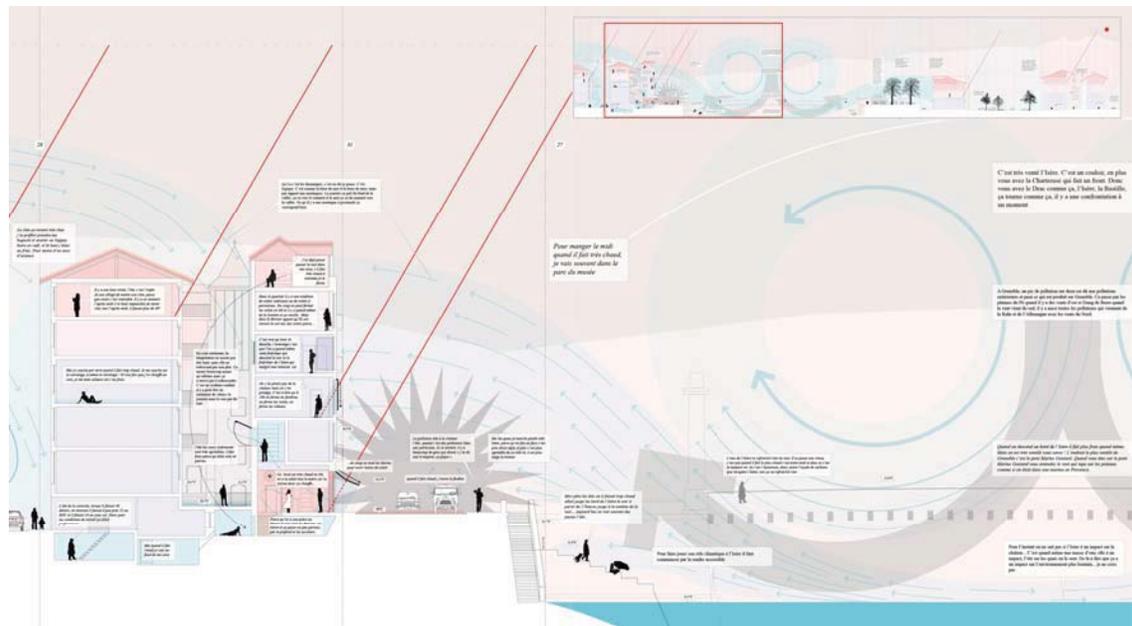
senses of context and spatial scales to which the different narratives refer.

**Colors and graphics were used in a very simple way:**

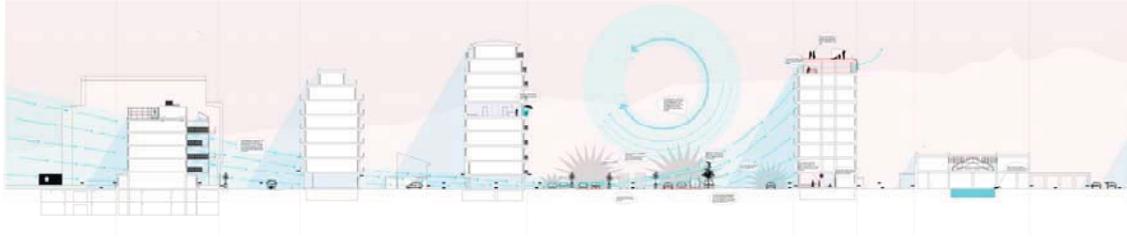
- blue for coolness, red for heat, with different nuances between the two representing intermediate temperatures
- The background colors represent the AURG temperature readings
- The more precisely situated readings we took are indicated with markers
- Air movements are shown with arrows, much as in meteorological maps, or charting of water currents in nautical ones
- the inhabitant's techniques for dealing with extreme heat are translated graphically. -- some of the words spoken are incorporated along with some of the bodily gestures that accompanied them



Section through and around the banks of the Isère River  
(length of the printed drawing was over fours meters)



Zoom on section through and around the banks of the Isère River



*The Grands boulevards*  
(length of the printed drawing was over four meters)

Quotations from the interviews have been placed directly in the drawings inside cartoon bubbles, essentially at the places where they were collected. This double process – thus associates what was said with the bodily gestures of the speaker and the context in her or she spoke. It allows for a simultaneous and connected vision of measurable quantities and perceived qualities and – potentially – for a drawing together of structure / expert and empirical / quotidian ways of knowing.

#### **Towards a “positioning” of the expressive capacities of the section**

Through these first explorations we were able to identify of a number of principles concerning what might be expressed by the urban section, and a corresponding hybrid of graphic strategy within which different graphic and discursive languages or conventions are freely combined.

The analysis of the narratives that were collected, lead us to divide the words collected into two main groups. The first contains commentaries that could be considered to constitute the central issue explored in drawing the sections: 1) the expression of effects of summer heat experienced and the contexts in which they arouse 2) the critical assessments by people of the living spaces “imposed upon” or “given to” them 3) the practices and the patterns of movement provoked by hot summer weather 4) the tactical capacities of users with respect to the spaces they inhabit or work in on a daily basis.

The second sort of commentary more or less explicitly defined openings into broader narratives in which the question of summer heat was simple one element. These narrative possibilities concerned: 1) collective and individual memories 2) how in talking about summer heat, connected stories would suggest themselves (concerning the rapport with a building superintendent, a problem linked to the technical qualities of shutters, how feeling humidity can affect one’s mood, the price of a weekend in the freshness of the mountains to escape

summer heat...) 3) the evocation of « scenes » or « decors » of summertime (old people on park benches, young people on the banks the banks of the river...).

These elements might suggest possible stories in which summer heat played role with necessarily being the central issue or might take the form of veritable intrigues, digressions leading out of one story and into another.

The presentation of these different narrative contents in the graphic form of the section requires a judicious selection of excerpts while begging the question of how they will – and to what end – they will be deployed. Should all the voices speaking be treated basically in the same way, as if all were of equal value? Would it be preferable to use graphic means to underline differences in register among these voices? How might one distinguish graphically between more conceptual, distanced, “overhanging” points of view and others embodying a more direct and immediate bodily engagement in space? How might one distinguish between expressions of a precise situation and ideas that do not speak of any one place in particular?

In exploring all these questions and possibilities, might it be possible to distinguish emergent forms of collective experience, implicitly or explicitly engaging a significant group of people in something like what Bruno Latour calls a “controversy”<sup>11</sup>?

<sup>11</sup> Cf. Bruno Latour, *Nous n’avons jamais été modernes. Essai d’anthropologie symétrique*, Editions de La Découverte, 1991.

# Urban Japan: Considering Homelessness, Characterizing Shelter and Contemplating Culture

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*From the edge of death,  
these chrysanthemums somehow  
begin to blossom.  
Matsuo Basho<sup>1</sup>*

## ABSTRACT

Contemporary Japan is a model of progressive design, effective business, efficient societal structures, and advanced technologies. Urban Japan, most notably captured in bustling metropolitan centers like Tokyo, Yokohama and Osaka, push the limits of architectural gymnastics, urban complexities, infrastructure possibilities and civic amenities. Yet, despite the undeniable advances in scientific, economic and technological systems, urban Japan confronts significant dilemmas common to other nations of the world – namely social breakdown, poverty, and homelessness. Due to severe stigma surrounding homelessness and social agency in modern Japan, such thorny issues are often marginalized within internal

research, scholarly and professional circles. Over the past decade the author has studied incidence of homelessness in several of Japan's major cities, examining in particular occasions of homelessness and the provision of shelter to accommodate such populations. With an environmental design perspective the researcher has explored, considered and documented the primary types of temporary shelter designed, crafted and inhabited by Japan's urban homeless. Various types of housing can be distinctly characterized using such classification systems as materials, siting and composition. Ethnographic sensibilities are deployed to richly describe living conditions, psychological circumstances and material culture therein. The present paper thoughtfully examines Japan's homeless situation and analyzes the transient shelter through various lenses, including domestic, social and spiritual viewpoints. Buddhist notions, such as impermanence, influence the scholarly interpretation of homeless shelter, as do cultural norms, social pressures, design tactics and environmental concerns. The researcher has documented a plethora of transient housing conditions, often explicitly located in high traffic areas in and around rail and subway stations as well as those hidden from view in city parks and sprinkled along river pathways. Many of the housing types demonstrate intense care and concern by their builders, illuminating the overwhelming and mainly positive role of culture even in the most difficult and demanding of circumstances. Attention to cleanliness, blurring of inside-outside demarcation, concern about construction of view, mindfulness to materiality, and focus on composition, for example, all factor into the equation of spontaneous settlements and homeless shelter. An integrated environmental design and environmental psychology tactic to understanding the dilemma of homelessness and the production of temporary housing provides a novel and fresh vantage point from which to better understand, interpret, and address this growing problem in present-day urban Japan. The research navigates sensitive territory and considers serious dimensions of homelessness, rough sleeping, day laboring, and various approaches to shelter – topics conventionally marginalized, stigmatized and

basically off-limits given the unambiguous social order and middle class mindset of modern Japan.

## PRELUDE + PROBLEM

*"Unlike westerners', the traditional Japanese mind-set does not regard space as empty."  
Boye Layayette De Metne<sup>2</sup>*

Japan stands out globally as a model of prosperity, modernity and the realm of the middle class. Having realized significant progress through the latter half of the last century, Japan's major cities have experienced rapid development, unimaginable growth, and impressive technological innovation + escalation. It is well understood that the society overall enjoys high standards of living and enviable personal comfort. While images of towering buildings, outrageous fashion, rush hour crowds, and state-of-the-art electronics come to mind when Tokyo is mentioned, there is another aspect of the city that exists in the margins and spaces of the in-between. Homelessness.

While the homeless in Japan are arguably not as large in number nor as visible as is the case in many other global cities, there is a growing population of displaced persons who find shelter and solace in the interstitial leftover zones of the metropolis. From hidden canal edges to the prominence of Ueno Park, and from Sanya district to the train stations of Ikebukuro, Tokyo's subculture of homeless men live an existence largely hidden from the tourist's gaze and generally tolerated by mainstream Japan.

Outsiders looking at the cardboard boxes adjacent to the water, or the box cities that spring into temporary existence daily in rail stations after the evening exodus, might be quick to negatively judge the situation. However, there is far more to the situation than meets the eye. Japanese society lives with high density and crowding as a simple fact of coping with a large population on a limited land base. Psychological, cultural and social norms have developed that permit so many people to live in such close proximity. Architecture and design support the need to live in confined spaces and tight places. Moveable ethereal *Shoji* screens, views from inside to outside, carefully delineated spatial

transition, and inter-connection of rooms make the small feel large. Rituals and customs, such as removing shoes at the doorway, serve to clearly demarcate + separate zones of public versus private, dirty versus clean, and tightly defined realms of circulation versus habitation. Zen Buddhist principles of change, impermanence & *mujo* (ephemerality) factor into the equation, as does the consideration and pursuit of wabi-sabi. While such cultural, spiritual and spatial gestures are readily seen in the traditional Japanese house, similar design devices and deployment of customs can be witnessed in the tent cities of Ueno or the box cities of Ikebukuro Terminal. Shoes left at the threshold. Flimsy cardboard walls serving to symbolize inside from outside. The temporary and the transient. The illusion of permanence with the reality of impermanence. Orientation for privacy. Provision for dignity. *Mujo* not as pessimistic but rather life acknowledging.

It is interesting to contrast the modern, lavish steel + glass edifices of Ginza's elite streets, and the wooden post + beam upper-class housing of Yamanote, with the cardboard and nylon assemblies of Tokyo's homeless precincts. While there are obvious and dramatic differences in material, scale and construction, there exists many aspects that serve to unite the typologies. Japanese culture has mastered control and delineation of space, from the tight and orchestrated layout and presentation of a Bento box to the architectural interplay of Kenzo Tange's towers. Modern Japanese designs convey aspects of the transient and qualities of the impermanent. In such a vein, Japan's homeless housing is not simply a random collage of recycled parts but rather proves an intentional installation that provides shelter, privacy, space, place and a sense of dignity to its disempowered residents.

## CONTEXT | CONDITIONS

*"Not to consider 'I am this', that is freedom."  
[Buddha]*

Japan, one of the world's most industrialized nations, is comprised of a series of islands (approximately the same area in total as Germany), located off the east coast of the

Asian continent. With almost 127 million inhabitants, Japan has the ninth largest population on the planet. Due to remarkable industrial growth after the WWII, and undeniable leadership in the high technology sector over the past few decades, Japan's economy proves a global force. While spiritual (Buddhist and Shinto) underpinnings color much of the society, the nation is not overly religious. Japan is strongly family oriented, strongly collective, strongly bound to severe cultural norms and driven by commonly understood societal expectations. It is important to understand issues of homelessness, social systems, design and planning within such parameters.

An outsider's view of Japan paints a picture of a tightly-controlled, strongly-ordered, economically stable, and largely middle class society. Stereotypical aspects such as ethnic/cultural homogeneity, intense density, urban chaos, and the predominance of advanced technology, add to this picture of a modern, progressive Asian nation. While the facts bear out the claim of overall economic health at the individual and collective levels, the gap between Japan's rich and poor is growing as is homelessness. While many Western countries have elaborate and often effective social support systems, Japan has relied on other coping mechanisms to address such societal ills. Rather than looking to the government for assistance, Japanese citizens (largely the male population) are expected to look to work as the first choice of support followed closely by family networks. Downstream, when all options are depleted, is government aid. Japanese Ministry of Health, Labor and Welfare (1997 fiscal year) numbers indicate that approximately 7% of national social security expenditure is allocated to 'livelihood assistance' and 'social welfare'. Less than 1% of Japanese receive social assistance. In comparing social security expenditure to national income, Sweden stands at over 50%, Germany at over 30%, USA at approximately 20%, and Japan at 15%.

While homelessness is not new to Japanese culture, its somewhat dramatic increase in recent years presents unprecedented challenges. Compared with American statistics, which place the number of homeless in New York City alone at 50,000, Japan's problems seem modest. Tokyo, with one of the more significant homeless

populations, has by numerous estimates (e.g., Japan Times) approximately 5000-6000 people living on the streets. Current estimates put the number of homeless in Osaka at approximately 15,000. For many reasons the majority of the homeless are men, mostly put on the streets when they lost their jobs, saw their companies go bankrupt, or suffered a disastrous disgrace in the eyes of their families / communities. Despite living without a permanent address, many of the nation's homeless are law abiding, respectful of cultural norms, and regular (albeit modest) contributors to the Japanese economy and society.

Karan<sup>3</sup> (2005), in his book Japan in the 21<sup>st</sup> Century: Environment, Economy and Society, underscores some of the challenges pertaining to social welfare and homeless. He notes that, "The bad news is that more than a few people slip off the safety net, and there is often nothing to save them. To be eligible for welfare, Japanese must prove both that they are unable to work and that they have a fixed address – conditions the homeless cannot fulfill. For them there are no permanent shelters and little sympathy." On a positive note regarding the dilemma of 'no fixed address', a recent ruling by the Osaka District Court deemed that a homeless man's tent in a city park should have been accepted as his home address when submitted to a ward office. In judging that the tent should be considered a fixed address, the district court underlined the basic resident register law's definition of a person's address as the "...center of that individual's entire life and that which has the deepest relationship with that individual's life." The court deemed that "the plaintiff's tent provided substance as the base of his life." This ruling has profound significance in Japan, where a growing number of disadvantaged men are electing or forced to live: 1. in flop houses in unpopular districts; 2. in informal tent structures along river banks; and, 3. in small cardboard 'rooms' in train stations.

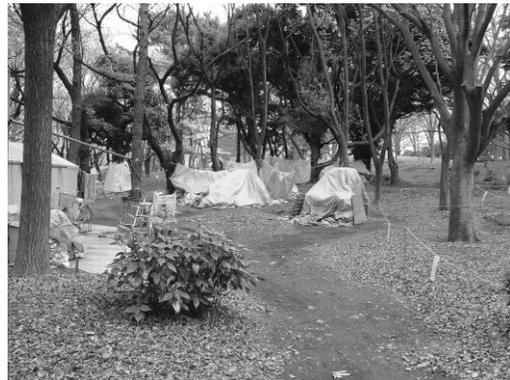
1. Sanya: In the infamous Sanya district in northeast Tokyo, day-laborers by the score live in flop-houses that line the narrow streets. Soup kitchen lineups wrap around buildings and construction workers' (*tobi shoku* | steeplejack) unique cloth shoes hang to dry on makeshift clothes lines. Many of the men of Sanya, while down on

their luck, continue to spend productive days on building sites throughout Tokyo. In a remarkable account of his personal experiences, American academic Edward Fowler<sup>4</sup> (1996) noted in San'ya Blues: Laboring Life in Contemporary Tokyo: "Tokyo's distinguishing features – and there are many – become apparent to the long term resident. One place, however, is immediately recognizable as different from any other: San'ya, the day-laborer community straddling Taito and Arakawa wards where workers – mostly construction workers – get their jobs off the street. In contrast to the rest of the city, moreover, San'ya leaves a disquieting impression of neglect, poverty, and outright misery." Shiro Oyama<sup>5</sup> (2005), in his book A Man with No Talents: Memoirs of a Tokyo Day Laborer, wrote: "One's true self is that which exists in the gaze of other people. Here in San'ya, I have continually practiced the technique of bringing my innermost self closer to the self that others have come to expect; for someone like me who must live out his days in San'ya, there is nothing more to do in life than refine this technique."



2. Tent districts: In addition to the more 'conventional' accommodation provided by the Sanya *doiyagai* (rooming or flop-houses), a growing number of homeless people in Japan live in makeshift tent shelters. While these shelters vary in size, complexity and location, there are common features they share. Generally they are constructed of waterproof blue sheet nylon. In many cases the constructions rely on a wooden or metal frame. Where assembled on hard surfaces, such as roads and walkways, they are constrained grade level by bricks, rocks or other such ballast. Where located in parks, the base of the tent

is often affixed to the ground through ingenious deployment of umbrella handles as ties. Outside the tent are laundry lines, work tables and an area for shoes to be stored. Relationship of outside to inside is understood and at times celebrated (akin to more traditional architecture efforts to dissolve boundaries between building and landscape). As a sign of respect, as well as a marker of outside/inside, Japanese always remove footwear before entering a home. The situation proves no different for the homeless, whether living in a flop-house, a tent, or a cardboard box. Inside the tent space is also carefully delineated and often well kept. Societal norms, cultural pressure, and lifelong indoctrination ensure that space is well managed, well honored and well appreciated. Tents are located in a variety of places, most notably adjacent to railway stations (e.g., Tokyo Shinjuku), along rivers (e.g., Sumida), and in popular parks (e.g., Ueno and Yoyogi). It is most interesting to consider the relationship of tents to one another within such communities – while urban design is not a conscious pursuit of the homeless, there are informal rules and relationships that dictate tent placement, orientation and proximity.



3. Cardboard 'rooms' | box cities: The third type of shelter for the homeless comes in the form of cardboard boxes. Compared with the robust qualities of nylon sheeting, the paper houses provide scant protection from the elements. In some cases the large cardboard boxes, if located outside, are covered in clear plastic or positioned under shelter (such as a rail bridge). More often, however, the boxes are placed inside public buildings, often outside peak hours. For example, in Tokyo's Ikebukuro Station

one witnesses the rapid emergence of box cities as the hectic commuter rush subsides. Cardboard is often intentionally provided by department stores and government officials to use by the homeless. Cardboard rooms are carefully constructed for sleeping, with care and respect afforded to norms and traditions such as leaving shoes 'outside'. As these shelters are 'constructed' inside buildings, and therefore safe from the elements, they commonly have only walls and no roof. What is important and meaningful is that the short walls provide enclosure, privacy and dignity to homeless men who struggle for 'face' in a relatively judgmental society. In the morning, before the commuters arrive en masse on the first trains of the day, the homeless work to disassemble their temporary abodes. The entire enterprise, from construction of cardboard 'rooms' late in the evening and use overnight, to their rapid removal in the morning, is impressive and assuring.



In his article "Different with a Difference", Roman Cybriwsky<sup>6</sup> (2000) portrays aspects of Tokyo's informal sector. He wrote: "About 200 of the homeless reside on Shinjuku Station's west side, amid heavy pedestrian traffic, in a tidy settlement made of cardboard boxes. Some of the dwellings have more than one 'room', are equipped with futons, a few basic kitchen items, and ropes for drying laundry. Calendars hang from cardboard walls, giving an added sense of permanence and domesticity." There have been, over the years, various attempts to remove or relocate such informal settlements. With the number of homeless on the rise in Japan, it is likely that any interventions that ignore the root causes of homeless will

fail. It seems that the Japanese will need to determine paths, approaches and solutions that preserve dignity, provide shelter, and work to alleviate sources of poverty, homelessness + social injustice.

All of these forms of shelter (*doyagai*, tents & paper houses) reflect temporary and impermanent qualities well understood within the spiritual practices of Japan, and most notably Buddhism. These forms of accommodation for the homeless represent fleeting, fragile & transient qualities – dimensions acknowledging cycles of life and underscoring the illusory nature of stability + permanence. Housing for the homeless has parallels within more conventional Japanese architecture (i.e., historical & contemporary).

#### IMPERMANENCE | EPHEMERALITY | DESIGN + PLANNING



*"Stopping of becoming is nirvana."  
[Buddha]*

Japanese architecture, from both historical and contemporary perspectives, has encountered strong inspiration & influence from Buddhist thought. Spiritual notions of impermanence & ephemerality (*mujo*) impart a sensibility into design. Such impact is seen in the employment of cardboard and paper as building materials in the projects of contemporary architect Shigeru Ban. Concepts of layering, lightness, change, transience and the transitory can also be seen in the work of Arata Isozaki, Rei Kawakubo, and metabolist master Kisho Kurokawa (notably his Nakagin Capsule Tower in Ginza). Taro Igarashi<sup>7</sup> (2005), in his article "Kisho Kurokawa: Buddhism and Metabolism", noted that the architect's "... global view

that creation and destruction run fluidly into one another has its roots in Buddhist doctrine.” He adds that, “In the original language of Buddhism, *samsara* means ‘to flow’, and also means the combination of various states, expressed through the process of reincarnation.” In a similar manner to the celebration of the temporary that we see in the work of numerous modern Japanese architects, the informal housing of Japan’s homeless acknowledges the inevitability of change, a lightness of being, and the cycle of suffering common to all sentient beings. Ongoing research, scholarly activity and creative endeavor of the author considers, delineates and develops connections & associations between Buddhism, design thinking, and built form (buildings, products, landscapes) in Japanese society. While housing solutions within the informal sector appear to be in stark contrast to mainstream Japanese design and building solutions, it is argued that there may be greater similarities than is commonly understood.

## SPACE, FORM AND BEAUTY

Space in Japanese culture is fundamental to design and living, yet is very different in understanding and approach compared to the West. As an island society with limited resources and large population, space is particularly precious and valued. Many families in Tokyo live in a fraction of the residential space that counterparts in North America might enjoy. Vehicles such as choreography of path and control of view (including the so-called ‘Zen view’) are vital in the quest for promoting comfort, pursuing beauty and seeking harmony (e.g., between people and environment; between the built and the natural, etc.).

Form and materials are important in Japanese design, interplaying in balance with the significance and meaning of space. On the material side, Japan is known as a ‘wood’ culture due to the historical access to timber as a primary building material. The structural qualities of wood, with its limited spans, gave way to a post and lintel construction system. The manner of building homes and temples, with complex joinery and regular grid layouts, fostered the rectilinear geometry that is so prevalent in historic Japanese architecture. From this building approach arose many aspects of Japanese design that are now well known

in the West, including perhaps most significantly the interconnection and mutability of spaces, the use of infill panels (most notably the *shoji* screens), and the creative control of perspective to shape perceptions. Nishi and Hozumi (1983) describe qualities of architecture arising through reliance on post and lintel construction: “There is, moreover, a fluidity in Japanese architecture between inside and out. Though fixed walls are frequently used, the distinction between wall and door is very elastic, and whole facades in both temples and residences can be opened to the elements at will by folding open or swinging up the panels between posts or by sliding open, or even removing entirely, the wooden or paper screens.”<sup>8</sup>

In Japan there is an important concept known as *shibumi*, which in essence translates as an unassuming elegance and conscious reserve. When *shibumi* is elevated it invokes what is called the beauty of *wabi sabi*. *Wabi* is about the wretched, forgotten and forlorn while *sabi* is about the ‘rust’ of age. It is arguably in the union of *wabi* and *sabi* where Japanese design becomes most compelling and aesthetics most remarkable – where the simple, the unaffected and the elegant coexist. We find this search for beauty, and the invocation of *wabi sabi*, deeply rooted in the traditional Japanese arts of *ikebana* (flower arranging), *bushido* (the way of the sword), and perhaps most notably *sado* (also referred to as *chado* or the way of tea). Certainly such concepts loom large in the efforts of Japanese architects and landscape architects, especially in their search to impart beauty, tranquillity and meaning in an ever-escalating modern milieu of technology, urbanity and uncertainty.

## QUALITIES & CONCEPTS

Japanese design has many important dimensions and principles that guide the creation of landscapes, buildings and interiors. While there are too many to adequately review within the present paper, a series of key concepts is used for purposes of the analysis of informal housing in major Japanese metropolitan centres. The main points considered, from a design and analysis perspective, include: 1. Landscape & Nature; 2. Ritual & Routine; 3. Fluidity & Functionality; 4. Craft & Construction; 5. Identity

& Place-making; and, 6. Impermanence & Transience. While this list is less than exhaustive, it does introduce some initial considerations with which to better understand informal housing and to begin to draw comparisons with other, more conventional forms of Japanese architecture and design.

While it is certainly true that informal housing, that is, the shelter created by the homeless class in Japan, does not benefit through the engagement of environmental design professionals, it is held by the author that design approaches whether intentional (high art) or vernacular (low art) are influenced by values, beliefs and conditions that prove omnipotent in Japanese society. For example, the notion of clean versus dirty realms is pervasive, with the very youngest of children taught to respect and revere the sanctity and simplicity of dwelling space. Another example of an omnipresent value is honouring nature as part of one's journey through everyday life. Such honour is seen in the great attention afforded to the *sakura*, or cherry tree, as it comes into blossom. Whether emperor or day labourer, the pleasure of viewing the cherry blossoms is a shared pursuit and a common joy.

One critical aspect of Japan, that informs and inspires design, is the deeply rooted spiritual history that underpins the culture. Shintoism and Buddhism are inextricably intertwined in the society, with ramifications witnessed over a spectrum of endeavours from business and the arts to education and politics. The Zen notion of *mushin*, or 'no mind', is a good example. Without a mind one is rendered without a self. Without a self one is afforded great freedom from the many trappings and seductions of common existence – inching ever closer to escape from the vicious cycle of suffering Buddhists call *samsara*. Japanese design and architecture often seeks such release from trappings and clutter, electing instead for the simple, the austere and the unadorned. The Japanese term *kanso* acknowledges the importance of simplicity of design, akin perhaps to German modernist architect Mies van der Rohe's famous dictum "less is more".

## 1. LANDSCAPE & NATURE

Through history Japanese society has held a highly synergistic relationship with nature. Celebrated perhaps most clearly in the pre-eminence of the garden in their culture, the Japanese work hard to dissolve the boundaries between humans and nature, and blur distinctions between inside and outside. From the joy found in admiring a twisted tree trunk to the intentional control of views into nature, the Japanese strive to respect their place within a much larger cosmos. The importance of water, the acknowledgement of imperfection, the mystery of asymmetry, and the search for order, among other aspects, underscores a keen desire to reside as a part of rather than above the natural world.

We see in informal housing many dimensions of design and construction that resonate with aspects of landscape and nature. With siting of tents commonly in parks and along rivers, the homeless frequently seek a strong bond to place. In parks, for example Ueno or Yoyogi in Tokyo, one can witness an intentional placement of dwellings that take advantage of tree cover, access to light and avoidance of traffic. On the river edge one can notice dwellings located with attention to wind protection and views to the water. In both cases there is often a clear relationship between adjacent dwellings that, while often subtle, fosters sense of community and distinguishes private versus more public spheres.

## 2. RITUAL & ROUTINE

In Japan the power of the collective, and the pressures of social norms, are profound. When one departs mainstream life these forces are not left behind and abandoned but rather continue to exert influence in many aspects of daily life. We see in the design and function of informal housing many qualities that respect the rituals and routines pervasive in modern Japanese culture. People in the West are aware of the Japanese tradition of removing shoes before entering a home or a temple. The separation of spheres, inside vs outside, private vs public, sacred vs profane, and clean versus dirty, is demarcated through the

simple gesture of abandoning shoes at the threshold (*genkan*).

Although an individual may be displaced, destitute or in despair, the role of ritual in everyday life commonly remains intact. When a tent home is constructed the rules at play that serve to delineate space, for example to signal indoors versus outdoors, loom large. While in a formal residence the *genkan* may be clearly designed and strongly demarcated, for a homeless individual a collapsed cardboard box, standing only a few centimetres above the cold concrete walkway, proves a sufficient signifier of threshold and difference. While the gesture might seem minor and even unnoticeable to the foreigner, to the Japanese it is a clearly understood demonstration of respect, conformity and dignity.

### 3. FLUIDITY & FUNCTIONALITY

As noted previously, space in Japanese culture flows quite seamlessly within buildings and between buildings and the environment. Through the flexibility and mutability of space, and the mobility and transformation of objects (e.g., screens, walls, doors, etc.), the boundaries between rooms and the definitions of place shift with relative ease. A wall that is at one moment opaque is in an instant transformed into a richly lit translucent screen or a vast opening to the outdoors. The possibilities for dissolved borders translates into a possibility for greater harmony and unrestrained flow: harmony and flow between spaces; harmony and flow between container and contained; and harmony and flow between dweller and nature.

Within informal sector housing we witness similar concern with fluidity and functionality. Tent structures are designed in a manner that permits walls to shift, flaps to open, roofs to be rolled back, and the inside-outside delineation challenged. In many cases intricate and innovative use of building materials, often found objects, ensures flexibility and adaptability. The use of sheet nylon, often secured with ballast made of stones or more commonly spent automobile batteries, translates into a rapidly and easily adjusted collection of walls, roofs and doors. Temperature, ventilation, daylighting and views in/out can be readily

modified as needs dictate. It is interesting that security of persons and materials is often not a major concern in Japan, for many reasons including intense social pressures and a widely and strongly held sense of honour (even among the homeless & day-labourers). Informal housing security features, for example, most commonly assume the form of roped-down window flaps and doors held closed with concrete blocks jarred on the exterior while the occupant is away on construction sites during the daytime hours.

### 4. CRAFT & CONSTRUCTION

Japanese architects and builders are renowned for their spectacular attention to detail. In projects ranging from large scale museums of concrete and glass to small scale teahouses of wood and paper there is extraordinary focus on construction, assemblies and materiality. Craft is highly celebrated and perfection of both process and product deeply valued. In the case of wooden joinery, for example, the pursuit of tight tolerances, skilful execution, and enduring performance is well accepted. As noted previously in the paper, the pursuit of perfection in Japan is not akin to Western notions of perfection. In Japan a surface may be intentionally rendered uneven, or a piece of lumber incorporated specifically because of its wretched shape. What is most critical is to produce works of beauty that resonate with accepted notions of harmony, poetics and meaning.

While most observers of informal housing in Japan would on first glance see mess and confusion, the design and construction of tent structures is often a complex, long and thoughtful endeavour. Collection of materials, concern about space and form, determination of site and orientation, consideration of mobility, deconstruction and reconstruction all factor into the equation. Aspects of craft and assembly are seldom happen-stance; rather they tend to be activities that are conscious, cumulative and meaningful. In many instances the informal housing units are owned by day-labourers who work in the construction arena. They are inhabitants who are used to working with their hands and often those who take pride in their craftsmanship. Often great ingenuity is demonstrated as

an object intended for one use is redeployed in unexpected and interesting ways. A wonderful example of such ingenuity and creative reuse is umbrellas repurposed as tent pegs – a tactic seen throughout Japan and most notably in tent cities in major urban parks.

## 5. IDENTITY & PLACE-MAKING

While Japan is a culture that strongly encourages conformity, it is also the case that personal identity and connection to place remains important. At the level of residential dwelling, aspects of customization, expression of personality and attention to image are evident. This is true of both conventional housing as well as informal housing throughout the country. In many instances there are efforts to personalize space and form both on the interior and exterior of dwellings. On first encounter all the structures in a tent city, or along a river's edge, may look similar. However, on closer inspection, and through interactions with residents of informal settlements, it is abundantly clear that each dwelling bears unique features and enjoys a distinctive imprint of its designer/owner. While it is certainly the case that conventional houses in Japan operate within a fairly narrow range of ornamentation (*kanso* is a germane Zen concept underscoring the importance of restraint, simplicity and understatement), informal housing is arguably less constrained. Such housing often enjoys an unusual array of appliqué, including bird houses, paintings, stuffed animals and an assortment of anime characters. This need to express identity and to celebrate persona seems a common trait regardless of culture and country, albeit with curious nuances based on place, time and circumstance.

## 6. IMPERMANENCE & TRANSIENCE

In Buddhism there is strong awareness of the illusion of permanence – that is, we construct and perceive our lives in a manner that suggests solidity, stability and predictability. All of this understanding of permanence however is mere folly, for the world and our lives are in constant change. What we accept now as reality is merely our best interpretation based on available knowledge, stimuli, past experiences and guesswork. Japanese

culture accepts that life is ever-changing, and that a path that acknowledges the frailty of our journey and the uncertainty of our path is wise and reasonable. Zen teaches that in the midst of unpredictability, disorder and delusion one is well advised to make things as simple as possible. The goal of reducing one's environment down to its basics, to limit exuberance and seek the most minimal essence, is indeed noble.

While we see this search for simplicity, austerity and restraint in contemporary Japanese design, from Tadao Ando's awe-inspiring concrete churches to Kengo Kuma's masterful collages of glass, steel and wood, it is also clearly evident in the constructions of the homeless. With challenges of subsistence and the demands of day-labouring, Japan's underclasses are artful in their optimal use of scarce resources and their clear acceptance of the impermanence of their situations. With the constant threat of forced relocation, the understanding that they reside in 'borrowed' space, and the need to make due with scavenged building materials, the homeless prove remarkably resourceful, resilient and inventive as they create 'homes' in less than ideal circumstances. The results are unquestionably accepting of uncertainty, mutable in nature, light on the land, efficient in operations, and effective in the provision of shelter that protects, nurtures and provides a rightful sense of dignity.

## SUMMARY & NEXT STEPS

*"Vacuum is all potent because it is all containing."  
Lao-Tzu<sup>9</sup>*



Japan is a nation where design is firmly engrained in the culture. Informed by spiritual aspects and shaped through a rich history, Japanese society places much emphasis on beauty, harmony and connection with nature. Modern Japanese architecture looks to many vital principles, such as *mujo*, *shibumi* and *wabi sabi* for inspiration and guidance. The result is commonly landscapes, buildings and interiors that are remarkably powerful in their aesthetics, materiality and spatial composition. The informal sector, or underclass in Japan, while residing in the margins nonetheless respects and responds to a similar set of principles and values, albeit less formally and less explicitly. Informal housing is crafted and constructed based upon unwritten codes and norms that prove pervasive within Japanese culture. Shared awareness of the importance of space, of the impermanence of existence, of our undeniable place as part of nature, and of the need to respect each other, proves a powerful determinant of housing space, form, order and meaning.

The present paper sought to make some preliminary connections and considerations regarding design and construction within Japan's informal sector. In looking at a wealth of communities and cases in the major urban centres of Tokyo, Yokohama and Osaka, the author observed and explored similarities and differences in informal housing and engaged in initial analysis of design and planning aspects. Ongoing research aims to further identify and illustrate relationships between Buddhism, design thinking, and built form (buildings, products, landscapes) in Japanese society. Also under study are the city-specific nuances in informal housing design, construction and inhabitation.

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## PRESENTATION SESSIONS | **SOCIAL / CULTURAL**

### Session Four

Moderator: Madlen Simon, AIA



# Office Design's Influence on Employees' Stress Levels

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This is an explorative study on the office design's relation to employees' stress levels and the architectural and functional features of the different office types, which are hypothesized to influence the employees' stress level. The main questions at issue are: 1) Are there differences in stress levels between employees in different office types, 2) If so can these be explained by the features of the office types? and 3) Are there gender-related differences in which office types are perceived as stressful or not?

The article is based on a sample of employees (n=468) in seven different office types that have rated their stress level on a twelve items stress index. Different statistical methods were used, e.g. univariate and multivariate logistic regression models.

The results show differences in stress levels between office types but also differences between men and women in perception of stress in different office types. These differences remain after adjustment for background factors. Though the base of the study is architecture a multi-disciplinary approach is applied since office design needs to be understood in the context of health and organizational aspects, which are found in areas of occupational health and organizational psychology. The results are discussed in a holistic context and also how to apply knowledge about employees' psychological and physical health into the design process.

Keywords: office design, stress level, gender, employees, office type, architectural features, functional features

## Introduction

Today a majority of the labor force works in offices in Western society (Brill, Weidemann, Alard, Olson, & Keable, 2001), a great part of these people's waken hours are thus spent in office environments. This fact combined with reported severe problems of emotional health among the white-collar employees in Sweden (Åsberg, Nygren, Rylander, & Rydmark, 2002) lead us to investigate what part the office design plays for the stress levels. The need for knowledge on this subject is great as the research that has investigated the influence of the building environment and its architectural features on human health is limited (Evans, 2003; Evans & McCoy, 1998).

A large part of the research on environmental influences on human health has focused on natural environmental features (e.g., Hartig, Bök, Garwill, Olsson, & Gärling, 1996; Hartig, Evans, Jamner, Davis, & Gärling, 2003;

Kaplan, 1995; Ulrich, 1993). With regard to the built environment the focus is often on ambient factors like light, noise, and air quality (e.g., Apte, Fisk, & Daisey, 2000; Bengtsson, 2003; Evans & Johnson, 2000; Lahtinen, Sundman-Digerts, & Reijulas, 2004; J. A. Veitch, 2001). The research on the influence of the built environment itself has focused on health care (e.g., Dijkstra, Pieterse, & Pruyna, 2008; Ulrich, 1984, 2001), residential (e.g., Hartig, Johanson, & Kylin, 2003) or urban settings (e.g. Evans, 2003), whereas there is a lack on the office environment's impact on health and well-being. The research that exists is often focused on open plan offices, and then often with a general approach (Evans & Johnson, 2000; Oomen, Knowles, & Zhao, 2008). There is a lack of recognition that there are different types of offices with open plan layouts that may influence employees differently. The review by de Croon et al. (2005) on the effect of office concepts with regard to office location, layout and use on employees' health status and performance is to our knowledge the only attempt in investigating the layouts importance for health

outcomes. To the authors knowledge the study by Bodin Danielsson & Bodin (2008) is the only study that investigates the impact of different features of office types on employees health status and job satisfaction. That study does however not investigate the office types' features in relation to stress.

Work plays a significant part in the life for a majority of people; its importance for the welfare of people both on as well as off work is acknowledged in occupational research (e.g., Marshall & Cooper, 1978).

The impact on employees' health status by the psychosocial environment' is recognized (Karasek & Theorell, 1990; Siegrist, 1996). Research has e.g. shown that the mere topic of work leads to erratic and dangerous ECG readings among patients that had survived a heart attack (Theorell, 1974).

Though some stressful conditions occur across most jobs, such as conflicts with co-workers or heavy workloads, others are specific for an occupation. For instance for an artistic occupation such as orchestra musicians a major stressor is having to violate the artistic integrity, and for a nurse the death of a patient (Spector, 2006). Also the psychosocial environment and management style vary between organizations and lines of business due to differences in organizational culture (e.g., Länsisalmi, Peiró, & Kivimäki, 2000). Finally the character and amount of workload vary with occupational level; it is established that job pressure is higher among middle managers than at lower as well as higher occupational levels (Marshall & Cooper, 1978). However, if an individual will develop stress-related disorder is, according to Ivancevich et al. (1982), at an individual level depending on: 1) the dimensions or characteristics of the person, combined with 2) environmental stressors at work. This explanation is called Person-Environment (P-E) Fit model (see French, 1974, Lofqvist et al. 1969, Van Harris, 1978 in Ivancevich et al., 1982).

Recognizing the complexity of occupational stress this article is a first attempt to investigate what part the office design plays in determining whether an individual will develop stress disorders or not. We therefore set out to investigate if the office type itself affects employees' stress levels.<sup>2</sup> There is a need to investigate the office environment's possible impact on employees' stress levels as most occupational health and stress research is conducted among blue-collar workers and in health care

and service sectors (e.g., Aust, Peter, & Siegrist, 1997; MacDonald, Colotla, Flamer, & Karlinsky, 2003; McVicar, 2003). The lack of research on health among white-collar workers in office environments is evident. These factors combined with the fact that it is well documented that open plan offices reduces privacy and job satisfaction among employees (de Croon et al., 2005; Sundstrom, Burt, & Kamp, 1980) motivate our study.

We believe that the dependence of the features that differentiate office types on employees' welfare has not been fully recognized in office research. With regard to offices with open plan layouts it is e.g. easy to assume these office types may lead to higher stress levels among employee and we therefore found it important to look closer at this specific question. In addition we also wanted to investigate possible gender differences in stress in different office types. And if so, could these differences be traced back to the features of the office types. This study is thus an attempt to investigate the question in an explorative manner by recognizing other features in office design than the plan layout in the analysis.

### **Purpose**

The research questions based on our hypothesis are: a) "Are there differences in self-reported stress levels among employees in different office types? If so: b) "Can these differences be traced to the architectural and functional features that define the seven different office types identified in modern office design?" A further question is c) "Are differences related to gender"? To test the hypothesis employees of twenty-six companies or divisions in larger companies in the Stockholm area, Sweden was investigated.

### **Method**

#### **Sample**

The layout of the sampling plan has been described in detail in Bodin Danielsson & Bodin (2008, 2009). The basic feature was a selection of 26 companies and from each company individual respondents were selected. Participation was voluntary.

The response rate was 72.5% (men 68%, women 74%). Questionnaires were received back from 491 office employees (men  $n = 247$ , women  $n = 236$ , no information on gender  $n = 8$ ; mean age 41 years, range 21-64 years) and form the base of the study. The characteristics of the

companies varied because some were small, local companies, whereas others were large, international companies. The number of employees in the companies represented in the sample ranged from 10 to about 100 employees. Some companies/divisions included up to four different office types, whereas others consisted of a single office type (see appendix in Bodin Danielsson & Bodin, 2008).

In the multivariate analysis, 23 subjects were excluded because of (a) employment in the service sector (three subjects; too few to be analyzed), (b) missing information on the pre-specified confounders (16 subjects), (c) missing information on office type (three subjects) and (d) missing information on the stress questionnaire (1 subject). Consequently, 468 out of the 491 subjects remained for the analysis. The number of employees in the different office types varied, ranging from 131 employees in cell-offices to 26 employees in shared-room offices.

#### Office definitions

In order to compare the influence of different office environments on employees it is necessary to categorize them. Office environments have traditionally been defined either by spatial organization or by work organization. Only using one method has its limitation as both factors influence the office employees. In contrast this article analyzes the office environments based on their unique combinations of *architectural features* and *functional features*. The most dominant architectural feature is the spatial organization of an environment. The functional features are based on the actual work taking place in the office. The seven identified office types in contemporary office design should be construed as prototypes (for details and illustrations see Bodin Danielsson, 2007; Bodin Danielsson & Bodin, 2008). They are defined as follows:

- (1) The *cell-office* is a room office for a single person. The plan layout is characterized by corridors where every room has access to a window. Most equipment is in the room. The office work is often highly concentrated and independent.
- (2) The *shared-room office*<sup>3</sup> is a room shared by two to three people. The shared rooms are either a result of a team-based work organization that emphasizes interaction within projects or a consequence of a lack of space. In the latter, the people tend, nevertheless, to have similar work assignments. Most office equipment is outside the room, though the team-based shared rooms sometimes have their own equipment within the room.

#### Open-plan Offices

The open-plan office is defined by employees sharing a common workspace. There are neither walls between workstations nor access to individual windows. The work is often routine processing with low levels of interaction between employees. The purpose of these office types is to be flexible to organizational changes and to handle these without any reconstruction. To reduce noise and create some privacy, there are often screens between workstations. The open-plan office exists in different configurations, depending on the amount of people sharing the workspace. This study uses three different definitions of the open-plan office:

- (3) The *small open-plan office* holds four to nine people per room. It is a good size for teams (Mullins, 2008; Svedberg, 1992).
- (4) The *medium-sized open plan office* holds 10 to 24 people per room. It is the most common size of open plan offices in Sweden (Christiansson and Eiserman, 1998).
- (5) The *large open-plan office* holds more than 24 people per room. It is e.g. not very common in Sweden, but in countries like the U.S.A.

#### Office types With a More Flexible Design

- (6) The *flex-office* is defined, often but not always, as an open-plan layout where employees lack any personal workstations. It is the most flexible office type, since not only the office plan is flexible but also the work-schemes of the employees. A good information technology (IT) system is necessary, since the choice of workstation is free and all work is dependent on access to the common computer system. The flex-offices are dimensioned for less than 70% of the workforce to be in office at the same time. Work outside of the office is expected to lead to this occupancy figure.
- (7) The *combi-office*<sup>4</sup> has no strict spatial definition. Instead, teamwork and the sharing of common facilities define it. There is good access to back-up spaces for teamwork, meetings, etc. Work within the office takes place more than 25% of the time at places other than the personal workstation on an as-needed basis. The work is characterized by both independence and interactivity in teamwork.

Neither the quality of architectural details and environmental differences (e.g., height and material on partitioning systems and amount of window space

available) nor differences in density define the office types. The seven office types act as broad categories, and there are variations between, as well as within, the office types concerning these aspects. The cell-office stands out as the clearest definition because all other office types imply sharing the workspace and amenities between employees to varying degrees.

#### *Sociodemographics*

There were some differences in the distribution of sociodemographic data within the sample and between the office types. In short the 468 office employees had a fairly uniform distribution with regard to age and gender. The middle-low job rank was the largest category and media/Information Technology (IT) was the most frequent line of business. Details on the distribution of the distribution on background factors and the specific characteristics of the office types depending on these are described in (Bodin Danielsson & Bodin, 2008).

#### **Questionnaire**

This article is based on items covering the general background of the respondents obtained from the studies of health status and job satisfaction by Bodin Danielsson & Bodin (2008), and environmental satisfaction by Bodin Danielsson & Bodin (2009), supplemented with specific questions concerning stress given in a 20 items questionnaire by Burell (2002). Out of these twenty questions we have chosen to analyze the shorter version of a stress index where twelve questions were used, (Burell, 2002). The following twelve items<sup>5</sup> were used to measure the respondents' stress level:

- 1 (a) *I feel like I am under time pressure,*
- 2 (c) *I hate standing in line,*
- 3 (d) *I get frustrated with other drivers easily,*
- 4 (e) *I am at high speed and I push myself hard,*
- 5 (f) *I easily get frustrated when people are slow,*
- 6 (h) *I often do two or more things at the same time,*
- 7 (i) *I feel irritated and upset without showing it,*
- 8 (k) *I can find myself hurrying, even when I have plenty of time,*
- 9 (l) *I get frustrated with people who are fumbling or sloppy*
- 10 (m) *I eat quickly and I am usually done first,*
- 11 (q) *I find it hard doing "nothing",*
- 12 (t) *People tell me to slow down and take it easy.*

These items were all scaled in four categories ranging from "Never/Rarely", "Sometimes", "Rather often" to "Very often",

scored as 1 to 4. The sum of the twelve items formed a summary index for stress behavior with a scale from 12 to 48. Before analysis we dichotomized the index with cut-points given by Burell (2002) with below 30 indicating no or minor stress and 30 or above indicating considerable or heavy stress behavior.

#### **Statistical Methods**

The different statistical methods in this study are basically the same as those used in Bodin Danielsson & Bodin (2008, 2009) and therefore we will here sketch only the basic principles for analysis. A cross-tabulation of the dichotomized stress index against office types was followed by a multivariate logistic regression with Odds Ratio (OR) as the outcome parameter. Prior to the analysis, cell office was chosen to represent the reference category with which the other office types were compared using the OR.

Gender, age, job rank, and line of business were added to the multivariate regressions because they are factors that are supposed to have an effect on the outcome parameter and cause biased estimates if they are not included in the model. The outcome parameter OR is by definition 1.0 for cell office, the reference category, OR >1.0 indicate a higher risk for inferior stress level compared to the cell-office and OR < 1.0 a lower risk. Statistical significance was set at  $p < 0.05$ . Processing of statistical data was done using the statistical software package STATA, version 10 (StataCorp, College Station, TX, USA)

#### **Results**

The prevalence of stress symptoms ('Low or no stress' versus 'Stress or severe stress') for the seven office types and for gender is shown in Table 1.

The overall percentage of stress is 21% with the lowest figure for small open plan office, 12%, and the highest figure for combi-office, 35%. Females show almost a twice as high prevalence of stress symptoms compared to men, that is, 28% versus 15%. For the background characteristics (data not shown in table) the prevalence for age goes from 32% for 21-34 years to 19% for 35-49 years and 12% for the oldest group above 49 years of age. Middle-high job rank has a prevalence of 33% whereas the other job ranks are in the range 16% to 21%. The Media/IT sector has a prevalence of 27%, personal and economic

guidance 22%, technical professions 15% and business administration and management has 14%.

The more detailed description of the prevalence for gender show that for all office types except large open plan offices, females have higher stress levels than males. For large open plan office the figure for females is 15% and for males 18%. All of the prevalences in Table 1 are given without adjustments for other factors.

With a multivariate analytical perspective from the logistic regression model and the Odds Ratio (OR) as outcome the relationship between the office types changes quantitatively (differences become smaller), see Table 2. The ranking of the office types is however almost the same as in Table 1. With cell-office as reference the smallest OR is found for small open plan office, 0.5, followed by large open plan office, 0.7, flex office 1.2, medium open plan office 1.2, shared-room, 1.4 and the worst case is combi-office with 1.5. This indicates an increase in the odds of stress prevalence in combi-offices of 50% compared with cell office, and an even higher increase in odds compared with small open plan offices, that is, 300%. Due to the relatively small sample size these differences are not statistically significant though.

For females the OR from a multivariate analysis in the total sample is 2.2 with males as reference category, an increase in the odds of stress prevalence of 220%, a figure that in this case is highly significant. However, the stratification of the analysis into males and females gives indications that the office type does not effect females and males in the same way. For males the lowest stress prevalence is found in cell office with highly increasing OR:s for medium open plan office, 2.2, large open plan office, 2.5 and combi-office 2.8. For females cell office is not the most favorable office, since the lowest odds for stress is found in small open plan offices and large open plan offices, OR=0.3 compared with cell office. A somewhat increased OR is found in combi-office. For shared-room, medium open plan office and flex—office results are similar to cell office.

Additionally it was found that the OR:s for age, job rank and line of business agree well with the previous information given by the pure descriptive prevalences.

	Cell-office (reference category)	Shared- room	Small open plan	Medium-size open plan	Large open plan	Flex- office	Combi- office	All office types
	(n=131)	(n=26)	(n=43)	(n=56)	(n=74)	(n=81)	(n=57)	(n=468)
		(2-3 pers./ room)	(4-9 pers./ room)	(10-24 pers./ room)	(25 - pers./ room)			
All subjects	16 %	<b>27 %</b>	12 %	<b>25 %</b>	16 %	<b>26 %</b>	<b>35 %</b>	21 %
Men	10 %	<b>21 %</b>	10 %	<b>17 %</b>	<b>18 %</b>	<b>14 %</b>	<b>23 %</b>	15 %
Women	24 %	<b>33 %</b>	13 %	<b>30 %</b>	15 %	<b>35 %</b>	<b>54 %</b>	28 %

Note. Figures in bold indicate more stress symptoms than for cell office, figures in italics indicate less stress symptoms than for cell office.

**Table 1.** Percentage of employees in different office types reporting stress symptoms, for all subjects and for males and females separately.

	Cell-office (reference category)	Shared- room	Small open plan	Medium-size open plan	Large open plan	Flex- office	Combi- office
	(n=131)	(n=26)	(n=43)	(n=56)	(n=74)	(n=81)	(n=57)
		(2-3 pers./ room)	(4-9 pers./ room)	(10-24 pers./ room)	(25 - pers./ room)		
All subjects	1.0	<b>1.4</b>	<i>0.5</i>	<b>1.2</b>	<i>0.7</i>	<b>1.2</b>	<b>1.5</b>
Men	1.0	<b>1.9</b>	<b>1.3</b>	<b>2.2</b>	<b>2.5</b>	<b>1.8</b>	<b>2.8</b>
Women	1.0	<i>0.9</i>	<i>0.3</i>	<i>0.9</i>	<i>0.3</i>	<i>0.9</i>	<b>1.2</b>

Note. OR < 1.0 indicate lesser risk for stress symptoms than for Cell Office, OR> 1.0 higher risk. All comparisons are within all subjects or within gender. OR in bold indicate higher risk for stress symptoms compared with cell office, OR in italics indicate less risk.

**Table 2.** Odds ratios (OR) from a multivariate analysis of stress symptoms for all subjects and for males and females separately. The reference category is Cell office (OR=1.0) and the multivariate logistic model included office type, and adjusted for gender, age, job qualification and line of business, though gender was not included in the gender-separated analysis

## Discussion

The descriptive data showed great differences in perception of stress between the office types, where combi-office employees were most stressed overall, but also for both genders independently (Table 1). The vulnerable position for combi-office's employees was already established in a former study on job satisfaction (Bodin Danielsson & Bodin, 2008), thus the result was of no surprise.

The descriptive data also showed that women independent of office type reported higher stress levels in comparison to men, a result established in several other studies (e.g., Borell, Munanter, Benach, & Artazcoz, 2004; Chesney & Orth-Gomér, 1998; Lundberg & Frankenhauser, 1999). However the magnitude of the difference between the genders in this study is high and the fact that the genders ranked the office types differently regarding to stress was a surprise.

The questions we set out to investigate require a deeper analysis than a pure descriptive analysis, which leaves out the possible influence of background factors on the relationship between stress and office type. The multivariate analysis showed that office type has an impact

as differences in stress remained between the office type, though they are not statistically significant. Also the difference between men and women in the ranking of the office types as more or less stressful remained with combi-office as the office type with highest risks for stress among its employees.

The question is though why the stress level is much higher in combi-office than flex-offices, which has the same architectural features? Both office types mean sharing of workspace between colleagues to different degree and good access of "back-up rooms" for concentrated work, meetings and telephone calls. The explanation might thus instead be found in their different functional features. In combi-office there is a higher degree of collaboration and teamwork than flex-office, which is more individual and task oriented. Flex-office also offers more flexibility and freedom for the individual as it is possible to choose workstation freely within the office and work outside of the office. The differences between the office types' functional features have an effect on the employee's ability to exercise personal control. Personal control refers to autonomy; the desire for it is fundamental for humans and a vital component in our well-being (see e.g. Rothbaum, Weisz, & Snyder, 1982 for reviews). In the office it is exercised by psychologically and physically means (Lee & Brand, 2005;

O'Neill & Carayon, 1993; Rodin, Solomon, & Metcalf, 1978; J. A. Veitch, Gifford, R., 1996). The office type can reinforce or thwart personal control by its architectural and functional features. This means that architectural features such as size, location and permeability of interior rooms has an impact due to its influence on the degree of social control, interaction and privacy (see review in Evans, 2003). But also functional features such as ability to work flexible and support feelings of autonomy and confidence at work at an individual and group level has an impact on personal control.

The functional features of combi-office with a high degree of teamwork and little possibility to choose where and when to carry out work, may explain the higher stress level in combi-office than flex-office, as this is where the office types differ from each other. However, the major explanation for the high stress level among combi-office employees is probably not found in the features of the office type, but within the field of leadership and management as employees in combi-offices reported significantly lower job satisfaction compared to other employees (Bodin Danielsson & Bodin, 2008). Why this is the case is an interesting question, however outside the topic of this study.

Not only the office type's impact on employees stress levels was investigated in this study, but also the possible gender differences. Here we found both extreme differences in stress levels between office types for both genders and difference in ideal office types.

For women it was e.g. four times higher odds to report stress in combi-office than in small open plan office and large open plan offices (25- pers./room.). For men the ideal office type was instead cell-office, where the odds were almost three times lower to report stress than in combi-office.

Besides the high stress level in combi-office for both genders there was a great differences in ideal office types out of a stress perspective. For men the ideal office type was cell-office followed by small open plan offices (4-9 pers./room.). Women on the other hand reported the next highest stress level in cell-office. For women all office types that imply sharing of workspace in different constellation, appear to have a positive effect on stress, with the exception of combi-office. In other words the result revealed an almost completely different perception of stress between the office types for men and women. These

differences were found after adjustment for job rank, age and line of business. The result thus indicates other explanations such as difference in environmental stressors between the genders. The lower stress level among women in small open plan office and large open plan offices may be due to lower sensitivity for disturbance from noise, a well-known stressor in open plan offices (Evans & Johnson, 2000; Sundstrom, Town, Rice, Osborn, & Brill, 1994); especially common in large open plan offices (Bodin Danielsson, 2008). As we controlled for job rank the explanation for the outcome is not that women hold more routine based work, which is less sensitive to noise disturbance (e.g., Franzén, 1969; Haka et al., 2009). However the group size may in this case have an impact as women reported less stress in shared workspaces, while men reported lowest stress in cell-office. Why women have less preference for medium-sized open plan office than small or large open plan office might depend on its lower support for group identity and ability for anonymity or sub-groups to develop, which may be of greater importance among women.

As our data does not allow us to analyze the possible impact of status on the employees' stress level we can only speculate if the difference in stress levels between the genders in open plan office depended on this. A tentative explanation might be that women are less sensitive to office environment as a status indicator. We know that men preferred cell-office out of a stress perspective, whereas women preferred small and large open plan offices. We also know that cell-office offers ownership, personal control over the work environment and ability for privacy, all traditional means to express status in an office (e.g., Davis, 1984; Sundstrom, 1986), whereas traditional open plan offices offers none of this.

The question is though how can the results of this study be interpreted architecturally? The higher risk for stress among employees in combi-office in comparison to other office types points out two important factors to consider in office design in our opinion:

- 1) The choice of office type should support psychological and functional needs related to the work carried out in the office, and 2) The managerial leadership should go hand in hand with the choice of office type in order to create a "healthy" organization. Architects need to recognize these factors in the design of office environments but also make the clients and other parties in the design process aware of

the importance of these factors for the health and well-being.

With regard to the revealed gender differences in stress levels between different office types it is harder to implement it architecturally as most organizations hold members of both genders. The difference needs however to be recognized in an organizational setting though we need further research on possible gender differences in environmental stress in office. From the present study we can only say that it appears to be a complex interplay between architectural and functional features in the different office types that determine the outcome. Difference in perception of environmental stressors of different character between the genders, combined with factors such as managerial leadership, psychosocial environment etc. at the workplace should be put in relation to the office type.

Some limitations for the interpretation of the study results need to be pointed out. Stress was measured with self-reported measurements of type A personality profile, and no physiological data from saliva, urine or blood was used. It is an observational cross-sectional study. Thus no definitive cause-effect relationship could be established. The study was conducted in an urban setting, the Stockholm area. The results for the shared-room offices should also be interpreted with some caution, as the sample size for this office type was small. Finally, there is possibly also some hidden confounding in the multivariate model that may contribute to explain the results.

### **Conclusions**

There are certainly other factors than the office type itself that influence employees' stress levels, e.g. workload, locus of control, leadership and management styles (Karasek, Baker, Marxer, Ahlbom, & Theorell, 1981; Karasek & Theorell, 1990; Sauter & Murphy, 1995), but the result shows that the office environment is a parameter to consider and that there is a gender dimension to office design. It is important to apply a broader perspective to office design and to incorporate other fields of research, social and behavioral, as many factors determine the work environment. Finally the results highlight the importance to incorporate other fields of research, social and behavioral in the design process, as many factors determine how good the work environment will be out of an individual and organizational perspective.

### **Notes**

1. Psychosocial work environment is here defined as the nonphysical work environment, including the relationship with colleagues and supervisors.
2. Employees' stress level was measured with type A personality profile since hazardous stress behaviors have a well established link to Type A personality trait (Ivancevich et al., 1982). It is characterized by competitiveness, a constant struggle against time, an achievement-orientation and an intense sense of urgency (Ibid. , p. 376).
3. According to Ahlin and Westlander (1991) an office shared by more than one person. The original definition in Swedish is "delat flerpersonrum" (room shared by several people).
4. The original combi-office was a combination of the cell-office and the open plan office, with individual offices facing a communal space where most office facilities were found. Today no strict spatial definition of combi-office exists; teamwork and the sharing of facilities define the office type. The employees may have individual offices or an individual workstation in an open plan office layout.
5. The original alphabetical order of the items in the questionnaire is shown within brackets in order to make it easier for the reader to go back to the source (Danielsson, 2005).

### **Biography**

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# Condensed landscape experience

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Key words: hybrid, intermixing, landscape, building, experience

## Sensation of landscape

'Re-thinking interaction between landscape and urban buildings' participates in an interdisciplinary discourse about the theoretical and practical advantages of openly juxtaposing landscape and architecture without having one more advanced in importance.

Recently, the greenification of buildings is becoming a standard in contemporary architecture. Merging architecture and landscape has turned into a principle for an ecological / sustainable architecture. Yet, my aspiration is to achieve a wider interaction involving an application of a wider range of perspectives, such as: urban identity, social demands, quality of space, mixture of functions, urban complexity, public life and cultural heritage.

In order to launch such an approach, an understanding of the spatial, social and environmental significance of a radical re-thinking of relationships between architecture and landscape is necessary.

This paper addresses the question of whether the sensation of landscape can be condensed in function or to the size of an urban building. It also discusses the benefits and potentials of the amalgamate, by underlining the unique qualities of such a hybrid.

In an attempt to define the experience of landscape, eight attributes are introduced: discover, diversity, cyclic, equality, scale, transformation, topography and wilderness. The essay analyzes the attendance of these attributes in two existing fascinating hybrid structures. The first example is *The High-Line*<sup>1</sup> a public space in New York, and the second example is *Dubiner Apartment House*<sup>2</sup> in Israel. Even though the examples are rather different one from the other, they embody a beneficial exchange of architectural and landscape features.

## Blending boundaries

Traditionally urban planning differentiates between landscape and architecture; green space and built space; horizontal and vertical. This common

approach supports a development of each practice independently without inviting the potential of fusion.

This essay is about mixing the two entities into a hybrid. One entity is landscape, the other is a building. One belongs to nature, the other to the city.

*Landscape Urbanism*<sup>3</sup> is a contemporary discourse about the potential of engaging landscape characteristics into the domain of urbanism. "Landscape today can obviously not be separated from cityscape. The boundaries between city and landscape, between urban and rural have disappeared – at least they seem almost invisible. In a border sense, we can say that nature and culture are intermingling"<sup>4</sup>

The discourse reads the city as a dynamic relationship between permanent and temporary, built and unbuilt. It manifests that landscape can challenge the city by empowering its ability to cope with scales, diversity, and rapid changes. Mohsen Mostafavi describes the relationship between landscape and urbanism "On one hand, one might see it as a literal transposition of the techniques and vocabulary of one to the other; and on the other, this relationship might operate on a metaphoric and metonymic register"<sup>5</sup>

While the main focus of Landscape Urbanism is the scale of the city, this essay contributes by addressing the scale of a single urban component – the building. The essay seeks after the characteristics of a mixed-form made by interrelating architecture and landscape.

## Attributes

Addressing the paper question of whether the sensation of landscape can be condensed in function or to the size of an urban building requires an understanding of what the sensation of landscape might be. The notion of landscape is layered and complex. Many feelings, words, and

concepts could assist to define the sensation of landscape - so many that this paper can not address them all. Therefore, for the purpose of this essay, the experience of landscape is unfolded to eight representations of landscape attributes. The choice of these attributes is subjective and intuitive, the way I experience it. Here is a short explanation of each attribute supported with a quotation from various literatures.

**Cyclic** = landscape as a no waste system

*"Nature operates according to a system of nutrients and metabolism in which there is no such a thing as waste. A cherry tree makes many blossoms and fruit (perhaps) germinate and grow. That is why the tree blooms. But the extra blossoms are far from useless. They fall to the ground, decompose, feed various organisms and microorganism, and enrich the soil"*<sup>6</sup>

**Discover** = the depth of landscape

*"Creating secrets and a sense of mystery builds suspense and creates opportunities for personal revelation as well as revelation of the spirit of place"*<sup>7</sup>

**Diversity** = the richness of landscape

*"Landscapes are cacophony until sorted into individual dialogues by focusing on a primary signal to which many elements respond, by tracing a single set of dialogues"*<sup>8</sup>

**Equality** = the social neutrality of landscape

*"Most of the people own no land. Most of us live in cities and have no garden of our own. We demand more from this planet than it has the space and resources to offer"*<sup>9</sup>

**Scale** = the sizes of landscapes

*"Landscapes are as small as a garden, as large as a planet. To a person the garden is a landscape, to a people the nation is, to the human species, a planet... There are landscapes within landscapes within landscapes. Every landscape feature is both a whole and a part of one or more larger wholes"*<sup>10</sup>

**Transformation** = the dynamic changes in landscape

*"Landscape is a medium... uniquely capable of responding to temporal change, transformation, adaptation, and succession. These qualities recommend landscape as an analog to contemporary process of urbanization and as a medium uniquely suited to the open-endedness,*

*indeterminacy, and change demanded by contemporary urban conditions"*<sup>11</sup>

**Topography** = the three dimensional form of landscape

*"Topography is the study of Earth's surface shape and features or those of planets, moons, and asteroids. It is also the description of such surface shapes and features... The topography of an area can also mean the surface shape and features themselves"*<sup>12</sup>

**Wilderness** = landscape as greenery and vegetation

*"Before there were any humans, the world was in a state of wilderness. Now we have spread out and multiplied; our works have gotten everywhere. A variable ratio of cultivated land to wilderness is present at every spot, with the expanse of the ocean"*<sup>13</sup>

### **Abandoned infrastructure vs. overgrown structuralism**

Two fascinating examples feature the blending of landscape and urban building into a hybrid structure.

The first example is *The High-Line* a public space in New York, and the second example is *Dubiner Apartment House* in Israel.



Figure 1: The High Line is a linear collage in which allows landscape to cross through urbanity<sup>14</sup>

**The High Line** - Although the self-sown landscape triggered the official redevelopment of the structure, and although today it is a designed park, the amazing thing about the High Line is that it happened by itself. Nature literally took over the former railroad structure. After several years being out of order, the abandoned space got covered by wild grass, trees, and bushes. The result is hybridization of an industrial structure carrying an open landscape. The High Line is a linear collage in which allows landscape to cross through urbanity. It cuts through buildings and introduces alternative types of relationship between built and unbuilt, density and openness. (Fig.1)

“From an aesthetic and design standpoint, it has always been our position to try to respect the innate character of the High Line itself: its singularity and linearity, its straight-forward pragmatism, its emergent properties with wild plant-life – meadows, thickets, vines, mosses, flowers, intermixed with ballast, steel tracks, railings, and concrete”<sup>15</sup>

**Dubiner Apartment House** – The structure is a composition of concrete solids, voids and vegetation. The solids are the apartments. The voids are a built openness. In the voids, a green oasis is hidden. The building is a hybridization of programmatic use with scenic perception. An outdoor green path cuts through the building. It connects the top and bottom of the local hill inviting the public to cross secretly through it. Since the entrance to the apartments is from this path, each living unit has a quality of a ground level with a small entrance garden – at all the building’s stories.



Figure 2: Dubiner Apartment House is a composition of concrete solids, voids and vegetation<sup>16</sup>

The fragmented structure creates an artificial landscape experienced differently from the street, in the building or in the apartment. The building's changes over time emphasizes the landscape character of the structure (Fig.2). “The hexagonal inside space creates a kind of stepped interior piazza with small scale landscaping...The piazza has its own microclimate -shadowy cool in summer and sun-warmed in winter”<sup>17</sup>

The examples reflect different context, time and place.

The High Line is a structure with an urban scale. The Dubiner Apartment House is a structure with a building scale.

The High Line is an open public space. The Dubiner House is a private property.

The High Line is a reusing project. The Dubiner House is designed and built from sketch.

The High Line is a linear form. The Dubiner House has an elaborated shape.

The High Line floats on its surroundings. The Dubiner House reflects its local context.

The examples are rather different one from another. Yet, their combination is interesting. What if nature took over an apartment building as happened in the High Line and influenced on it to be a mouton of individual houses as the Dubiner House is?

### **Participation of the attributes**

The attributes are seen as analysis filters. Investigation of the two examples through these filters show a possible involvement of the landscape attributes in the structure.

Starting with the High Line, **Wilderness** is condensed to The High Line space. Even in Manhattan, the mother of all metropolises, nature finds its way in and takes over abandoned architectural structures. Seeds of grass, bushes and trees were taken by trains, wind and birds, and greenery was self-sown in the middle of Manhattan. This poetic naturalization process revealed a new character of the existing structure and stimulated a re-using process of the abandoned rail-line.

**Cyclic** - The High Line is a re-cycled space. Rather than demolition, it was decided to re-develop the abandoned space and to give it another use and identity. This conversion generated new life, activities and developments in the nearby area. It conformed that a legitimization of a natural cycle initiates a chain of positive urban changes.

The redevelopment process offers the city a sense of **equality**. It provides the city of Manhattan a larger space to be and to recreate regardless their socio-economical position, color, marital status or political opinion. It was initiated by the citizens and made for the citizens.

The High Line enhances the urban **diversity**. It opens new views on the city, and exposes a new dialogue with the ongoing urban scene. It exposes the city to new exchanges between nature and culture, fast and slow, horizontal and vertical.

Possible characteristics of the other four landscape attributes are illustrated by the Dubiner Apartment House.

Dubiner House embodies a secondary urban route going up or down the hill framing unique views to the city. The walk in this path could associate the walker with a hidden spot in the Israeli landscape of the desert. It allows inhabitants and visitors to wander, to get lost, to **discover**, and to be surprised.

The apartment building articulates shifts in **scales**, from the contextual scale of the neighborhood to the scale of a detail. While walking in the open path, the users experience this jump in scales through panoramic outlooks to the city from one hand, and the smell of flowers from the other. The urban scale gets into the building as a shortcut route. From the street the building appears as a built cliff, and from inside the circulation space, the voids are experienced as a green oasis.

The structure creates a three-dimensional artificial landscape - a replicated **topography**. The structure is made by integrating the three coordinates – X, Y, Z. It is perceived differently while standing at different spots looking at the building from inside or from outside, up or down.

Dubiner House constantly changes. It reflects an ongoing **transformation** process. Since it was built, the concrete solids, the voids and the plantation have become one whole, one landscape. The climate, the seasons, the inhabitants, the visitors and the site keep on changing the appearance of the building and the experience of it. The plants have grown and some have wilted, the concrete has gotten worn down, the voids have “experienced” stories of people coming and going, kids playing, neighbors talking.

### **Beneficial exchange**

We carry on – as planners, the challenge is to explore the unique potentials of intermingling

landscape attributes and urban buildings. The examples are employed as an illustration of the spatial, social and environmental potential.

Spatially, a correlative interaction between landscape and urban buildings opens up the ordinary architectural vocabulary to an analogous vocabulary of landscape and nature. By an inclusion of replications and interpretations of landscape attributes, the spatial experience at the building is enhanced.

For instance, back to the example of the Dubiner House - the residential unit connects the limited **scale** of the apartment with the openness of the outdoors supporting a strong relationship between inside and outside. This quality enhances the spatial experience of the indoor space by providing the inhabitants a perception of a bigger space (from the actual size of it). It also liberates the interior space of the apartment from the common urban compression.

The relationship between inside and outside is strengthened also by the attribute of **transformation**. Changes outdoors (such as change of seasons, light or vegetation) penetrate indoors and boost the static space with dynamic atmosphere. The building changes also over time. It seems to get “older” with the years. Yet, the older it becomes, its scenic spatial experience is increased and becomes younger. This simple paradox enhances the sensation of landscape inside the building.



Figure 3: a green oasis is hidden in the void of Dubiner House<sup>18</sup>

The attribute of **discover** triggers a personal experience in the space. Often in apartment buildings the stairs are an efficient space connecting the apartments to the street. Yet, in Dubiner House the circulation space is a celebration of green. Mixing the private program with a public path let this secret garden to be discovered by wandering in the neighborhood. (Fig.3) An insertion of this attribute articulates the scale of the user, in which is often forgotten in the city. The focus on the user manifests the belief in publicness and openness.

Socially, an incorporation of landscape into urban buildings may assist in expending the common urban identity and life styles. "Landscape contributes to the formation of local cultures and cultural heritage... Landscape is an important part of the quality of life... Landscape is a key element of individual and social well-being..."<sup>19</sup>

People tend to identify with particular landscape typology reminding them of their history and culture. Consequently, an inclusion of contextual landscape typologies in the urban scene increases the sense of place and social identity.

Through The High Line the social potential is exemplified. After being excluded for centuries, **wilderness** has returned to Manhattan. As a result, the image of public space in Manhattan has shifted towards fresher, opener, and healthier image.

The linear space has no social preference or limitations. It promotes **equality**, participation and belonging. The space on The High Line is almost a fantasy. It is an urban mirage, continuously unfolding. (Fig.4)

More than that, The High Line reflects cultural heritage and continuity. It is a built evidence of the historical development of Manhattan. The new generation grows up facing the **transformations** occurred in story-line of the city. Re-using, re-cycling, re-thinking – The High Line illustrates how to link the needs of the future with the outcomes of the past.

Environmentally, increasing green surface to reduce CO2 emission has become a significance design parameter in architecture. Yet, a creative integration of landscape and architecture has a greater potential than technical solutions such as green roof or green facades. For instance, the Dubiner House is located in a very dense urban tissue (13.1 people per hectare<sup>20</sup>).



Figure 4: The High Line promotes equality, participation and belonging<sup>21</sup>

Yet, it is experienced as openness. Playing with the notion of **scale** is a tool to manipulate the perception of urban density. More than that, the attribute scale could be understood as a link between the bigger scale and the smaller scale supporting a reading of an urban building as a whole which is a part of a bigger whole including a smaller whole. This sustainable attitude promotes planning methods of mixture, incorporation and juxtaposition of uses and users.

The re-using of The High Line space is an example for an urban **cyclic**. The High Line introduces new urban equilibriums. The open space cuts through the verticality of the buildings. It connects common separation of programs and ownerships. In a naive way it mixes built and landscape, density and openness. The High Line is an inspiration for new ideas about urban complexity and **diversity**.

In contradiction to the linearity of The High Line, the Dubiner House is formed as a (hollowed) hill. This artificial **topography** could assist in developing interactions between built and green. It could be the key to twist technical solutions (such as green surface) to spatial characteristic and social quality.

## Conclusion

By means of the eight attributes, the paper talks about the spatial, social and environmental potential of an interdisciplinary approach merging urban building and landscape.

Even though the sensation of landscape is broader than the sum of the eight attributes, and even though the analyzed examples illustrate only a

particular interpretation of these attributes – this paper demonstrates that scale, experience and perception of landscape can be condensed to, involved in and experienced at an urban building. It shows that landscape attributes could participate in the planning process of diverse functions and sizes of urban buildings.

By inserting the sensation of landscape into a building and playing with it, the boundaries between real and artificial are blended. More border zones are challenged by this approach, for instance: horizontal and vertical, built and unbuilt, bigness and detail, private and public, inside and outside, ecological and cultural, old and new. As a consequence, approaching a design of an urban building as a hybrid structure generates new architectural characteristics, and enhances the living environment in the city.

An inclusion of the notion of landscape allows the building to be a green spot in the urban context and to confront the common architecture with a fresh character and an optimistic spark.

The paper's both examples are a cultivated wilderness, a delineated openness, a built open space. They illustrate that the characterization of a building and the experience of landscape can be intermixed so that the meaning of building and landscape start to juxtapose.

What is the outcome of such hybridization? The hybrid structure is neither "pure" architecture, nor landscape. It is a mutual dialogue. It is a dynamic exchange of oppositions with the same degree of importance. It is about an equal "collaboration" of building and landscape generating a third entity, in which is greater than the sum of the two.

A hybrid structure is created by a broad understanding of the terms building and landscape. Landscape means more than plants. A building is more than structure and envelope. A wide and fresh reading of these terms can generate hybrids that integrate architecture and landscape in such a commitment that building becomes landscape and landscape becomes building.

As an intermediate planning approach, it could be termed Landscaped Architecture. This approach bridges the two separated practices. It does not blur the borders between them, but supports the tension of confrontation between them triggering new

qualities, in which could not be generated by each discipline alone.

However, this essay is only a teaser to express the potential of the approach of re-thinking interaction between landscape and urban building - a greater feasibility is yet to be explored.

## **The Place of Research / The Research of Place**

According to ARCC/EAAE 2010, the topic of the article is categorized as environmental research. This is correct, but not entirely precise. The interdisciplinary approach of **Re-thinking interaction between landscape and city architecture** is bordering between different modes of research. It is an environmental research searching for sustainable planning methods to build in the city. It is a design research aiming at exploring new architectural language. It is social research seeking to enrich urban life.

Photo credit: Thomas Krarup

Notes:

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- <sup>1</sup> Architect J. Corner Field Operations and Diller Scofidio + Renfro, Manhattan, USA ([www.fieldoperations.net](http://www.fieldoperations.net)) 2004.
- <sup>2</sup> Architects Z. Hecker, E. Sharon and A. Neumann, Ramat Gan, Israel ([www.zvihecker.com](http://www.zvihecker.com)) 1961.
- <sup>3</sup> Started in the Landscape Urbanism symposium and exhibition in 1997 organized by C. Waldheim
- <sup>4</sup> H. Adam, Landscape Architecture in Mutation: Landscape as a Means to perception Staging Landscape: From Sentimental to Paradoxical (Zurich: Swiss Federal Institute of Technology, 155) 2005
- <sup>5</sup> M. Mostafavi, Landscape Urbanism. A manual for the Machinic Landscape (London: AA, 7) 2003.
- <sup>6</sup> M. Braungart & W. McDonough, Cradle to Cradle (London: Vintage, 92) 2009.
- <sup>7</sup> M. Potteiger & J. Purinton, Landscape Narratives (New York: John Wiley & Sons, INC, 137) 1998.
- <sup>8</sup> A. W. Spirn, The Language of Landscape (London: Yale University Press, 38) 1998.
- <sup>9</sup> R. Reynolds, On Guerrilla Gardening (London: Bloomsbury, 16) 2008.
- <sup>10</sup> A. W. Spirn, The Language of Landscape (London: Yale University Press, 18) 1998.
- <sup>11</sup> C. Waldheim, The Landscape Urbanism Reader (New York: Princeton Architectural Press, 39) 2006.
- <sup>12</sup> <http://en.wikipedia.org/wiki/Topography>, 2010.
- <sup>13</sup> P. Shephard, The cultivated Wilderness – or, what is landscape (London: The Mit Press, 10) 1997.
- <sup>14</sup> Photo credit:  
[http://gothamist.com/2006/02/01/highline\\_constr.php](http://gothamist.com/2006/02/01/highline_constr.php)
- <sup>15</sup> J. Corner, Designing The High Line (New York: LLC, 30) 2008.
- <sup>16</sup> Photo credit: T. Krarup, 2008.
- <sup>17</sup> [www.zvihecker.com](http://www.zvihecker.com)
- <sup>18</sup> Photo credit: T. Krarup, 2008.
- <sup>19</sup> Recommendation CM/Rec(2008)3 of the Committee of Ministers to member states on the guidelines for the implementation of the European Landscape Convention, 2008.
- <sup>20</sup> [http://en.wikipedia.org/wiki/Ramat\\_Gan](http://en.wikipedia.org/wiki/Ramat_Gan)
- <sup>21</sup> Photo credit: [www.thehighline.org](http://www.thehighline.org)

# Conceptualizing A Place Assessment Model: A Study of the Presence and Quality of Place-making Patterns in Sacred and Secular Buildings

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## Abstract

Using qualitative and quantitative data, differences in the presence and quality of expression of place-making patterns between a sacred building (i.e., Rothko Chapel, Houston, Texas) and a secular building (i.e., Contemporary Arts Museum, Houston, Texas) were explored. A total of 48 questionnaires were administered to 24 Houston architects (i.e., 24 questionnaires at each setting). Relative frequencies were calculated for multiple-choice answers in the questionnaire, while open ended questionnaire items were subjected to inductive content analysis. The analyzed data was synthesized to test whether the presence and quality of expression of place-making patterns at the selected buildings, contributed towards the sacredness of place. Through the research, a place assessment model (based on the presence and quality of expression of specific place-making patterns) was conceptualized and tested – a model that can be used by researchers and architects to access the spatial and physical characteristics of built environments. In addition, a place-making pattern matrix meant to serve as a guide to architects in creating everyday architecture that is extraordinary, was developed as part of this study. The research intends to increase our understanding of whether, and how certain place-making patterns contribute to place being experienced as sacred. In this sense, knowledge gained through the study, contributes

significantly toward the development of the theory of place-making. The study concludes that built environments which possess a higher presence and higher quality of expression of certain place-making patterns are more likely to be experienced as sacred, than built environments with a lower presence and lower quality of expression of the place-making patterns.

## Introduction

Defining the sacred is improper, because definitions imply limits and are not all-inclusive.<sup>1</sup> But, though the sacred cannot be defined, it can be sensed and partially understood – its presence can be known.<sup>2</sup> According to the famed historian of religion, Mircea Eliade, the sacred can be thought of as the “opposite of the profane” – something that reveals and manifests itself to us as a wholly different order from the profane, thus making us aware of its reality.<sup>3</sup> To understand the sacred in architecture, therefore, one has to explore multiple ways in which it finds inclusion in place-making (i.e., the action for creating a place or sense of place).

According to Eliade, desecralization of place has made it increasingly difficult for modern societies to rediscover existential dimensions of the sacred that were once readily accessible to humans of archaic societies in their everyday places.<sup>4</sup> In a time dominated by vapid architectural styles and economy-oriented place-making strategies, the rediscovery of timeless design principles and values, which have guided and informed place-making from time immemorial, is often overlooked or worse, forgotten. The motivation behind this study, therefore, comes from the need to reconnect with such design principles and to reinvigorate the corporeal process of desecralised architecture. In this sense, the study is intended to foster a renewed interest in the meaning and use of place-making characteristics that contribute towards the sacredness of place, and further, to provide empirical data that contributes toward the development of the theory of place-making. *Patterns* refer to recurring or underlying characteristics which *first*, can be discerned and *second*, can be used to generate something. Place-making patterns, within

the context of this study, can be defined as spatial and/or physical characteristics that contribute to creating a sense of place. Critchlow propounds that such characteristics that contribute towards the sacredness of place, express higher intensions, exemplifications, and important cultural values.<sup>5</sup> Place-making patterns, when uplifted in place, therefore, could transform secular architecture into sacred environments. How does this process happen? What are the contributing factors? Can they be objectified? One assertion is that sacred places embody specific place-making patterns, by means of which they distinguish themselves from our other inventory of places, and reveal themselves as sacred to us.<sup>6</sup> However, place-making patterns, theorized to be exclusive to sacred places, may also be present at secular places.<sup>7</sup> The purpose of this research was, therefore, to examine differences in the presence and quality of expression of place-making patterns between a sacred and secular building.

The research was guided by the following questions: 1) Do place-making patterns, common to both sacred and secular places, differ in their presence and quality of expression?; and 2) If yes, then how? The central hypothesis for this study is that *built environments which possess a higher presence and higher quality of expression of certain place-making patterns are more likely to be experienced as sacred, than built environments with a lower presence and lower quality of expression of the place-making patterns*. The hypothesis was tested through the following research objectives: 1) Assessing the difference in the presence of place-making patterns between a sacred and secular building; 2) Assessing the difference in the quality of expression of place-making patterns between a sacred and secular building; and 3) Validating whether the selected buildings were experienced to be sacred or secular.

## Background

Several authors have studied and developed characteristics associated with place-making in their respective works. These include (in ascending order of date of publication): a) Marcus Vitruvius Pollio (*The Ten Books on Architecture*);<sup>8</sup> b) Andrea Palladio (*The*

*Four Books on Architecture*);<sup>9</sup> c) Christopher Alexander, Sara Ishikawa and Murray Silverstein (*A Pattern Language: Towns, Buildings, Construction*);<sup>10</sup> d) Michael Brill (*Using the Place-Creation Myth to Develop Design Guidelines for Sacred Space*);<sup>11</sup> e) Charles Moore and Donlyn Lyndon (*Chambers of a Memory Palace*);<sup>12</sup> f) Phillip Tabb (*Sacred Place: The Presence of Archetypal Patterns in Place Creation*);<sup>13</sup> and g) Christopher Alexander (*The Nature of Order: The Phenomenon of Life*).<sup>14</sup> Of the aforementioned authors, Brill and Tabb theorize the presence of specific design characteristics or place-making patterns at sacred places. The place-making patterns ascribed by Brill and Tabb, seem to have been derived from the philosophical underpinnings of the work of famed historian of religion, Mircea Eliade – *The Sacred and the Profane: The Nature of Religion*.

In his text, Eliade suggests that sacred places symbolize a break in the homogeneity of space, and as such, are qualitatively different from our other inventory of places.<sup>15</sup> Brill suggests that this qualitative difference is experienced at sacred places through the presence of fourteen distinct design characteristics.<sup>16</sup> Similarly, Tabb theorizes the presence of fifteen unique place-making patterns that recur at sacred places.<sup>17</sup> The place-making patterns and design characteristics proposed by Brill and Tabb are listed in Table 1. The place-making patterns proposed by both authors were analyzed for comparative similarities and differences (i.e., place-making patterns common to both authors were listed together, while unique patterns were identified separately). From this analysis, a *Comprehensive Place-making Pattern Set* (henceforth CPPS) comprising of 18 place-making patterns was developed, as shown in Table 1. The place-making patterns from the CPPS were used as a basis for conducting the research. A descriptive summary of individual place-making patterns from the CPPS is provided in Table 2.

**Table 1: Development of Comprehensive Place-making Pattern Set.**

Place-making patterns proposed by Phillip Tabb	Design characteristics proposed by Michael Brill	Comprehensive Place-making Pattern Set
Center	Making a Location and Center	Center
Bounding	Bounding	Bounding
Direction	Making Orientation and Direction	Direction
Descent	Triumph over the Underworld	Descent
Ascent	Reaching Upwards	Ascent
Passage	Passage	Passage
Numeric Order		Numeric Order
Geometric Order		Geometric Order
Spatial Order	Spatial Order	Spatial Order
Anthropomorphic Order		Anthropomorphic Order
Ordered Nature	Nature in Our Places	Ordered Nature
Celestial Order	Celestial Order	Celestial Order
	Differentiating Boundaries	Differentiating Boundaries
	Ordered Views	Ordered Views
Materiality	Materials for Making	Materiality
Elementals		Elementals
	Light	Light
Ceremonial Order	Finishing a Place	Ceremonial Order

**Table 2: Descriptive summary of individual place-making patterns from the CPPS.**

Comprehensive Place-making Pattern Set	Descriptive summary of individual place-making patterns
Center	Focal point or geometrical center of the place. It is typically associated with intense activity and meaning. It could be the focal point of ceremonial experience at the place or the conceptual essence of the place.
Bounding	Enclosures such as the outer walls, floors, roofs of a building, or the edge of the site. These enclosures could be solid or have openings (windows, doors, etc.) at specific locations to provide views and to enable physical movement.
Direction	Building alignment on site such to provide significant orientation with cardinal directions or position of the sun.
Descent	Features that occupy the under-realm and allow visual or physical descent such as ground and lower floors, foundations, footings, and wells. These features signify a connection with the earth by gesturing downward.
Ascent	Vertical features that allow visual or physical ascent such as towers, vertically ascending roof lines, tall columns, and shafts of light from above. These features signify a connection with the sky by gesturing upward.
Passage	Doorways, foyers, entrances, or thresholds that provide points of entry to the place. These thresholds function as distinct spaces of continuity between two domains.
Numeric Order	Significant recurrence of architectural features such as the singularity or duality of forms, the number of towers, doors, windows, columns, walls, and steps.
Geometric Order	Shapes that make up the physical form of the building. It defines volume in space.
Spatial Order	Rhythm and succession of spaces that could reveal symmetry and be circular, linear, radial, triangular, orthogonal, or spiral in nature. It generates correspondence and relation between spaces.
Anthropomorphic Order	Proportions in form based on measurements of the human body.
Ordered Nature	Special plants, trees, gardens, and other natural landscape features that are bordered and controlled, i.e., continually taken care of by humans. It could address the changing of seasons at the place.
Celestial Order	Openings or markers that indicate the movement of the sun, moon, other celestial objects, or through alignment of the building to articulate solstices (i.e., to celebrate temporal changes or the changing of light). It could be manifested by domed or vaulted ceilings.
Differentiating Boundaries	Boundaries such as walls and roofs that reveal differentiation depending on their orientation with the cardinal directions.
Ordered Views	Limited or specially positioned windows or openings that prevent vision between sacred and mundane spaces – windows or openings that provide direct visual interaction between sacred and mundane spaces are avoided, while direct views between two sacred places are provided. The absence of views is also expressive of this pattern – windows or openings are sometimes avoided in a space to restrict views that would otherwise negate the experience within the place.
Materiality	Building materials such as brick, stone, wood, cement, steel, ceramic tile, plaster, and glass.
Elementals	Fire, water, air, and earth. It is expressed by features such as fireplaces, fountains, ventilation openings, and masonry walls.
Light	Luminance that could provide orientation with the cardinal directions or demarcate the passage of time with movement of the sun across the sky. The absence of luminance (i.e., darkness) also forms an essential quality of light.
Ceremonial Order	Spaces that allow for ceremony, meditation, prayer, temporal/seasonal celebrations or ritual/consecrative acts at the place.

## Methodology

A set of 10 criteria, ranging from *Place-type* to *Accessibility* were used in selecting the case studies (Table 3). The purpose of this study was to explore differences in the presence and quality of expression of place-making patterns between sacred and secular buildings. Difference in place-type, therefore, was the most important criterion in selecting the case studies, i.e., one case study had to be an acknowledged sacred place, while the other case study had to be a secular place. This fundamental difference in place-type between the two case studies allowed for the study of the difference in presence and quality of expression of place-making patterns between sacred and secular buildings. Based on the 10 criteria, the two case studies were Rothko Chapel and Contemporary Arts Museum, both located in Houston, Texas.

*Table 3: Comparative analysis of criteria associated with the selection of case studies.*

Criteria	Rothko Chapel	Contemporary Arts Museum
Place Type	Sacred place (non-profit institution)	Secular place (non-profit institution)
Spatial Program	Gallery space	Gallery space
Denomination	Non-denominational	Non-denominational
Site Context	Urban	Urban
Cultural Context	Houston, Texas	Houston, Texas
Building Life	1971	1972
Design Process	Designed by professional architects (Philip Johnson, Howard Barnstone, Eugene Aubry)	Designed by professional architect (Gunnar Birkits)
Scale	Area = 4,500 sq. ft.	Area = 8,900 sq. ft.
Visitation	Facility open year round	Facility open year round
Accessibility	100 miles from researchers' location	100 miles from researchers' location

Rothko Chapel is an acknowledged sacred building and houses a group of fourteen paintings by Mark Rothko. The paintings are exhibited along the periphery of the interior octagonal shaped plan of the Chapel. Besides exhibiting Rothko's work, the Chapel functions as a place for private meditation, common worship, and hosting colloquia related with

philosophical and religious themes. In contrast, Contemporary Arts Museum is a secular building, dedicated to exhibiting contemporary art to the public.

The questionnaire was comprised of open-ended as well as multiple choice questions. The presence of individual place-making patterns from the CPPS at the sacred and secular buildings was scored by using the terms – *Yes* and *No* (where *Yes* = pattern is present, and *No* = pattern is absent). To assess the quality of expression of the place-making patterns at the sacred and secular buildings, questionnaire responses allowed for scoring from 1 to 5, on a 5 point scale (where 1 = very low quality; 2 = low quality; 3 = intermediate quality; 4 = high quality; and 5 = very high quality). The questionnaire contained an open-ended questionnaire item – *Comments*, which allowed for recording ways in which participants observed the presence of individual place-making patterns from the CPPS at the sacred and secular buildings. The sacredness of the selected buildings was scored by using the terms – *Yes* and *No* (where *Yes* = place is sacred, and *No* = place is not sacred), followed by an open ended question – *Please explain briefly, why you feel that this place is sacred?*, allowing participants to justify why they felt the place was sacred (if at all). Upon completion of pilot studies, minor changes were made to the questionnaire. The final questionnaire included 2 introductory questions (requesting participant age and gender), 37 multiple-choice answers, and 19 open-ended questions.

Questionnaire items were specific in their usage of architectural language. Therefore, completing the questionnaire entailed participants to have an architectural background. The sample population for the questionnaire was, therefore, architects from firms in Houston, providing basic architectural services and specializing in the design of both, religious and secular facilities. The online directory on the AIA Houston website served as a useful and effective guide for identifying participants for this study. The inclusion criteria, used to derive the list of architecture firms for recruiting questionnaire participants were as follows: 1) Houston, Texas, as the geographic location of firms; 2) Basic architectural services as the type of service provided by firms; and 3) Religious facilities as the building-type specialization of firms. Architecture

firms not matching these 3 criteria were excluded. A total of 90 architecture firms matching the 3 criteria were identified and contacted. Of these, 24 firms (i.e., architects) replied with positive responses, stating their willingness to participate in the study. As a result, a total of 48 questionnaires (24 at the sacred place and 24 at the secular place) were administered in this study.

During data analysis, relative frequencies were calculated for multiple-choice answers, while open ended questionnaire items were subjected to inductive content analysis, *first*, reading responses to identify emerging categories and, *second*, coding for category inclusion. Descriptive analysis and charts were used to analyze questionnaire results.

## Results

A total of 48 questionnaires (24 at each setting) were administered to 24 architects at the sacred and secular places. Of the 24 architects, 16 participants were male, while 8 participants were female. A total of 12 participants were in the age group of 25 to 40 years, 8 participants were in the age group of 41 to 55 years, 3 participants were in the age group of 56 to 70 years, and 1 participant was in the age group of 71 years or above.

Questionnaire results are categorized as follows: 1) Assessment of presence of place-making patterns at selected buildings; 2) Assessment of quality of expression of place-making patterns at selected buildings; and 3) Assessment of sacredness of selected buildings.

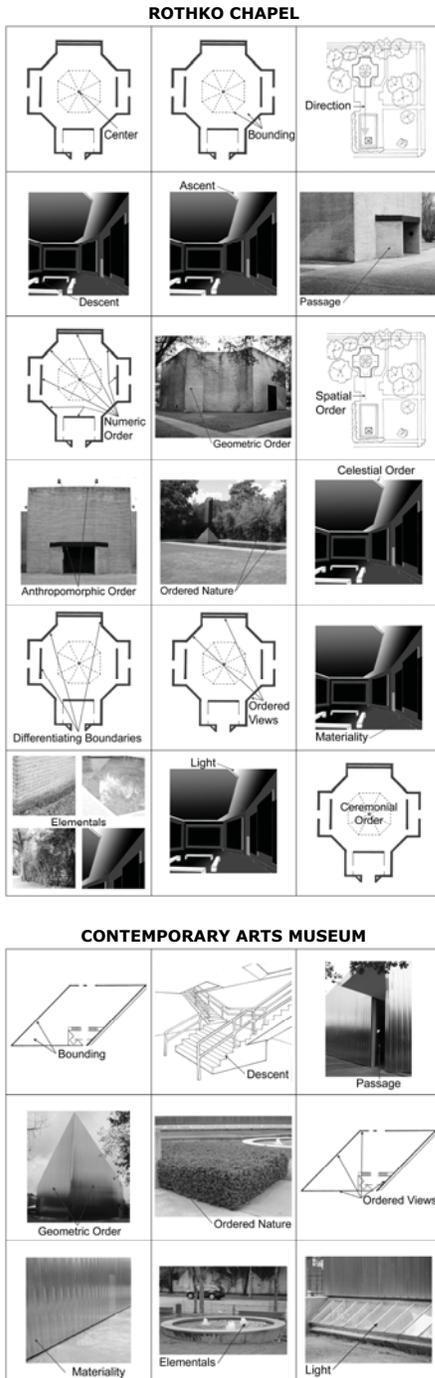
### **Assessment of Presence of Place-making Patterns at Selected Buildings:**

A summary of ways in which questionnaire participants observed the presence of the place-making patterns at Rothko Chapel and Contemporary Arts Museum is shown in Table 4. The table is followed by graphical data showing ways in which participants experienced the presence of the place-making patterns at Rothko Chapel and Contemporary Arts Museum (Figure 1).

*Table 4: Presence of place-making patterns as observed by participants at Rothko Chapel and Contemporary Arts Museum.*

Pattern list	Rothko Chapel	Contemporary Arts Museum
Center	Spatial center of octagonal shaped plan of Chapel.	No comments recorded.
Bounding	Walls, floor, and ceiling of Chapel.	Walls, floor, and ceiling of Museum.
Direction	Alignment of Chapel entrance with pool on south.	No comments recorded.
Descent	Darkness inside Chapel.	Stairs leading to lower level of Museum.
Ascent	Light entering skylight in ceiling of Chapel.	No comments recorded.
Passage	Main entrance doorway of Chapel.	Main entrance doorway of Museum.
Numeric Order	Eight sides of Chapel.	No comments recorded.
Geometric Order	Octagonal shape of Chapel.	Parallelogram shape of Museum.
Spatial Order	Hierarchical arrangement of spaces from center of Chapel to outdoors.	No comments recorded.
Anthropomorphic Order	High ceilings of Chapel.	No comments recorded.
Ordered Nature	Water pool with bamboo screening.	Vegetative shrubs on site.
Celestial Order	Light entering skylight in ceiling.	No comments recorded.
Differentiating Boundaries	Varying offsets in wall planes of Chapel.	No comments recorded.
Ordered Views	Large solid walls of Chapel restricting all views to outside.	Walls of Museum restricting all views to outside.
Materiality	Gray walls of Chapel.	Metallic siding of Museum.
Elementals	Walls – earth, skylight – fire, pool – water, and movement of bamboo groove – wind.	Fountain – water.
Light	Sunlight entering skylight in ceiling and contrasting with darkness inside Chapel.	Sunlight entering basement clerestory windows of Museum.
Ceremonial Order	Building's inherent function as Chapel and gathering space.	No comments recorded.

Figure 1: Graphical data showing presence of place-making patterns at Rothko Chapel and Contemporary Arts Museum.



The assessment of pattern presence at each setting is as follows: 1) Percentage values ranging from 83.3% to 100% (20 to 24 participants agreeing that pattern is present) indicate that pattern presence is very high (i.e., likelihood of pattern being present is very high); 2) Percentage values ranging from 62.5% to 79.1% (15 to 19 participants agreeing that pattern is present) indicate that pattern presence is high (i.e., likelihood of pattern being present is high); 3) Percentage values ranging from 41.6% to 58.3% (10 to 14 participants agreeing that pattern is present) indicate that pattern presence is uncertain (i.e., likelihood of pattern being present or absent is uncertain); 4) Percentage values ranging from 20.8% to 37.5% (5 to 9 participants agreeing that pattern is present) indicate that pattern presence is low (i.e., likelihood of pattern being present is low); and 5) Percentage values ranging from 4.1% to 16.6% (1 to 4 participants agreeing that pattern is present) indicate that pattern presence is very low (i.e., likelihood of pattern being present is very low). The assessment of the presence of the place-making patterns for the sacred and secular buildings is shown in Table 5.

**TABLE 5: Assessment of pattern presence at selected buildings based on percentage (%) values of participants who agreed that the place-making patterns were present or absent.**

Pattern list	Rothko Chapel		Contemporary Arts Museum	
	Percentage (%) of participants who agreed that pattern is present	Pattern presence based on percentage (%) values of participants	Percentage (%) of participants who agreed that pattern is present	Pattern presence based on percentage (%) values of participants
Center	95.8%	Very high	25%	Low
Bounding	100%	Very high	83.3%	Very High
Direction	70.8%	High	33.3%	Low
Descent	66.6%	High	66.6%	High
Ascent	91.6%	Very high	58.3%	Uncertain
Passage	83.3%	Very high	58.3%	Uncertain
Numeric Order	83.3%	Very high	58.3%	Uncertain
Geometric Order	100%	Very high	87.5%	Very High
Spatial Order	87.5%	Very high	58.3%	Uncertain
Anthropomorphic Order	75%	High	41.6%	Uncertain
Ordered Nature	95.8%	Very high	75%	High
Celestial Order	87.5%	Very high	16.6%	Very low
Differentiating Boundaries	66.6%	High	33.3%	Low
Ordered Views	83.3%	Very high	66.6%	High
Materiality	100%	Very high	91.6%	Very High
Elementals	91.6%	Very high	66.6%	High
Light	100%	Very high	62.5%	High
Ceremonial Order	100%	Very high	25%	Low

At Rothko Chapel, the presence of 14 place-making patterns – *Center*, *Bounding*, *Ascent*, *Passage*, *Numeric Order*, *Geometric Order*, *Spatial Order*, *Ordered Nature*, *Celestial Order*, *Ordered Views*, *Materiality*, *Elementals*, *Light*, and *Ceremonial Order* was very high, while the presence of the remaining 4 place-making patterns – *Direction*, *Descent*, *Anthropomorphic Order*, and *Differentiating Boundaries* was high. At Contemporary Arts Museum, the presence of 3 place-making patterns – *Bounding*, *Geometric Order*, and *Materiality* was very high, while the presence of 5 place-making patterns – *Descent*, *Ordered Nature*, *Ordered Views*, *Elementals*, and *Light* was high. The presence of 4 place-making patterns – *Center*, *Direction*, *Differentiating Boundaries*, and *Ceremonial Order* was low, while the

presence of 1 place-making pattern – *Celestial Order* was very low at Contemporary Arts Museum. The presence of 5 place-making patterns – *Ascent*, *Passage*, *Numeric Order*, *Spatial Order*, and *Anthropomorphic Order* remained uncertain at Contemporary Arts Museum.

Based on the opinion of questionnaire participants, a comparison of the presence of place-making patterns between Rothko Chapel and Contemporary Arts Museum is shown in Figure 2. As observed, questionnaire results indicated that the presence of all 18 place-making patterns at Rothko Chapel was higher than the presence of their counterparts at Contemporary Arts Museum. Difference in percentage values of the presence of place-making patterns between Rothko Chapel (RC) and Contemporary Arts Museum (CAM) is shown in Table 6.

Figure 2: Pattern presence at Rothko Chapel and Contemporary Arts Museum.

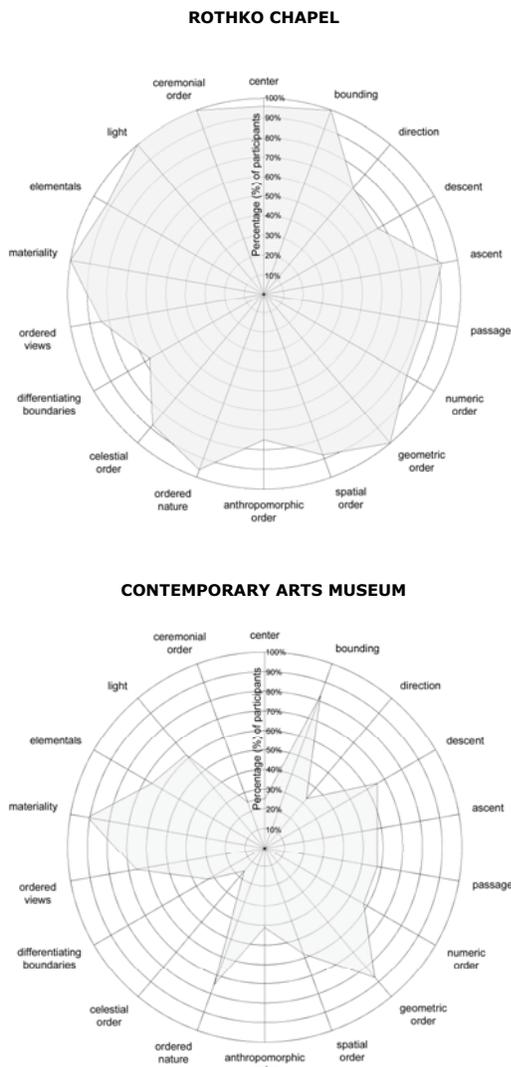
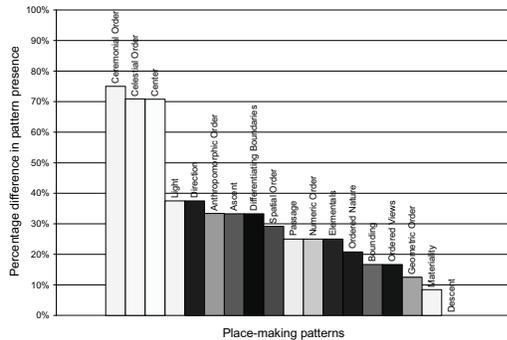


Table 6: Difference in percentage (%) values of pattern presence at selected buildings.

Pattern List	Percentage (%) values of pattern presence		Difference in percentage (%) values of pattern presence between RC and CAM
	RC	CAM	RC - CAM
Center	95.8%	25.0%	70.8%
Bounding	100.0%	83.3%	16.7%
Direction	70.8%	33.3%	37.5%
Descent	66.6%	66.6%	0%
Ascent	91.6%	58.3%	33.3%
Passage	83.3%	58.3%	25%
Numeric Order	83.3%	58.3%	25%
Geometric Order	100.0%	87.5%	12.5%
Spatial Order	87.5%	58.3%	29.2%
Anthropomorphic Order	75.0%	41.6%	33.4%
Ordered Nature	95.8%	75.0%	20.8%
Celestial Order	87.5%	16.6%	70.9%
Differentiating Boundaries	66.6%	33.3%	33.3%
Ordered Views	83.3%	66.6%	16.7%
Materiality	100.0%	91.6%	8.4%
Elementals	91.6%	66.6%	25%
Light	100.0%	62.5%	37.5%
Ceremonial Order	100.0%	25.0%	75%

Figure 3 shows the difference in percentage values of the presence of place-making patterns at Rothko Chapel over Contemporary Arts Museum. In the figure, the place-making patterns are arranged in descending order, based on difference in percentage values associated with pattern presence, as follows: 1) Ceremonial Order; 2) Celestial Order; 3) Center; 4) Light; 5) Direction; 6) Anthropomorphic Order; 7) Ascent; 8) Differentiating Boundaries; 9) Spatial Order; 10) Passage; 11) Numeric Order; 12) Elementals; 13) Ordered Nature; 14) Bounding; 15) Ordered Views; 16) Geometric Order; 17) Materiality; 18) Descent.

Figure 3: Descending order of patterns based on difference in percentage values of pattern presence.



The difference in percentage values of the presence of the place-making pattern *Ceremonial Order* was highest, while the place-making pattern *Descent* displayed no difference in percentage values of presence. Three place-making patterns – *Ceremonial Order*, *Celestial Order*, and *Center* displayed exceedingly high differences in percentage values associated with pattern presence between Rothko Chapel and Contemporary Arts Museum.

**Assessment of Quality of Expression of Place-making Patterns at Selected Buildings:**

The assessment of pattern quality at each setting is as follows: 1) Mean values ranging from 4.0 to 5.0 indicate that pattern quality is very high; 2) Mean values ranging from 3.0 to 3.9 indicate that pattern quality is high; 3) Mean values ranging from 2.0 to 2.9 indicate that pattern quality is intermediate; 4) Mean values ranging from 1.0 to 1.9 indicate that pattern quality is low; and 5) Mean values ranging from 0.1 to 0.9 indicate that pattern quality is very low. The assessment of the quality of expression of the place-making patterns at the sacred and secular buildings is shown in Table 7.

Table 7: Assessment of pattern quality at selected buildings based on mean values.

Pattern list	Rothko Chapel		Contemporary Arts Museum	
	Mean of quality of expression of pattern	Pattern quality based on mean values	Mean of quality of expression of pattern	Pattern quality based on mean values
Center	4.34	Very high	2.5	Intermediate
Bounding	4.75	Very high	3.05	High
Direction	3.76	High	3.37	High
Descent	4.0	Very high	2.68	Intermediate
Ascent	4.4	Very high	2.71	Intermediate
Passage	3.85	High	3.5	High
Numeric Order	4.4	Very high	2.92	Intermediate
Geometric Order	4.58	Very high	3.47	High
Spatial Order	4.14	Very high	2.71	Intermediate
Anthropomorphic Order	3.55	High	1.9	Low
Ordered Nature	4.08	Very high	2.05	Intermediate
Celestial Order	3.9	High	2.0	Intermediate
Differentiating Boundaries	3.31	High	2.37	Intermediate
Ordered Views	4.85	Very high	2.93	Intermediate
Materiality	4.08	Very high	3.31	High
Elementals	3.9	High	2.25	Intermediate
Light	4.54	Very high	2.26	Intermediate
Ceremonial Order	4.54	Very high	3.0	High

At Rothko Chapel, the quality of expression of 12 place-making patterns – *Center*, *Bounding*, *Descent*, *Ascent*, *Numeric Order*, *Geometric Order*, *Spatial Order*, *Ordered Nature*, *Ordered Views*, *Materiality*, *Light*, and *Ceremonial Order* was very high, while the quality of expression of 6 place-making patterns – *Direction*, *Passage*, *Anthropomorphic Order*, *Celestial Order*, *Differentiating Boundaries*, and *Elementals* was high. At Contemporary Arts Museum, the quality of expression of 6 place-making patterns – *Bounding*, *Direction*, *Passage*, *Geometric Order*, *Materiality*, and *Ceremonial Order* was high. The quality of expression of 11 place-making patterns – *Center*, *Descent*, *Ascent*, *Numeric Order*, *Spatial Order*, *Ordered Nature*, *Celestial Order*, *Differentiating Boundaries*, *Ordered Views*, *Elementals*, and *Light* was intermediate, while the quality of expression of 1 place-making pattern – *Anthropomorphic Order* was low at Contemporary Arts Museum.

Based on the opinion of questionnaire participants, a comparison of the quality of expression of place-making patterns between Rothko Chapel and Contemporary Arts Museum is shown in Figure 4. As observed, questionnaire results indicated that the quality of expression of all 18 place-making patterns at Rothko Chapel was higher than the quality of expression of their counterparts at Contemporary Arts Museum. Difference in mean values of the quality of expression of place-making patterns between Rothko Chapel (RC) and Contemporary Arts Museum (CAM) is shown in Table 8.

Figure 4: Pattern quality at Rothko Chapel Contemporary Arts Museum.

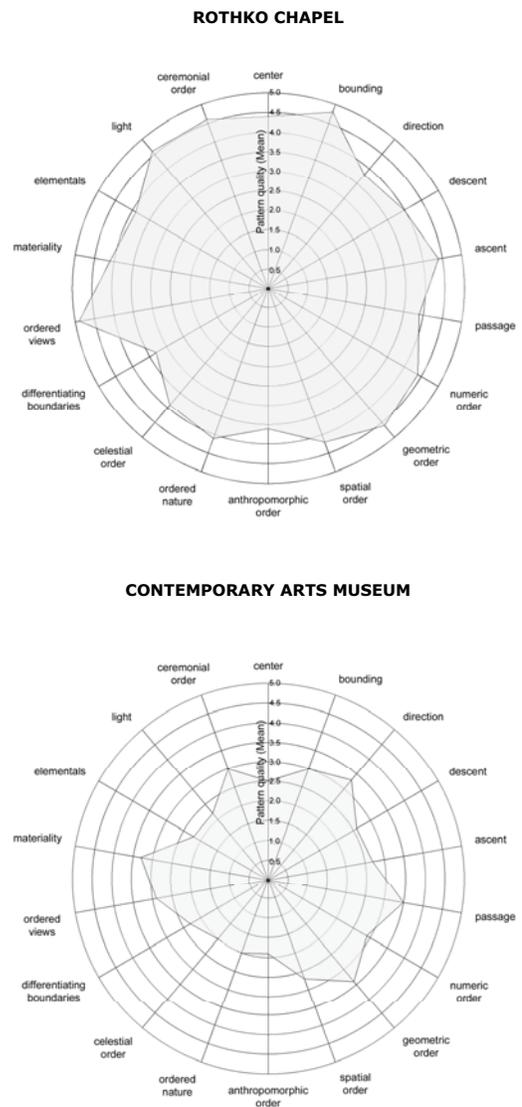
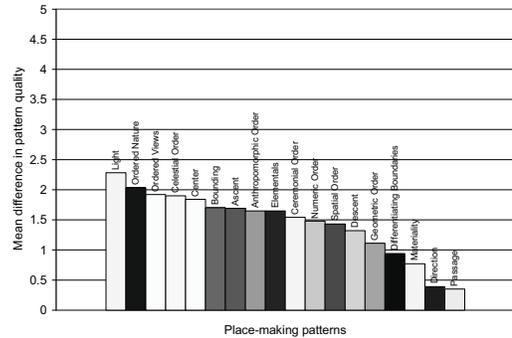


Table 8: Difference in mean values of pattern quality at selected buildings.

Pattern List	Mean values of pattern quality		Difference in mean values of pattern quality between RC and CAM
	RC	CAM	RC - CAM
Center	4.34	2.5	1.84
Bounding	4.75	3.05	1.7
Direction	3.76	3.37	0.39
Descent	4	2.68	1.32
Ascent	4.4	2.71	1.69
Passage	3.85	3.5	0.35
Numeric Order	4.4	2.92	1.48
Geometric Order	4.58	3.47	1.11
Spatial Order	4.14	2.71	1.43
Anthropomorphic Order	3.55	1.9	1.65
Ordered Nature	4.08	2.05	2.03
Celestial Order	3.9	2	1.9
Differentiating Boundaries	3.31	2.37	0.94
Ordered Views	4.85	2.93	1.92
Materiality	4.08	3.31	0.77
Elementals	3.9	2.25	1.65
Light	4.54	2.26	2.28
Ceremonial Order	4.54	3	1.54

Figure 5 shows the difference in mean values of the quality of expression of place-making patterns at Rothko Chapel over Contemporary Arts Museum. In the figure, the place-making patterns are arranged in descending order, based on difference in mean values associated with pattern quality, as follows: 1) Light; 2) Ordered Nature; 3) Ordered Views; 4) Celestial Order; 5) Center; 6) Bounding; 7) Ascent; 8) Anthropomorphic Order; 9) Elementals; 10) Ceremonial Order; 11) Numeric Order; 12) Spatial Order; 13) Descent; 14) Geometric Order; 15) Differentiating Boundaries; 16) Materiality; 17) Direction; 18) Passage. The difference in mean values of the quality of expression of the place-making pattern *Light* was highest, while the difference in the quality of expression of the place-making pattern *Passage* was lowest.

Figure 5: Descending order of patterns based on difference in mean values of pattern quality.



**Assessment of Sacredness of Selected Buildings:**

Rothko Chapel was experienced to be sacred by 95.8% of the participants, while only 8.3% of the participants felt that Contemporary Arts Museum was sacred. A summary of characteristics (as recorded by participants in the questionnaire) that contributed to sacredness experienced at Rothko Chapel and Contemporary Arts Museum is shown in Table 9.

Table 9: Summary of characteristics that contribute to sacredness of place.

Place	Characteristics that contribute to sacredness of place according to participants
Rothko Chapel	Separation of inner space from outside world; quietness of space; formal elements of building; symmetry of form; humanized proportions of building; materials; paintings; quality of light; progression of spaces – garden to inner meditative space; chapel activities.
Contemporary Arts Museum	Nature of exhibits.

**Development of Place-making Pattern Matrix:**

Based on data collected and analyzed in the research, a *Place-making Pattern Matrix*, meant to serve as a guide to architects for creating sacred place, was developed as part of this study. The hierarchical placement or ordering of place-making patterns within the Matrix is based (collectively) on differences in the

presence and quality of expression of the place-making patterns between the sacred and secular buildings. A scoring system of values from 1 to 18 (since the CPPS was composed of a total of 18 place-making patterns) was used to determine the hierarchical ordering of place-making patterns within the Matrix – the highest score of 18 was assigned to patterns with the highest difference in presence value (see Table 6) and the highest difference in quality of expression value (see Table 8), while the lowest score of 1 was assigned to patterns with the lowest difference in presence value (see Table 6) and the lowest difference in quality of expression value (see Table 8). Each of the 18 place-making patterns was, thus, assigned two scores ranging from 1 to 18 – one score for its presence and one score for its quality of expression, based on its order of listing in Tables 6 and 8. The two scores (i.e., presence score and quality of expression score) were then added to determine a total score for each place-making pattern as shown in Table 10. The total score determined the hierarchical order of each of the 18 place-making patterns within the Matrix (Figure 6).

*Table 10: Presence scores, quality of expression scores, and total scores for place-making patterns.*

Patterns	Presence score	Quality of expression score	Total score	Hierarchical order in Place-making Pattern Matrix
Light	15	18	33	1
Celestial Order	17	15	32	2
Center	16	14	30	3
Ceremonial Order	18	9	27	4
Ascent	12	12	24	5
Anthropomorphic Order	13	11	24	6
Ordered Nature	6	17	23	7
Ordered Views	4	16	20	8
Bounding	5	13	18	9
Spatial Order	10	7	17	10
Elementals	7	10	17	11
Direction	14	2	16	12
Numeric Order	8	8	16	13
Differentiating Boundaries	11	4	15	14
Passage	9	1	10	15
Geometric Order	3	5	8	16
Descent	1	6	7	17
Materiality	2	3	5	18

The Place-making Pattern Matrix is composed of 18 components, arranged in 2 concentric layers around *Sacred Place-making* at the center. *Sacred Place-making*, here, is likened to *Unity* or the *experience of wholeness* or *oneness* between the 18 place-making patterns in the outer 2 layers of the Matrix (i.e., it denotes the integral and meaningful unification of all place-making patterns that contribute to the making of sacred place). A total of 12 place-making patterns – *Ordered Nature*, *Ordered Views*, *Bounding*, *Spatial Order*, *Elementals*, *Direction*, *Numeric Order*, *Differentiating Boundaries*, *Passage*, *Geometric Order*, *Descent*, and *Materiality* are arranged in the outermost layer of the Matrix, while 6 place-making patterns – *Light*, *Celestial Order*, *Center*, *Ceremonial Order*, *Ascent*, and *Anthropomorphic Order* are arranged in the middle layer of the Matrix. The 6 place-making patterns in the middle layer of the Matrix were found to have higher differences, collectively in

pattern presence and pattern quality (between the sacred and secular buildings) than the 12 place-making patterns in the outermost layer of the Matrix.

Figure 6: Place-making Pattern Matrix.



## Conclusion

The study utilized both qualitative and quantitative data by means of questionnaires, to examine differences in the presence and quality of expression of place-making patterns between a sacred building, i.e., Rothko Chapel and a secular building, i.e., Contemporary Arts Museum. Contrast and comparison of empirical evidence which emerged from data collection and analysis, revealed that the presence and quality of expression of all 18 place-making patterns from the CPPS were higher at Rothko Chapel than their counterparts at Contemporary Arts Museum. In addition, Rothko Chapel was experienced to be sacred by the majority of participants in comparison to Contemporary Arts Museum. Data collected and analyzed, therefore, validated the hypothesis of the study by concluding that *built environments which possess a higher presence and higher quality of expression of certain place-making patterns are more likely to be experienced as sacred, than built environments with a lower presence and*

*lower quality of expression of the place-making patterns.*

The hierarchical ordering of patterns within the Place-making Pattern Matrix highlights the importance of the patterns (collectively through their presence and quality of expression) in contributing to sacredness of place. In this sense, it is likely that the presence and quality of expression of place-making patterns in the middle layer of the Matrix – *Light, Celestial Order, Center, Ceremonial Order, Ascent, and Anthropomorphic Order* have greater impact in contributing to sacredness of place, than the presence and quality of expression of the 12 place-making patterns in the outermost layer of the Matrix – *Ordered Nature, Ordered Views, Bounding, Spatial Order, Elementals, Direction, Numeric Order, Differentiating Boundaries, Passage, Geometric Order, Descent, and Materiality*. To reiterate, the presence and quality of expression of the place-making pattern *Light* is likely to have greater impact in contributing to sacredness of place, as compared to the presence and quality of expression of the place-making pattern *Materiality*.

Further studies are required to explore how, or in what specific ways the 6 place-making patterns – *Light, Celestial Order, Center, Ceremonial Order, Ascent, and Anthropomorphic Order* in the middle layer of the Matrix, impact sacredness of place, as compared to the 12 place-making patterns – *Ordered Nature, Ordered Views, Bounding, Spatial Order, Elementals, Direction, Numeric Order, Differentiating Boundaries, Passage, Geometric Order, Descent, and Materiality* in the outermost layer of the Matrix.

The contents of this study could be seen as a small step in re-evaluating the process, goals, and status of using the place-making patterns in place-design as an activity. The place-making patterns, when meaningfully embodied and uplifted in place, have the potential of contributing to the sacredness of place. The resulting architecture could, in turn, act as a medium for remembering and experiencing the sacred. It is through the lens of the place-making patterns that the qualitative nature of sacred place may be understood. In this sense, the patterns could assist in the making of place that helps us re-remember our quest for the most exemplary model of place – place that is sacred and place that heals.

## ENDNOTES

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- <sup>16</sup> Brill 25-26.
- <sup>17</sup> P. Tabb, *First Principles: Architecture of the Unseen* (CO: The Academy for Sacred Architectural Studies, 2006).

# **Impact of Design, Establishment of Knowledge: The Exchange Between the Design Project and the Conceptual Framework of the City**

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## **Abstract**

A design is based on knowledge, intuition and skill, which are embedded in the process, but are only partially communicated by the results for further development. This paper investigates in what manner design can perform as an instrument of research. As a case study, design work performed by the author in an academic environment, having Hanoi as the locus of investigation, illustrates how architectural questioning exceeds the process of establishing proof to make the case for a design approach, but moreover, can establish scientifically exchangeable knowledge.

Primarily, the studio established a vision for urban development, consolidated within a number of strategic projects. In doing so, it devised an urban paradigm that was tested with design proposals. Secondly, the studio results are involved in a critical review of underlying theoretical concepts. If a design approach is not able to prove the hypothesis defined in an urban vision, the applied framework experiences a crisis as defined by Thomas S. Kuhn. Considering that a framework is established by theory, and design tools are developed and applied within practice, research by design reflects upon both aspects. This leads to an explanation of urban phenomena defined within the discipline. As a research practice, the design addresses lacunas, resulting either in an affirmation or a collapse – a crisis – of the theoretical framework. The specific case of Hanoi asked for the juxtaposition of 'postmetropolitan' theory focused on the city territory and theory of 'everydayness,' analysing small scale spatial production. Thus, the findings of this study present an approach that considers the interaction between the fragment and the overview.

## 1. introduction

Human Settlements are the material counter form of society, and reflect the complexity of the civilisation by which they are established. This condensation testifies of the interaction between technological progress, institutional control and human endeavour. The method of shaping the environment can be equally durable and withstand changes imposed by political, social or economical development.<sup>1</sup> As a result, a settlement pattern can be built up from physical situations that do not function to present-day standards. As around the world architecture and urbanism have to address a rapid development of city regions, growth occurs through the reproduction of spatial systems that are not capable to sustain urban life when enlarged and applied to another level (Fig. 1).



Figure 1. Architectural principles subverted by density. Housing in Hanoi.

<sup>1</sup> HOMMELS, Anique, *Unbuilding Cities, Obduracy in Urban Sociotechnical Change*, Universitaire Pers, Maastricht, 2001

Within the architectural discipline, this situation would be studied on both a practical and a theoretical level. The architect 'in the field,' has a clear mandate, which is giving form to space required by people, and approaches the task with a set of concepts and instruments that are proper to the discipline: the tools of a designer. The researcher, practicing within the walls of the university, usually does not use architectural instruments to study architecture, often because it is studied from a related discipline. However, also a researcher with the same academic roots as the practitioner, would investigate the field and come up with results that lead to 'knowledge about architecture' and not 'knowledge of architecture.'<sup>2</sup> This leads to the question whether the instruments of the designer, being proper to the discipline of architecture, can provide a different sort of knowledge, that is fully inscribed in both the practical and theoretical aspect of the profession.

With this paper, a methodology for research by design is elaborated. As a case study, an urban design studio held as a part of the Master of Human Settlements programme at the K.U. Leuven<sup>3</sup> regarding the city of Hanoi, Vietnam, illustrates how architectural questioning exceeds the process of establishing proof to make the case for a design approach, but moreover, can establish scientifically exchangeable knowledge. This paper aims to build further upon the structure and conclusions of this design project, which is rooted in the research approach of the department of Architecture, Urbanism and spatial Planning in Leuven<sup>4</sup> and in the fruitful cooperation between professors and

<sup>2</sup> HEYNEN, Hilde, "Unthinkable Doctorates? Introduction", in: *The Journal of Architecture*, vol. 11, no. 3, June, 2006, pp.277-282

<sup>3</sup> The Studio 'Water Urbanism in Hanoi, Red River + Lakes,' part of the 2008-2009 MaHS/ MaUSP postgraduate programme, ASRO department, K.U. Leuven, Belgium, was organised and mentored by Prof. Kelly Shannon, Ward Verbakel and dr. Benoit Legrand. Studio participants: Ayasha Siddiqua, Bardia Mashhoodi, Bart Pluym, Dagnachew Getachew Assefa, David Chi-cheng Yang, Emil Zane Sinclair, Ling Chan, Marijn van de Weijer, Nguyen Chi Trung, Pamela Hayne Maro, Patrick Lootens, Sherin Abd El Rahman, Stephen Nyamoto, Wei Guo, Xiaoxiao Ma.

<sup>4</sup> Further elaborated in K. SHANNON, "Vietnamese field/work: The case of Hanoi's water urbanism" in: CLARE BERNIE, Victoria, EWING, Suzanne, MCGOWAN, Jeremie, SPEED, Chris (eds.) *Field/Work AHRA Critiques Series*, Routledge, London, forthcoming, November 2010, p. 81-91

students. To make this case, the paper is structured around three topics. Primarily, it reflects upon theory regarding research by design. Secondly, the situation of Hanoi is explained according to performed fieldwork and urban theory. Thirdly, the design is shown as a method to bring together theory and practice within a project, in order to mediate between the two and come forward with knowledge derived from both aspects.

## 2. Design as an instrument for research

The design studio addressed the greater Hanoi region. It now is being inhabited by 6.2 million people, and is expected to cater for a population of 10 million by 2030. Agricultural land is rapidly being urbanised. The studio goal was to structure that growth through the revision of landscape and infrastructure. In itself, it was an applied research on a specific spatial situation, and investigated the possibilities of an alternative to current Vietnamese planning methods. The main design method was based on the focus on a strategic approach that is advocated in Leuven.<sup>5</sup> The output consists of spatial reproduction, caught in maps, plans and follow-up questions. Research delivers a different view on space and practice. But can this process also work in two ways? Can design also be a double edged sword, interpreting space and practice to question theory?

In order to relate design tools to research, the normal process of science needs to be compared to the process of design. Traditionally, science and design have a number of methodological contrasts based on which, they are considered as opposites. Nigel Cross enumerates a number of these antitheses,<sup>6</sup> which serve as the basis for an elaborated list of contrasting lemmas:

Science		Design
Generic	>	Specific
Standards, rigour	>	proper rules
Explicit knowledge	>	Tacit knowledge <sup>7</sup>
Exchangeable fact	>	Personal choice
Convergent	>	Divergent
Problem defining	>	Problem solving
How things are	>	How things ought to be

These issues generate a broad discussion within the field of design sciences, especially with regard to whether design can be used as a scientific research method, generating innovative and valuable knowledge. In that case, the methodology is termed *research by design*, and is distinguished from *research into design* –which studies the work of designers- or *research for design* – which generates knowledge to be used by designers.<sup>8</sup> It is the statement of this paper, that research *can* be done using design as a method, and that the gap between science and design can be bridged.

Therefore, Kuhn's principle that scientific practice is being exercised within the boundaries of a fixed paradigm is relevant here.<sup>9</sup> Comparison of paradigms, and their methods and questions, can prove problematic. This lack of communication is termed incommensurability.<sup>10</sup> Researchers solve problems using concepts and methods defined within a scientific paradigm. Only those problems that can be solved are being addressed by this method; as soon as a problem is outside of the reach of the familiar methodology, it often is ignored. To determine whether a problem is in or out of the appropriate frame, a set of rules is defined to delimit acceptable solutions. If a certain paradigm is accepted without contestation, a given problem will automatically be researched according to the rules defined by the paradigm. If a research approach is not able to prove the hypothesis from within the boundaries of the paradigm, the applied framework experiences a crisis, and is succeeded by a new one. This can be achieved by looking across the boundaries of a paradigm, to include a cross- disciplinary discourse.

<sup>5</sup> De MEULDER, Bruno, LOECKX, André, SHANNON, Kelly, "A Project of Projects", in: *Urban Trialogues, Visions Projects Co-productions*, UN-HABITAT, Nairobi, and PGCHS, Leuven, 2004, pp. 187-198

<sup>6</sup> CROSS, Nigel, "Designerly Ways of Knowing: Design Discipline versus Design Science", in: *Design Issues*, vol. 17, no.3, Summer 2001, p.51

<sup>7</sup> Tacit Knowledge as defined in: POLANYI, Michael, *The Tacit Dimension*, Peter smith, Gloucester, 1983

<sup>8</sup> FRIEDMAN, Ken "Research into, by and for Design", in: *Journal of Visual Arts Practice*, vol. 7, issue 2, 2008, pp. 153-160

<sup>9</sup> KUHN, Thomas S, *De Structuur van Wetenschappelijke Revoluties*, Uitgeverij Boom, Amsterdam, 2003 ('1962)

<sup>10</sup> op. cit. 9, p.203

The notion of the project, as it is used in architecture, provides a useful encapsulation for a research method, which allows to cross disciplinary boundaries and to develop knowledge in an explorative way, unlike the puzzle solving of Kuhn's 'normal science'. The project is defined as a position to be taken from which questions can be asked regarding both the knowledge and the tools used in obtaining it.<sup>11</sup> Drawing (representing spatial situations and reflecting on ways to intervene) is the main instrument of architecture within this project. Spatial phenomena are analysed and communicated, within a well defined disciplinary field. At the same time, since the strongest characteristic of the profession is design, with its explorative and testing nature, a design project could be exactly the field in which the investigative discipline is defined clearly, and the point from where the discipline commences its intersections with related fields: Chris Younès argues that the discipline should be well defined in order not to dilute in this cross- disciplinary discourse. Thus, architecture has to define and build its own body of knowledge.<sup>12</sup> Paradigms should be interpreted and translated into the language proper to the field of architecture. With regard to the definition of a project as a base for research, the proper condition of scientific rigour can be added; the project should allow for well defined conditions of exchange and reflection.<sup>13</sup>

Furthermore, contradicting the assumption that architectural strategies are exclusive to the practitioners opens a view to an investigative enterprise that critically addresses the architectural discipline, both in the fields of practice and theory, as put forward by Davidts et al.<sup>14</sup> From this viewpoint, a classical separation between intellectualisation and practice is unproductive in surpassing the division between the university as the seat of theory and the field as the locus of practice. How can this separation be overcome?

Research by design, especially in an academic environment, can address practical issues that are rooted in society and are advocated by relevant stakeholders with

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<sup>11</sup> DAVIDTS, Wouter, DELBEKE, Maarten, LAGAE, Johan, LEACH, Andrew, "The Inconceivable Agenda", in: *The Journal of Architecture*, vol. 11, no. 3, June, 2006, pp. 353-357

<sup>12</sup> YOUNÈS, Chris, "Doctorates Caught Between Disciplines and Projects", in: *The Journal of Architecture*, vol. 11, no. 3, June, 2006, pp. 315-322

<sup>13</sup> Op. Cit 12, p. 319

<sup>14</sup> Op. Cit. 11.

various backgrounds, but, instead of generating design ideas to come to a practical solution in an efficient way, use design to generate a new interpretation of existing problems and reframe the issues at stake.<sup>15</sup> In line with changing practices, the academic studio is also more and more organised as an experimental environment where designers work and investigate together. Helen Furjån explains how this alters the way designers work: "Practice – whether in the office or in the school – is now a laboratory: group orientated, open-source, networked and hybrid."<sup>16</sup> Therefore, a large creative production is used as a method of questioning theory and testing hypotheses.

Following these methodological remarks, this paper discusses the condition of Hanoi based on two modes of spatial production and their theorizations. On one hand, we have top- down planning exercised in the use of Master plans, thinking about the structure of the city starting from the large scale. On the other hand we have bottom- up local spatial production, consisting of small scale initiatives that together make up the nature of the city. Both of these modes are practiced in Hanoi, and both fail in structuring the city in a qualitative way. Both modes can be seen as paradigms in crisis. In the following paragraph these conditions are explained and clarified theoretically, based on field work exercised during a two week workshop on urbanism in the greater Hanoi region.<sup>17</sup> Thereafter, this paper explains how a project incorporates these theories together in a research by design in order to reflect upon practice and theory, in an attempt to overcome this paradigmatic incommensurability.

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<sup>15</sup> HEYNEN, Hilde, SMETS, Marcel, SHANNON, Kelly, *Research by Design in Architecture and Urbanism*, unpublished position paper, K.U. Leuven, February 2010

<sup>16</sup> FURJÅN, Helen, "Design/Research, Notes on a Manifesto", in: *Journal of Architectural Education*, Vol. 61, No.1, pp. 62-68 (p. 64)

<sup>17</sup> Workshop 'Water Urbanism in Hanoi: Red River + Lakes', 12-20 February, organised by the Urban & Architectural Institute of the University of Civil Engineering (UCE) Hanoi, Vietnam, K.U. Leuven, The Vietnamese Institute of Architecture and Planning (VIAP) and the Forestry University of Vietnam. The workshop was directed by Prof. Doan Minh Khoi, Prof. Kelly Shannon, Dir. Pham Thi Hue Linh and Dr. Pho Duc Tung.

### 3. How does fieldwork follow into theoretical reflection? The condition of Hanoi

Hanoi exemplifies the ambiguous relation between the local and the global or the vernacular and the modern, the arena in which the condition of displacement induces the contestation over the meaning of space and objects. Vietnam is a one-party state with a free market. Facing poverty and the incapability of feeding its own population, the Communist Party opted for a change in ideology in 1986. At the Sixth Party Congress, the decision was made to open up to the global market economy. Vietnam was brought into the sphere of influence of the West. Western investment has brought more prosperity, but the new wealth is not divided equally, and the growing fragmentation of society, visible in a developing separation between rich and poor, now worries the Vietnamese population.<sup>18</sup>

The city is overwhelming and captivating. Its tissue is stretching out from the old city core along its main radial roads in a dense, monotonous way. The omnipresent honking of claxons, the numerous plastic chairs obstructing the walkways and the dense urban fabric all relate the story of the growing city. One of the most noticeable aspects of modern life in Hanoi is the use of motorbikes. Since almost every inhabitant of the city has one, Honda engines fill the street with their nerving sound and dizzying exhaust fumes. The crowded city is vibrant, street life is the norm. In search of new places to build, the historical relationship to the landscape of small lakes is sacrificed as they are filled and built over. This situation extends into the countryside. The outskirts of the city are encroaching the small rivers of the Red River Delta.

Like in many Asian cities, a rapid development of built fabric rarely is accompanied by an appropriate adaptation in the urban infrastructure. William Lim sees this as the main weakness of East Asian cities.<sup>19</sup> In Hanoi, developments have occurred in historical tissues like the

ancient quarter, the old commercial heart of the city that was given its name by its urban structure: the 36 Streets District. The French Colonial District, characterised by its rational grid structure, also had to support implantation of large, new structures. These districts have managed to cope with these changes, though their character has changed with it, as the historical street layout had to deal with more and more traffic, at the cost of public space.

Urban expansion now shows the marks of foreign protagonists. Korean, Indonesian and Japanese conglomerates draw up generic city expansion. On the edge of the city, the first gated communities appeared, as well as several golf courses. The last green spaces close to the city centre are envisioned to grow into urban centres.<sup>20</sup> Rapid design-and-build actions of high rise buildings define a changing urban field in the cities that support the rise of the Asian 'Tigers.' These buildings exemplify the thinking in the here and now, and the "lack of architectural theories and knowledge of how to re-link her immensely rich heritage to contemporary urban projects."<sup>21</sup>

On the other hand there is the effort local people make to shape their own environment. 'Everydayness' is certainly a potent method to read the urban reproduction. The main daily practice of the Vietnamese is performed in the public sphere. As they open up their houses every morning to the streets, public life enters the spaces adjoining the sidewalks, and private life is moved on to the pavement. Daily life makes a mockery of designed life, as the street profile with its sidewalks and driving lane is rendered insignificant; people sit on the pavement, walk in the lane, cross the roads as they please (Fig. 2). This congestion is an expression of the general wish to thrive and survive in the city context, something that was kept in check by former communist policies to move people to the countryside as much as possible. After dark, the streets become empty quite quickly, the nightlife is limited to some market places, and so the cycle of day and night is felt quite strongly as a governing rhythm.

As a result of these described mechanisms, it is difficult to address growth in a structured way. Several master plans for Hanoi have been drawn up, but are always caught up by

<sup>18</sup> LOGAN, William S., *Hanoi, Biography of a City*, University of New South Wales Press Ltd, Sydney, 2000

<sup>19</sup> LIM, William S. W., "The Dynamics of East Asian New Urbanism", in: HEYNEN, Hilde, HENKET, Hubert-Jan (eds.), *Back from Utopia, the Challenge of the Modern Movement*, 010 publishers, Rotterdam, 2002, pp. 198-205

<sup>20</sup> *Hanoi New Town Project (phase 1)*, Tu Liem District, Korean H.N.T. Consortium, April 2003.

<sup>21</sup> Op. Cit. 19, p. 205

reality or political and cultural adversity.<sup>22</sup> The Vietnamese shape their environment on a small scale, taking matter into their own hands but also sacrificing valued landscape elements to a colourless urban sprawl. The ongoing growth and the resulting monotony raise the question: what would be the most feasible design approach to deal with an urban mechanism that is over complex and out of control?



Figure 2. Street life in Hanoi. Claiming public space for numerous uses.

This question fits into the discussion on the ongoing growth of urban areas. The relationship between centre and periphery is an essential topic within this discussion. A deformation of the idea of the traditional metropolis has influenced this relationship. This results in a new modus of everyday life, taking place in the *postmetropolis*, in which urbanized space has shaken the traditional image and its relation to the centre, and has inverted its geography in a focus on a system of multiple nodes.<sup>23</sup>

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<sup>22</sup> The Hanoi Urban Master Plan 2020, envisioning growth to the North, on the other side of The River(1998), and the HAIDEP plan by JICA, also crossing the river (2006), are being opposed because in the eyes of the locals, the River as a central element will pose flooding danger and the plans break with the historical settlement pattern as well as the relation to the landscape based on Feng Shui principles. The Master Plan for Extended Hanoi (2008) envisions an expansion to the west, away from the Red River. Explained in presentations by Iwata Shizuo and Ngo Trung Hai during the 'Water Urbanism in Hanoi' workshop. UCE Hanoi, 12- 20 February, 2009.

<sup>23</sup> SOJA, Edward, "Exopolis: The Restructuring of Urban Form" in: MILES, Malcolm, HALL, Tim, BORDEN, Iain (eds.), *The City Cultures Reader*, Routledge, London and New York, 2000

The architectural background to this phenomenon is elaborated in the book *Ladders* by Albert Pope.<sup>24</sup> The main interest in his work is to reveal concepts and theories behind the sprawling city, since it is not architects that determine the character of the city solely through built form, but the immense urban spaces and their infrastructure.<sup>25</sup> Pope therefore looks to formulate a method of decoding the qualities of space within the urban territory. According to his argumentation, this requests a reversal of the primacy of built form. Urban reality is made up from a series of self referring elements. These shards each have their own organisation and only communicate partially on the scale of a city. A perfectly equal and open system would be a complete grid, but only partially does the urban tissue really function as a grid. Rather, these half-breed raster layouts could be termed *Ladders*.<sup>26</sup> It is in the 'in between', the space of voids and infrastructures, that the city can be described and made intelligible.

Ladders facilitate the rupture from the core through a leap from its influence and logic. small scale investment and demand only allow for partial execution of large scale urban plans, resulting in a fragmented field of discontinuous figures. A field like this can have a number of characteristics that lead urbanisation to be seen as sprawl. In Hanoi, this can be seen as the omnipresent production of narrow, deep and tall housing buildings- no matter what environment they are put in, be it urban or rural (figure 3). This illustrates the conflict between the historical centre and its periphery that has not been altered successfully into a polynuclear field. In concluding his study Pope stipulates the absence of an encompassing urban identity, which however can be read in a positive way as a *tabula rasa*.<sup>27</sup>

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<sup>24</sup> POPE, Albert, *Ladders*, Princeton Architectural Press, New York, 1996

<sup>25</sup> Op. Cit. 24, p.3

<sup>26</sup> Op. Cit. 24, p.53

<sup>27</sup> Op. Cit. 24, pp. 238-239

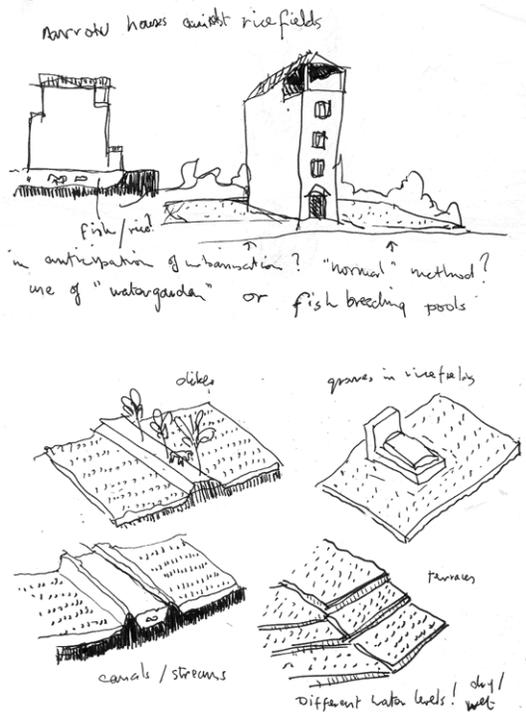


Figure 3. field work study of housing and other functions amidst rice fields.

The idea of an overarching comprehensibility of the city derived from the in-between space excluding the urbanised figures, can be inverted through recognition of the structuring capacity of fragments. From the early start of modernist thinking, fragmentation has been a part of design strategy, as the most radical ideas imagined a rupture with the existing city.<sup>28</sup> Even though only established in fragments, modernity was passed on and developed in its atomisation and aimed to redefine urbanity and density. This also meant that fragmentation was a part of daily life. After World War II, the French philosopher Henri Lefebvre arose as an important advocate. His theory, escaping the dominance of the architectural elite, holds productive ideas to explain the urban fabric of Hanoi and intervene in it, as this city is densely built up from fragments, that however expose the same daily patterns over and over.

<sup>28</sup> JACOBS, Steven, "Shreds of Boring Postcards: Toward a Posturban Aesthetics of the Generic and the Everyday", in: GUST (Ghent Urban Studies Team) (ed.), *Post, Ex, Sub, Dis, Urban Fragmentations and Constructions*, 010 Publishers, Rotterdam, 2002, pp. 15-48

Lefebvre sees the everyday as the sole constant factor in establishing a daily reality since, other than doctrine, politics and ideology, it is surviving the constant impact of revolutions. He therefore proposes to establish it as a system for decoding the modern world. If we conceive of the everyday to be present in all aspects of society, the banal can explain the real just like "the surreal, the extraordinary, the surprising, even the magical."<sup>29</sup> Through this lens, Lefebvre analyses symptoms of modern society - standardisation, repetition, and consumption. The monotony of repetition, a rationalisation that is brought by a linear, progressive time conception, can crush the cyclic rhythm of life, so characteristic for southeast Asia. The everyday thus is a complex system, intertwined with modernity,<sup>30</sup> that through close analysis can be uncovered but not easily altered. In a city constituted from spaces that do not allow a traditional mode of public life, everydayness can be the bottom up generator of new forms of public space. A basic rethinking of what could be termed as public space is a fundament for the understanding of these processes.

Margaret Crawford explains how new spatial uses arise at a point when public space is described following the rules of a dominant group in society, that does not fit the needs of new or growing 'counterpublics'.<sup>31</sup> As the everyday is omnipresent but elusive, hidden and obvious at the same time, the appropriation of space it generates can be both invisible and ostensive. The inscription of daily practices like washing, buying, selling and working can almost go unnoticed. As meanings are not defined and permanently changing, everyday space is temporal, existing "in between past and future uses."<sup>32</sup> the temporality is cyclic, returning activity to place on the basis of years, seasons, weeks, and even based on the day- night cycle. In their innocence and adaptability, these activities in themselves do not appear rebellious or capable of establishing new urban politics. In

<sup>29</sup> LEFEBVRE, Henri, "Everyday and Everydayness", in: BERKE, Deborah, HARRIS, Steven, *Architecture of the Everyday*, Princeton Architectural Press, New York, 1997, p. 35

<sup>30</sup> Op. cit. 29, p. 37

<sup>31</sup> CRAWFORD, Margaret, "Blurring the Boundaries: Public Space and Private Live", in: CHASE, John, CRAWFORD, Margaret, KALISKI, John (eds.), *Everyday Urbanism*, Monacelli Press, 1999, pp. 22-35

<sup>32</sup> Op. Cit. 31, p.29

the multiplication of small, insignificant and chance events lies however the possibility to redefine reality.

A regular day in the streets of Hanoi exemplifies this small scale approach by which individuals shape their environment. Every morning the streets fill up with vendors, motorbikes and children playing. And if a Vietnamese cannot find a plot to build, he will build in a rice field, in a courtyard, over water or in the air. Unfortunately, this also devours the lakeshore to linger, the tree to lie under and not in the least, space for excessive water to flow to. Equally, Pope's 'tabula rasa,' the void of urban identity consisting of the landscape in between city fragments and a polycentric field, cannot be established. It seems Hanoi has exposed a blind spot in both theories. The design studio provided the right tools to expose and address this blind spot.

#### 4. Mediating between fragment and overview: a design approach.

In a first design step, the analysis lead to a formulation of 3 corresponding visions that pronounce a possible new future. In three strategic projects the visions are illustrated and sharpened. This strategic approach steers urban design away from the all- encompassing master plan. Current day urban complexity does not allow a one-directional approach, as the situation in Hanoi illustrates. Despite the resilience of reality, it is still possible to envision – and design – new futures, by means of punctual projects that are derived from this vision and offer insight and feedback that could readjust the envisioned point of departure. Design establishes a 'project of projects.'<sup>33</sup>

The visions are defined on the scale of the city region and focus separately on infrastructure, the waterscape and the structure of vegetation - both natural and cultural. These structures interact together and determine the course of further urbanisation: the interaction between the three visions will define spots on the map as favourable or unfavourable for living and building. Each vision proposes a set of spatial situations: infrastructure, water bodies and vegetation are thus diversified according to scale, function, origin and so forth. The vision for vegetation for example, was named 'Cultivating a Structure', and combined large ecological elements along the river and in the mountains, productive wetlands along smaller rivers, linear forests to prevent uncontrolled urbanisation along infrastructure, and park fields, as hybrid green spaces within the current city

boundary (Fig. 4). In doing so, the visions are a constructive effort but also question spatial reproduction through a number of questions linked to them. To what extent can new infrastructures for trade and transport be used to guide an integrated process of urbanisation? What qualities can be added to the urban environment if we give more space to the natural flow of rivers? Can a conscious cultivation of particular mosaics of vegetation guide the growth of the Delta in a determined direction?<sup>34</sup>



Figure 4. A vision for Hanoi: Cultivating a Structure.

In combination, the visions propose an approach that differs from the aforementioned master plans. Instead of a concentric development with the current city centre as a central core, the design imagines a 'ladder structure' along existing infrastructural arteries, one that contains space for urbanisation, agriculture and ecology. The building stones of these maps came forward in a continuous process of zooming in and out, between the scale of the region, the city, and a large number of small scale *situations*. These

<sup>33</sup> Op. Cit. 5.

<sup>34</sup> Questions formulated as part of the design research studio, Op. Cit. 3.

situations vary in scale and are derived from the fieldwork. Therefore, they involve the day to day reality of how a village or a neighbourhood is given shape, how a river organises agriculture, bridges and dikes, how people live, thrive and survive along a stretch of road or a street, how a lake can be the centre of a district. Structuring elements derived from the vision give room for an appropriate local development. Also, when design work exposed a flaw – a fragment of the vision insufficiently allowed for a meaningful development of space, based on appropriate local standards – the vision was developed further and improved (Fig. 5 and 6).

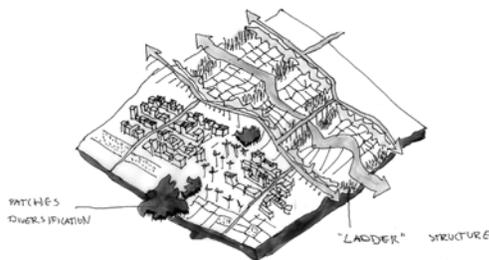


Figure 5. linking housing en infrastructure with an ecological 'ladder' along the river.

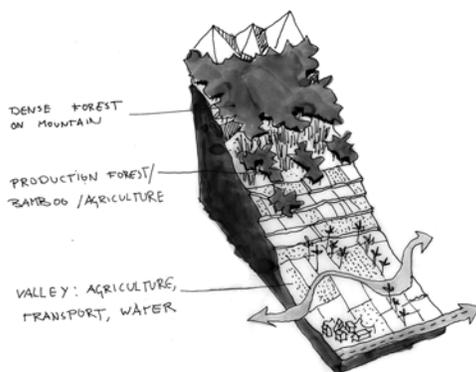


Figure 6. relating systems of agriculture, ecology and infrastructure to topography.

Mediating between scales, between top down imposition and bottom up initiative, this design also looks for common ground between the two initial theoretical strands. Postmetropolitan theory accepts small scale initiatives. These initiatives are however interpreted as fragments without structuring power. Theory of 'Everydayness'

accepts the presence of planned and imposed spatial production, but claims that real life is existing in the 'in between', and escapes the vision that is imposed from above. This design seeks a path to mediate between both and negotiates a specific balance, adapted to the situation in Hanoi. The strategic approach allows for a changing interpretation of place, for temporary uses and for unimagined appropriation. The metaphor of the 'ladder' as an incomplete, dysfunctional grid, is reinterpreted as a potent instrument to combine several significant layers into a synthesised plan. This superimposition leaves enough space for local, small scale initiative. A drawback to this approach is that part of the development of urban tissue is beyond control of the design method. In order to imagine production of urban tissue guided by the proposed structure, the design team had to revert to reproduction of existing methods. While infrastructure, water and vegetation were put forward, the built tissue would follow. To a large extent, this approach has let go of an architectural way of place making, while the built form also could be a vision of itself, combining local methods, techniques and culture to find more balance and completeness.

## 5. conclusion

Rethinking the city is a process that goes with a recalibration of design tactics and analysis. In a continuous process, both components redefine each other. A new paradigm for reading the city can adjust a design method, or even formulate a completely new approach. The investigating capacities, that lie in design tools, can unveil and remove errors and incompleteness. Design is a form of output that allows answers and results to become comparable even if different scientific inputs have been used to lay theoretical foundations for the project. It works in two ways. Primarily, it addresses the situation in Hanoi, it advocates a different approach to guide urbanisation in a rapidly developing region. It looks for qualities and latent structures, proposes methods and puts them to the test. Secondly, it discovers problems that cannot be solved within one paradigm and questions the completeness and correctness of theoretical frameworks. It also proposes spatial phenomena as examples of these flaws. In addition, the productive character of design looks for answers to merge and combine- to cross paradigms without diluting the discipline. Design, performed as *research by design*, therefore can be seen as a methodology that escapes the unproductive antitheses as enumerated above. From a positivist outlook, science only includes knowledge that is

derived from repeatable experiments that are established to explain existing phenomena. Design however, generating a product that is more projective, can also generate results that are open to analysis, exchange and dissemination. Grace to its explorative character, design can very well test current theories. By exposing gaps and lacunas, the methodology of research by design offers the proper analytical tools to reformulate scientific issues regarding spatial production and use.

This makes *place* a significant aspect of the research, as it is only in real situations that existing phenomena can be interpreted and incorporated into a project that covers both the practical and the theoretical aspect of the profession. Place can be researched from different interacting levels. A proper understanding of the larger scale leads, when researching by design, to a better implementation of the intermediate, the tangible and the modest. Smaller fragments of architecture, agriculture or nature are bound and defined. This does not mean that these elements are insignificant. Architecture defines the infrastructure in which daily life takes place, and is housed. These elements are however to be linked and understood beyond their own limits, within a larger framework.

Furthermore, the design is the arena in which an incommensurability can be resolved. Postmetropolitan theory has declared a crisis in architecture, as place making in the traditional sense, of shaping buildings and public spaces, no longer structures the city. It considers large scale landscape elements and infrastructure to be the generators of an urban comprehensibility. Theory of Everydayness has also declared a crisis in architecture, for as far as it cannot claim a materially makeable of society. Instead it focuses on spatial production and reinterpretation without an architect. Combining resilient structures with local spatial reproduction overcomes differences of both paradigms and exposes how a combination of multiple theories can be applied to read and address a rapidly urbanizing environment in a productive manner. Is this one of Kuhn's scientific revolutions? Maybe not yet, but as a first step, the research by design elaborates a site-specific approach to mediate between the fragment and the overview as it sharpens the undefined space in between them.

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## PRESENTATION SESSIONS | **TECHNOLOGY**

Session One

Moderator: Brian R. Sinclair, FRAIC



# Representation + Fabrication: Connecting descriptions and artifacts in the digital age

T. Al-Haddad, R. Gentry, A. Cavieres, M. Carpo, J. Cho, L. Wagner & A. Zaitsev  
*Georgia Institute of Technology, Atlanta, Georgia, USA*

This paper broadly considers the question of new modes of linking the representation of a thing to the actual process of physical making through advanced parametric CAD and digital construction technologies to reformulate existing construction logics; in other words considering parts, relationships, and actions. This approach implies the refinement of the traditionally understood idea of CAD/CAM, or digital manufacturing, and begins to formulate a new intellectual direction of *Digitally Augmented Making* [DAM] paradigms where anthropological design and fabrication activities are enhanced through digital means. An important aspect of this research deals with broadly applying the *digital promise* to real world AEC industry constraints in order to have a meaningful impact on well established construction protocols. The particular case study presented in this paper is framed through the lens of rethinking complexity and potentiality in variable concrete masonry systems and processes.

## 1 INTRODUCTION

### 1.1 *Descriptions and artifacts*

The gap between the description of a thing and the thing itself has been the subject of inquiry dating back at least as far as the Platonic construct of the Ideal. In today's AEC industry this gap could also be understood in terms of the relationship between the design representations of the architect and the material constructs of the builder in the act of Becoming, or the act of translation from drawing to building. The traditional process of interpreting design intent into constructible form has long been established through the system of shop drawings, submittals and specifications. This process of interpretation and translation from the design representation to material construct is a contested space riddled with perceived limitations, miscommunications, and ambiguities. It also represents a vast territory for architectural research in light of the computational tools and technologies that have emerged both in practice and academia. These tools represent an opportunity to bring the representation and the artifact into closer direct contact in the many actualization phases of a project.

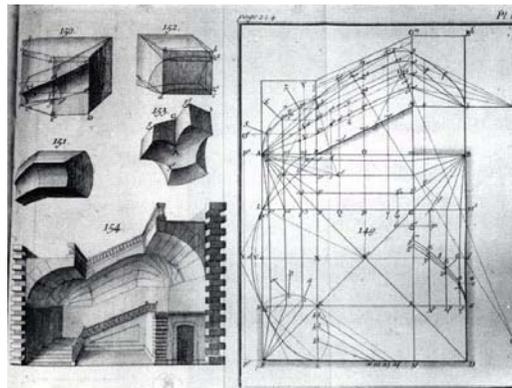


Figure 1. A.F. Frezier – *La Theorie et la pratique de la coupe des pierres* (Evans, 1995)

Digital technologies, both representational and fabricational [CAD/CAM] have been said to allow for a new form of digital craft and user specification through CNC fabrication. This type of purely digital making has been widely researched, practiced, and written about in the last decade however it is becoming more and more clear that the notion of the purely digital is incongruent with the realities, traditions and possibilities of current construction practices at the scale of buildings. As was the case in computer science the concept of the purely virtual gave way to the hybrid, the blended, the bastardized. The research moved from the concept of Virtual Reality to Augmented Reality, a form of both/and. Digital making is at a similar intellectual bifurcation. In order to push the possibilities of the digital into the practicalities of the physical a new hybrid approach of Digitally Augmented Making [DAM] must be developed which asks first how can the space of potentiality offered by digital technologies begin to learn from, react to, and ultimately transform existing design and making processes that have long historical threads and broad cultural implications.

Today the question of non-standard construction and formal complexity often implies the use of sophisticated CNC fabrication equipment to manufacture unique parts in order to construct a complex whole. While this approach remains to be a valid and rich territory for exploration the inverse approach of using standard parts within a complex whole offers another trajectory for designers and constructors to explore within the larger question of complexity, emergence, and construction. Through the systematic deconstruction and codification of the rules, or logics, that regulate various material/construction systems we are now beginning to close the gap between the representation and the artifact. This extracted construction knowledge can now be made explicit and can be embedded within intelligent design environments [Parametric Models/BIM] in order to give designers the ability to interactively test high level formal or programmatic ideas against low level material construction possibilities so as to tune design intentions with material realities. BIM systems [Building Information Modeling] are beginning to allow architects to develop constructible complex geometries from both standard and non-standard construction systems while giving engineers and contractors a means by which to calculate, verify, and construct the design. Again, this emphasizes the ability of digital technologies to begin to close the gap between the representation and the artifact; working both as top-down and bottom-up design systems simultaneously.

## 1.2 *Historical Traces*

In the beginning, buildings were conceived and made by those who needed them. In time, as constructions grew bigger and more complex, actors and agencies intervening in the process of building became increasingly estranged from one another. Buildings, or parts of them, started to be designed by specialists working off-site, who sent documents of various kinds to workers that were expected to understand or interpret the instructions they received, and build accordingly. The degree of separation between design and construction (hence the degree of precision of design notations) ebbed and flowed in the course of time, but it is at the beginning of the Renaissance that Leon Battista Alberti, the humanist, first claimed that architects should stop making things, and should design them instead.

Since then, the "Albertian paradigm" has defined the architectural profession in the West, and to this day still underpins the global practice of architecture, including in its legal aspects. In the modern, humanist tradition architects are expected to design objects without making them, and builders are expected to carry out the design notations they received without changing them. The consequences of this cultural and technical paradigm have been determinant for many aspects of early-modern, modern, and contemporary architecture. The separation between design and building limits the realm of buildable forms to those forms that can be geometrically notated, and measured in drawing. In turn, the architect's authorial role depends on the identical translation of architectural notations into building: as Alberti first stated, all changes in design that are not "authorized" by the designer should be considered as errors. The industrial revolution, and the mechanization of construction technologies that ensued, further validated and corroborated the importance and extent of this notational and authorial way of building.

But for the last twenty years or so, the digital turn (the shift from mechanical to digital technologies) has drastically reversed this trend. As digital tools can be used to design and fabricate at the same time, CAD/CAM technologies have already started to bridge the gap between con-

ceivers and makers; digital notations have conspicuously reduced the formal limitations of traditional, Mongian based architectural drawings; digital fabrications technologies are mostly indifferent to economies of scale, which derived from the technical logic of mechanical matrixes, molds, or imprints; and the interactivity and reversibility which is inherent in all digital processes are alien or averse to the traditional and modern definitions of authorship (Carpo, 2008).

Bricks, or in this case blocks, are a technology of choice to test this new covenant between digitally enhanced manufacturing and pre-mechanical hand-making, because bricks have always been a hybrid technology, at the frontier between industrial mass-production and manual artisanship. From the start, bricks were made to measure for hand manipulation, as their sizes and weights are determined by the shape of the hand, and the strength of the arm. But from Roman times, baked bricks (unlike the sun-dried bricks still described by Vitruvius) started to be industrially mass-produced, in standard sizes and with standard mechanical resistances. Until recently (before, that is, the digital turn) bricks have been, paradoxically, highly standardized items of mass-productions in a technological chain of which the last and determinant step is still entirely and exclusively dependent on the old, ancestral gesture of the bricklayer--a gesture which has not changed from prehistoric times. Mass-produced and machine-made, bricks must still be laid one by one by the hand of a craftsman: a craftsman who is in turn expected to repeat the same gesture identically and ad infinitum, as a machine would, and possibly as fast.

Unlike asphalt, steel, or reinforced concrete, which can be machine-made from start to end, bricks were never a good ideological fit for modernist, mechanized building technologies, due to their ultimate and apparently inevitable dependence on the human factor. The filmmaker Andrzej Wajda immortalized in a famous movie of the pre-Solidarnosc age (*Man of Marble*, 1977) the true story of the bricklayer Birkut, the man that could lay 30,000 bricks in a single shift, and of his rise and fall from grace in communist Poland in the 1950s. But today's digital technologies, unlike the mechanical technologies of the twentieth century, can reproduce, imitate, and emulate the organic adaptivity of the human gesture. And digital technologies can deliver the same amount of customized variations at a lesser cost, both human and economic--as individual variations are now calculated, designed and produced by machines, not by hand in many cases.

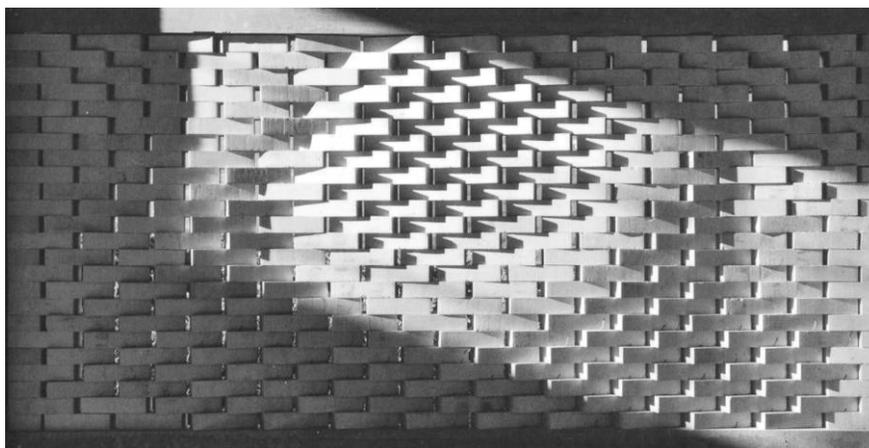


Figure 2. Gramazio + Kohler - Gantenbein Vineyard Façade

Robotic, non-standard bricklaying has been the object of recent research at the ETH in Zurich (see the recent work of Gramazio and Kohler [G+K]; the winery Gantenbein, Fläsch, a collaboration with the office of Bearth and Deplazers, Chur, has recently garnered much critical and public praise) (Figure 2). This work is widely known and may be one of the best recent examples of digital masonry. The project described in this paper reflects a similar approach in many regards but also tackles many other issues not addresses in the work of G+K. The construction of structural masonry at the scale of buildings is still problematic with the fully digital approach. There are two significant problems with the robotic approach and two significant differences be-

tween our project and the work of G+K which deal with the interpretation and implementation of construction conventions and structural behavior in masonry. The robotically laid bricks of G+K are essentially glued together, are unreinforced, and deal with relatively small, single story walls. All of these aspects present significant limitations of the G+K system to be deployed as a primary structural system within buildings of any significant size and which must comply with contemporary building codes. Our project begins to deal with these issues by developing a hybrid making system between conventional analog construction methods and digital technology, the DAM approach. Additionally, structural calculations, constructability feedback and detailed construction data is all embedded directly into the parametric model for a more holistic representation.

### 1.3 Workshop Explorations in Concrete Masonry

This question of Digitally Augmented Making is being interrogated through a series of graduate research workshops entitled Parametric Modulations in Masonry [PMiM] in the College of Architecture [CoA] at Georgia Tech [GT]. These workshops investigate the potential of parametric representations in relationship to existing construction conventions within today's masonry industry in order to develop tools and techniques for creating robust constructible masonry systems as parametric design tools. The research explores both the possibilities and the limits of a standard masonry unit as seen through a computational lens. The spring 2009 workshop developed the computational, structural, and constructional logic which allowed for a fully parameterized wall design using standard concrete masonry units [CMU]. A simplified structural calculation was imbedded within the parametric model to calculate for structural compliance in real-time with each parametric permutation in the overall design scheme. Additionally, construction data such as quantity takeoffs, block positioning and rebar placement have been explicitly parameterized within the system. This parametric masonry tool/system allows us to quickly work through a series of formal iterations in the design of a double masonry wall which will be built in the Georgia Tech College of Architecture courtyard in the spring of 2010 (Figure 3).

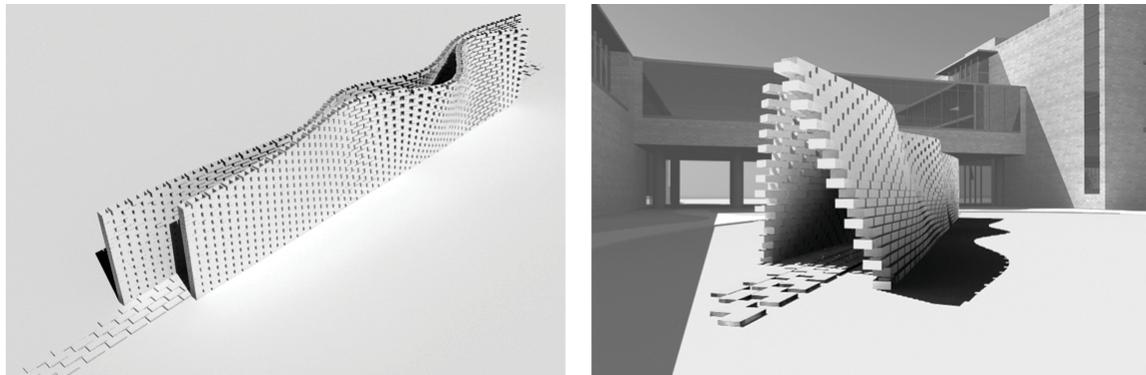


Figure 3. Parametric Modulations in Masonry Wall | Georgia Tech

## 2 CONCRETE MASONRY

### 2.1 Unpacking the parametric potential of the unit

Masonry is a system of assembling units into a whole through the use of a mortar joint. The logic of masonry as a system of standardized parts aggregated within a larger configurational whole offers many possibilities to explore formal complexity at the level of both the local [masonry unit] and the global [wall/building]. In this case study a standard 4 hour rated half-high CMU was selected as the module for exploration. This unit was selected due to its 'half-high' 3-5/8 inch tall face and 2 inch thick face shells. The half-high dimension allows for an increase in the resolution of the overall geometry and a 'smoother' doubly curved surface through the use of smaller masonry units, or conceptual pixels. The thicker face shell of the 4 hour block allows for a larger amount of sectional 'slippage' between units in regular running bond coursings;

therefore allowing for a greater amount of resultant curvature and geometric complexity within the overall system while still maintaining structural stability and configurational limits for proper block-to-block bearing and steel reinforcing placement (Figure 4).

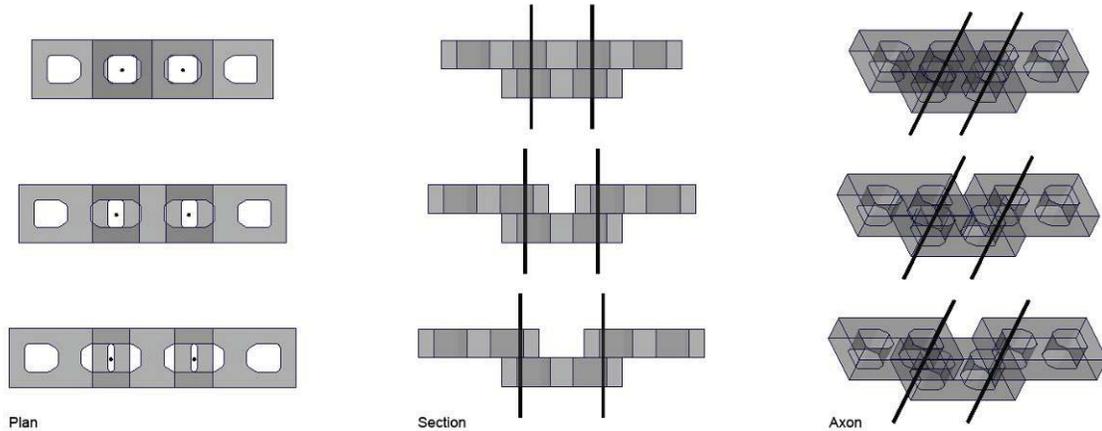


Figure 4. System logic - possibilities and constraints of block adjacencies | ‘Slippage’

### 3 PARAMETRIC DESCRIPTIONS

#### 3.1 *Building Object Behavior [BOB]*

In general the process of embedding design intent and knowledge into parametric models remains an art. As in computer programming, there are always several different ways of implementing a solution within a design. This depends basically on the designer’s expertise, goals and constraints. In any scenario a good solution will be a trade-off among design requirements, model performance and flexibility as well as model re-usability.

Indeed one of the major challenges for the development of rich-knowledge parametric models is to find a general and formal method to facilitate the translation of design intent and expertise into a proper set of parametric behaviors. This approach is required because it emphasizes the principle that parametric objects have to be modeled not only as they look but most importantly, as semantic relationships within a specific domain (Sack et al, 2003).

To solve this issue we adopted the Building Object Behavior (BOB) description method and notation developed by Lee, Eastman and Sacks (Lee et al, 2003). In our project we adapted this methodology to guide the implementation of parametric behaviors of components and assemblies within the domain of concrete masonry construction (Cavieres et al, 2008). The graphic and abstract nature of BOB representation facilitated the process of collaborative elucidation of structural and constructive constraints. In this manner we were able to pre-tune and guide the parametric definition prior to any software implementation or modeling activity. Such processes allowed us to reduce ambiguity and unnecessary complexity, while providing a graphic specification that can be further re-used and up-dated.

#### 3.2 *Parametric Implementation*

Generative Components was selected as the parametric CAD environment for its ease of use, extensibility, and flexibility. Given the specification of parametric behaviors required by concrete masonry construction the implementation was set according to the main design intent and system constraints (Figure 4). In this case that blocks in a course would be separated from each other based on the curvature of the wall, generating a screen effect. This result was defined as a function of the gradient of the horizontal coursing curves (as seen from top view). The mechanism used was the projection of equal-spaced (16 inch) vertical cross-section lines on the wall surface. The vertical spacing for the joint beds (4 inch) was achieved by propagation of equal-spaced points along the projected vertical cross-sections. In this way the specification of both

vertical and horizontal spacing for the masonry running bond grid was satisfied while producing the gaps needed for the screen effect (Figure 5a and 5b).

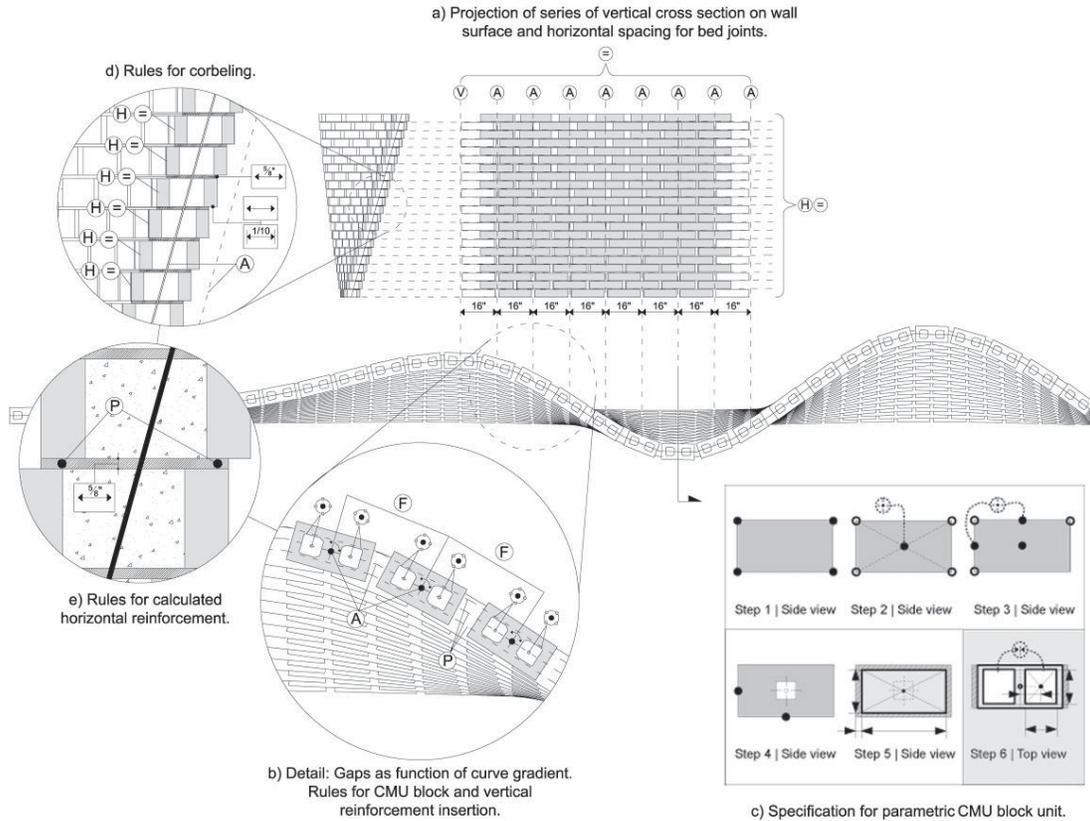


Figure 5. Parametric relationships of local objects within global configuration [B.O.B.]

The parametric implementation for the blocks themselves follows the specification of the BOB diagram (Figure 5c). In this case, rather than explicitly modeling the block solid with cells, a lightweight data structure was chosen for memory efficiency. This data structure encapsulates the coordinates for the each cell centroid, guiding the insertion of vertical reinforcement (rebar and concrete grout) if needed based on the procedure described in the previous section (Figure 5b and 5d). A similar approach is used for horizontal reinforcement when horizontal tying is required by excessive traverse wall displacement (Figure 5e). Additionally, the model gives designers real-time feedback of constructability by analyzing local relationships between units and color-coding conditions that do not meet the predefined criteria. As a final process the model generates a list of coordinates for block and rebar placement by the mason during the physical construction of the wall. This data represents the handoff from the digital to the physical realm.

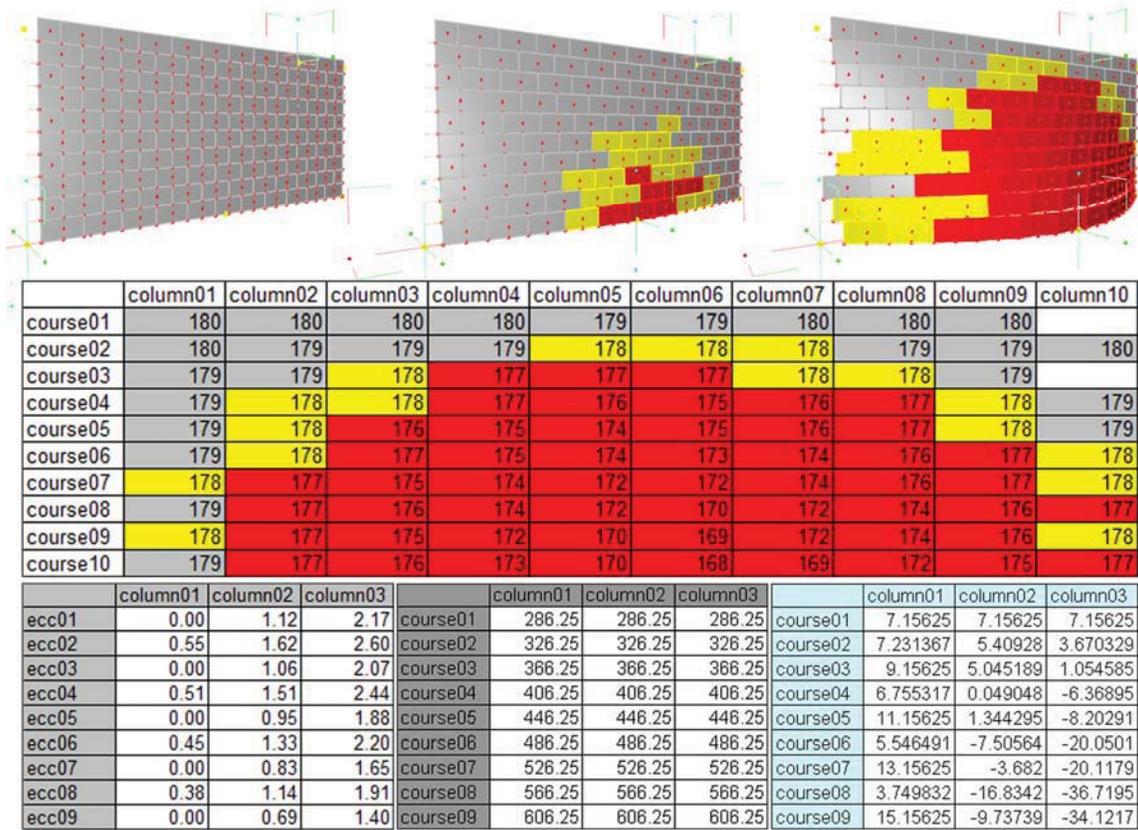


Figure 6. Example of feedback function to check angles between adjacent CMU blocks in a curving wall. Grey block means angle values above 179 degrees, so that no cut is necessary. Yellow means that flanges of flanged blocks have to be removed. Red means cuts beyond flanges. A spreadsheet version of angle values is automatically generated (top), as well as spreadsheets containing eccentricities between adjacent rows (bottom left) and automatic load and stresses calculations for vertical reinforcement.

## 4 STRUCTURAL FEEDBACK

### 4.1 Background

From a structural perspective, masonry is well-suited for horizontal curvature – witness Jefferson’s horizontally curved walls at the University of Virginia. To achieve horizontal curvature, each masonry unit can rotate in its coursework a moderate amount from the prior unit while still maintaining its horizontal coursing.

Vertical curvature is more difficult to achieve. The traditional method, and the one employed in this project, is through corbelling – that is, the offset of one block relative to the one below it by some limited amount, all while keeping the horizontal coursework flat and level. Tilted masonry coursework has been achieved by Brunelleschi and Dieste, and is a key component in masonry vaults, but generally only works with completely centered or self-stabilizing forms (Dieste, 1992). Another example of this type of masonry construction can be seen in the vaulted work of Rafael Guastavino Moreno as documented by John Ochsendorf of M.I.T. (<http://web.mit.edu/masonry/>).

### 4.2 Structural strategy

In our project, double curvature is achieved through a combination of rotating each block in plan and through corbelling in section. Structural strength and stability are achieved through a combination of vertical and horizontal reinforcement in the wall – conventional strategies in con-

crete masonry. These are made more complex in this project by the rotation of the units and by the sliding of units along the courses – and the subsequent gaps cause by the sliding.

The structural design algorithm is detailed in what follows. For more details see Parametric Design, Detailing, and Structural Analysis of Doubly-Curved Load-Bearing Block Walls (Gentry et al, 2009). As a first-order approach, the walls are treated as individual cantilevered wall segments. The wall is divided into to a set of vertical slices, at 16 inch increments (Figure 7). The vertical bending moments are calculated based on the self-weight of the wall, along with a 200 lb/foot uniform load applied at the top. The vertical reinforcement is sized based on the typical reinforced masonry wall assumption that the masonry takes all of the compressive stresses and that vertical steel reinforcement takes all of the tensile stresses. The 16 inch increment represents two cells in the block wall, the range of reinforcement required ranges from no vertical steel (for a completely vertical wall) to one number three bar (in one cell) to two number five bars (in both cells).

The transverse displacement at the top of the wall is also calculated for each segment, to allow for a determination of the relative deformation between segments. For a given segment, if adjacent segments show significant differential displacements, this indicates the need for horizontal joint reinforcement, to allow for sharing of bending forces between segments. In conventional walls, this horizontal tying would be achieved through the use of bond beams. Here, that is not possible due to the use of half-height masonry units and due to the sliding of blocks relative to one another in highly curved sections of the wall.

This iterative process uses the well-understood idealization of the way that masonry works in vertical and horizontal bending. The use of linear-elastic finite elements, while possible, does not lead to the direct determination of wall reinforcement. This embedded structural feedback allows the designer of the wall to have a real-time “check” of the structural requirements and validity of each design iteration.

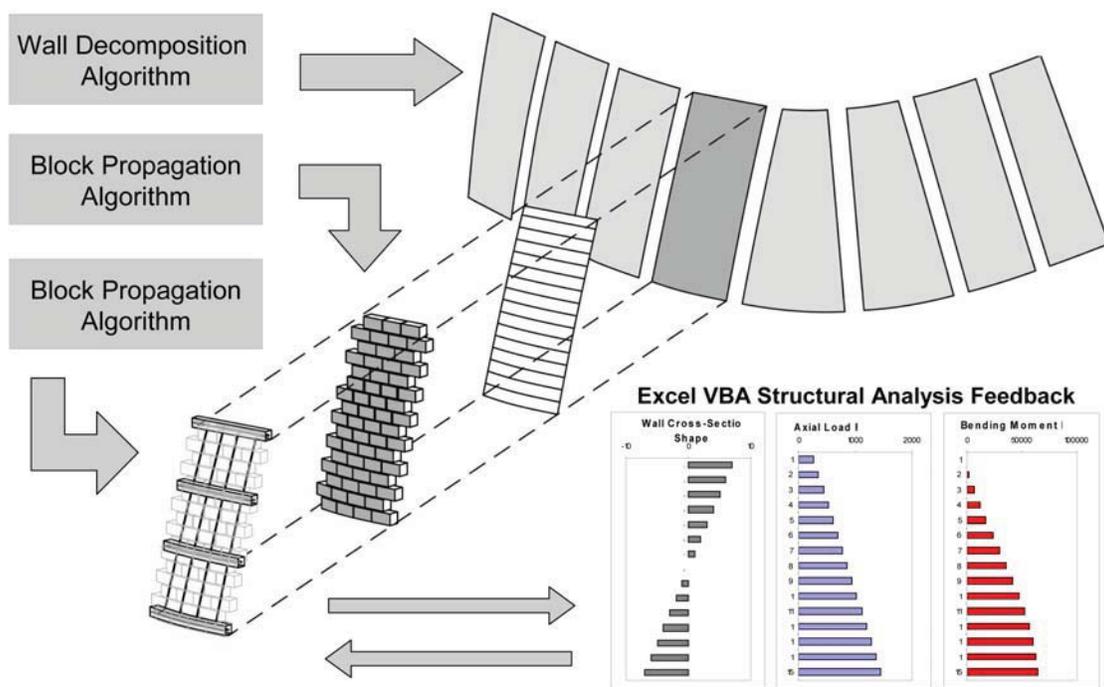


Figure 7. Top-down decomposition of a wall for simplified structural analysis. Feedback function checks cross section eccentricity of blocks and loads to verify allowable stresses and the recommends back values for positioning and diameter of steel rebar.

## 5 CONSTRUCTION

### 5.1 The digital mason's line

The use of robotic positioning systems in construction is well known, with the best examples coming from the automobile manufacturing sector. The robotic masonry work of Gramazio and Kohler, referenced above, along with others is both exciting and relevant, and it represents a vast terrain for future research. However, contemporary use of robotically placed load-bearing masonry assemblies for onsite construction has proven to be a difficult task for many logistical reasons at the scale of actual buildings. Additionally, our research has not shown the use of robotically placed reinforced masonry for onsite construction due to complexities of applying mortar and placing rebar inside grouted cells. For this reason, along with some of the larger conceptual goals of the DAM paradigm, our research is developing alternative construction protocols which can quickly and intuitively be integrated within current construction practices.

As an initial experiment into physical construction of the system we looked to one of the most fundamental masonry construction technologies, the mason's line. Using the mason's line as a low-tech analog to a digital vector we developed an anthropomorphically driven NC [Numeric Control] construction machine. An initial design sketch of the construction machine and staged process model of construction is illustrated below (Figure 8). The basic concept of NC technology is constructed around the idea of automated positioning and action [cutting, placing, joining, etc] in Cartesian coordinate space  $[X,Y,Z]$ . Our construction machine establishes a variable  $XY$  plane and  $XY$  coordinate through the intersection of these two primary axes. These planes then floats up and down along a tracking scaffold to determine the  $Z$  coordinate, or course height, of the block configuration. The  $XY$  coordinate for the centroid of each block and  $Z$ -Axis rotational vector are all queried from the BOB model and stored in a spreadsheet. The mason then uses the spreadsheet block positioning data along with the line intersections to place each block quickly and with a technique that is familiar. Therefore with the construction machine and data on the four degrees of freedom for each block  $[X,Y,Z,A$  ( $Z$ -axis rotation)] the mason is able to place each block within the overall wall configuration with sufficient accuracy, speed, and conventional hand tools. This familiarity of construction contributes to the overall DAM strategy to be more easily integrated into an industry where radical change is not always welcomed. In this way the construction machine becomes a hybrid system somewhere between conventional masonry construction methods and fully automated robotic block placement.

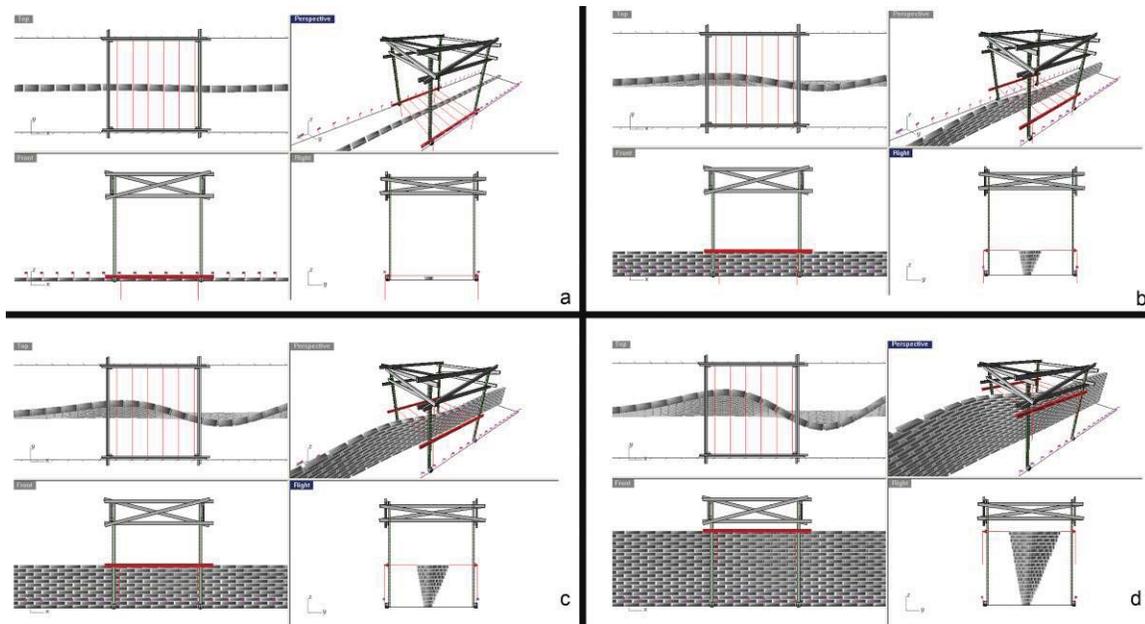


Figure 8. Construction machine for variable masonry assemblies seen in 4 stages from the first 'straight' course in  $X,Y,Z,A$  space to the top 'curvy' course  $X,Y,Z,A$  space.

## 6 CONCLUSION

### 6.1 *Future research*

Ultimately this research hopes to give architects, engineers, and constructors new tools and methodologies to expand the formal and compositional possibilities of existing construction systems in an intelligent and responsible way. The construction machine described above in Section 5 was an interesting and enlightening first pass at the question of physical construction however current and future research questions are focused on the use of digital positioning systems which could drive floating handheld block positioning devices. There are many existing market-ready technologies which could be adapted to work with DAM masonry systems. The intension is to ‘fit’ the block with a small light-weight device which will be a kind of visual homing mechanism for the mason to place each block and will be driven from coordinate data from the B.O.B. model. One could almost imagine the mason with an on-demand iPhone block positioning system.

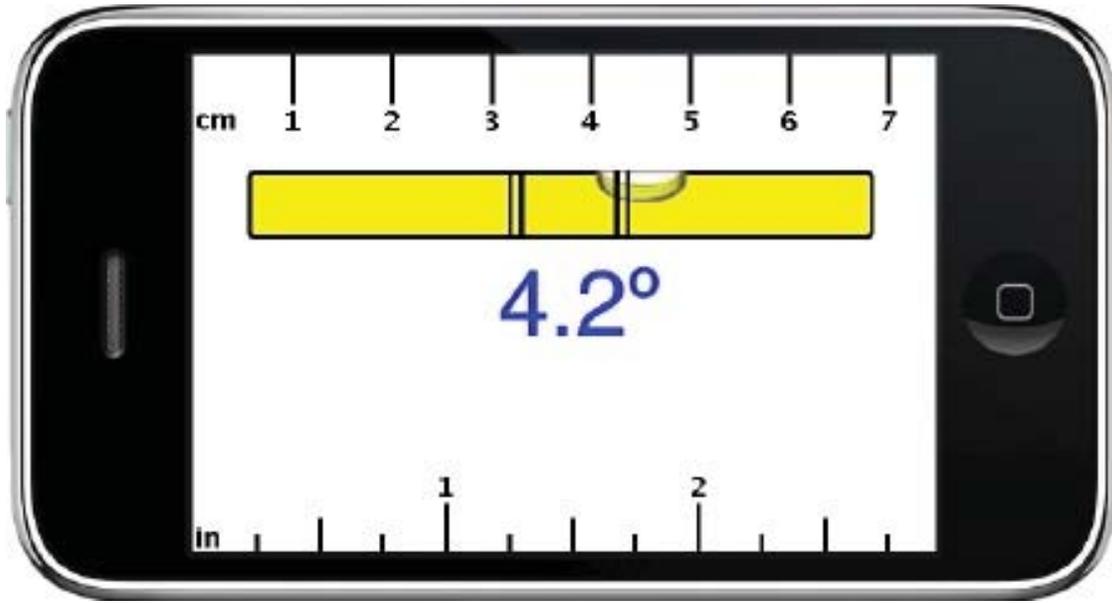


Figure 9. Accelerometer controlled freeware leveling application for Apple iPhone.

Additional future research will focus on the refinement of both the structural analysis method and the B.O.B. implementation in order to create a valid tool which all the players of the design and construction process can easily and intuitively understand and creatively use.

The gap between digital design representations and physical constructs continues to contract as new and novel methods for interrogating the relationship between existing construction industry conventions and new modes of practice continues to develop. Questions of how and where digital tools will fit into an industry as enormous and complex as that of the AEC world are only beginning to be formulated. The promise of fully automated, self constructed buildings may or may not come to fruition but in the meantime hybrid Digitally Augmented Making methods will fill the void of this possible future.

### 6.2 *Acknowledgement*

This research has been generously supported in part by the National Concrete Masonry Association’s Education and Research Foundation, Bentley Systems, and Block USA.

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# **The Transformation of Architecture: Design for Dis-assembly**

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of New Mexico**

**Chris Beorkrem- University  
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## **Abstract**

The research presented in this paper focuses on the performance of an architecture responding firstly and primarily to its ecology and available resources; this criteria will change how the design performs throughout its lifecycle. If we as architects intend to use technology to become true 21<sup>st</sup> century “master builders” we must understand that the term entails a very different set of parameters than it did 500 years ago. The responsibility for the generation of waste has returned to the architect. We propose that this responsibility translates into a design methodology. First, the primary criteria for construction, is the use of a process creating 0% waste. Second, the building must be able to adapt and change, to mature along with its occupants. Thirdly, as a product of the first two criteria, the building must have the ability to be disassembled in part or in whole to be re-assembled, re-used, or re-manufactured.

Performance-based architecture is defined by more than the simple building product. It is composed of a complex

set of systems, both technological and cultural, made of physical commodities and human effort. Ultimately, the Architect is responsible for coordinating this discourse; responsible from the point of conception to the destruction of the building. This responsibility includes not only how the building performs throughout its life- cycle, but equally how it performs during construction, through adaptive re-use and in its eventual demolition. We must consider every commodity consumed in the production of building products as a part of its design. The EPA reports 331 million tons<sup>1</sup> of construction and demolition waste and debris was generated in 2008. 60% of all landfill waste is a result of the building industry (not including waste from civil projects such as bridges, roads, subways, or rail systems.)

“We need buildings which fulfill their task today and will do so tomorrow, which in other words, do not age in adhering to their forms and this becomes a drag upon the economy as well as the visual environment. But in order to build adaptably we must try to build as lightly, as movably, as possible and with the greatest perfection technically available.” <sup>2</sup>

This paper is the product of a year long thesis project investigating an approach to assembly that will ultimately

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<sup>1</sup> EPA. *2008 Sector Performance Report*. Rep. 2009. Page 41 Electronic. <http://www.epa.gov/ispd/performance.html>

<sup>2</sup> “Larsen, Olga Popovic, and Andy Tyas. *Conceptual Structural Design Bridging the Gap Between Architects and Engineers*. Nashville: Thomas Telford, 2003. Print.

allow for a comprehensive consideration of design related to environmental and human health impacts over the life-cycle of a building. The paper will include a survey of historical and contemporary, available and imagined construction methods and processes. It will demonstrate proposals for a variety of new construction methods, which afford the flexibility to design for 0% waste. The work demonstrated will go beyond analysis and attempt to demonstrate methods for combining software and digital manufacturing processes to increase performance and assembly time.

*Design for Disassembly* is a new method, a re-prioritization of process that considers every day of a buildings life cycle with equal weight.

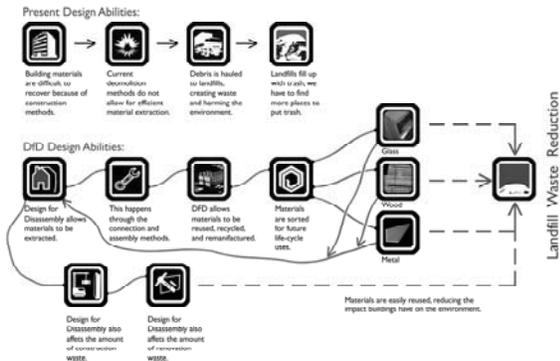
### **Moving Beyond Temporality**

Buildings are temporary. The responsibility of a generation of architects and engineers dealing with consumption and waste, on a scale unimagined, has begun to shift; the result of this epidemic will be a sea change in construction methods and material usage. It is difficult to determine what the future for any building may hold; to assess the length of time a building will stand, or how human behavior and occupant needs may change its program or define its use. What is apparent is the need for wholesale change, change in the way Architects think, change in the way materials are used and recovered, and change in how buildings are able to perform throughout their lifecycle.

The typical building is a set of predominately rigid pieces constructed in an immovable configuration. Buildings are simply not designed to accommodate change, however they occupy an entropic world, where circumstances

always change. Technology, culture, human behavior, and the environment affect the generational shift that happens over time. It is these shifting periods that have distanced the master builder (architect, builder, product engineer, materials scientist) from their trade. As technology and the environment continue to challenge and change what we know, it also provides opportunities to adapt the current methods of design, fabrication, construction and recovery of resources into new models. As time passes, so must conventional design practices, so must a static definition of Architecture.

In order to recover materials and resources we must take a backwards approach to design. *Design for Dis-assembly* is an idea front loaded with responsibility – although the architect may not typically be involved with a building's demolition, the responsibility of a building's afterlife is determined by the construction processes defined in plan and section. The architect is responsible for defining the method of demolition for the buildings they design; – a backhoe and wrecking ball or through dismantling. As designers we must consider how our decisions in the construction process result in a figural “death” and burial in a landfill, or through the process of disassembly, creating the possibility for an “after-life” for the components that once stood together as an assembly.



## The Responsibility of Architects and Architecture

As we return to the model of the master builder we must stand up and take responsibility for every aspect of a building. Every commodity consumed in the production of building must be considered as a part of a responsible design process. The EPA reports 331 million tons<sup>3</sup> of construction and demolition waste and debris was generated in 2008. 60% of all landfill waste is a result of the building industry (not including waste from civil projects such as bridges, roads, subways, or rail systems.) This reverse approach to assembly will ultimately allow for a comprehensive consideration of design related to environmental and human health impacts over the life-cycle of a building. We can work to reduce the impacts of typical consumption and landfill processes, but these will have only a minor impact. Similar to the shifts in the automobile industry to hybrids, they provide shifts to more

<sup>3</sup> EPA. 2008 Sector Performance Report. Rep. 2009. Page 41 Electronic. <http://www.epa.gov/ispd/performance.html>

sustainable methods while still operating within the typical carbon-based energy production.

Design for Disassembly, is the only real method of optimization. By considering holistic changes to assembly, componentry, and systems design and establishing a culture of re-usable building components and materials. Design for Disassembly is a method of design that supports future change, it allows buildings to transform and adapt as society and patrons need it to. This method of design simply provides the ability to recover, reuse, rebuild and reconfigure materials.

This backwards view, from end game to construction, will ultimately allow for a comprehensive consideration of design related to environmental and human health impacts over the life cycle of a building. Design for Disassembly, is the method of optimization through; assembly, component connections, and systematic design. Design for Disassembly supports future change; it accommodates people, place and the environment. This method of design simply provides the ability to recover, reuse, rebuild and transform materials and configurations of buildings. This methodology is not a different form of architecture, but a new articulation in the design and construction process.

The list of processes and customs, which must change starts with our expectations for construction processes and personnel. We have long relied on processes tied to a craftsman based assembly process, where a craftsman learns through thousands of hours of apprenticeship. We need to move away from this resource intense process to one of *assembly*. "Assembly differs from construction in that it requires very little skill; it does not rely on information

passed on through experience or development through apprenticeship. Assembly comes from a hierarchical understanding of groups of assemblies that all connect through series of steps.”<sup>4</sup> Assembly allows for rapid production through a specific set of smaller sets of assemblies and connections. By removing the necessity for the craftsman, the architect is again responsible for the precision and quality of their work. Not only does this responsibility free the designer from many of the intense hours of construction administration but it also gives us the sense that we are able to and are responsible for the craft and quality of the construction, something we should all desire.

### **Digital Building Equals Real Building**

These changes are made possible through digital processes in construction and design, because buildings can be explored and built digitally with extreme precision; the designer can work out sets of assemblies and actually simulate the assembly process prior to anything being physically built. The relationship between parametric – building information modeling and an investigation into the opportunity that lie within design for disassembly will inform designers through a set of constraints and conditions derived through an awareness of the environment. Through the simultaneous investigation of connection, assembly, BIM, and product lifecycle, and exploration through analysis will evolve developing a systematic method for

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<sup>4</sup> Kieran, Stephen, and James Timberlake. Refabricating Architecture. New York: McGraw-Hill Professional, 2003.

assessing levels of prefabrication as well as the necessary level of design for disassembly. These studies will provide, through fabrication, diagrammatic analysis, and parametric systems, a change that will prompt a further investigation of the possibilities and revolution of architecture.

Simulative modeling cannot be comprised of lines that represent parts; it however must be crafted by elements and assemblies of parts. Simulation modeling creates the opportunity for architects to develop a case-by-case kit of parts. Through a simulative model, an architect can choose which components could be pre-assembled, and which should be assembled on site. Manufacturers of materials are also able to produce their parts parametrically with limitations set by the manufacturer. Through parametric modeling, all the information is grounded to one place, one set of systems and are all in unison. All the documents provide the information from the same reference point, creating a system that cannot contradict itself.

### **The Financial Shift**

The architect, and the client, should consider a building as a financier views an investment. A building becomes a vault, a place to deposit their materials and resources. The materials deposited in that location are safe forever, and could stay, make changes or be withdrawn and replaced. Materials stored in a building increase in value as limited worldwide resources decrease and demand increases. Just as demand for the land that a building sits on can increase, so should the value of the materials. As technology continues to expand, a building designed for disassembly will be able to regenerate, renew and update itself through the disassembly and reassembly of particular

components. Designing for assembly through the careful consideration for disassembly will make it possible to extract materials when necessary.

The motivation for change has to come from clients, though we as designers must be educators in this sense. Clients have the only financial links to the endgame of the products, which go into a building. As the proportion of property value shifts from primarily land to primarily material this motivation will become more apparent to clients. We must educate clients to consider the materiality of their projects as an investment with a significant return, just as any other commodity based investment would be a part of their portfolio.

We do not propose that we recreate the conventional material palette for designers (though this undoubtedly could assist in minimizing our effect on the environment). The intention is to use standard architectural materials in new assemblies and processes to create components that can be assembled, disassembled, and reassembled in multiple ways. It is the methods of connection that must be re-designed to accommodate standard architectural materials.

We propose that we don't simply think of a single moment of disassembly but that we consider the reality is that most structures need to change and adapt to new and alternative needs and programs. We suggest that we construct using systems, which provide the opportunity for a building to be dismantled (in part or whole) both during and at the end of its lifecycle. Although it can be difficult to anticipate change; change in a city or a building, we can accommodate these changes by providing buildings the

ability to quickly adapt. To the client, a building that can perform for them throughout not their life, but instead the life of the building will be more beneficial to them. Through analysis and discussion with the client and patrons of a project it will be possible to assess the life span of each part of a project. Through this analysis designers will be able to use various levels of flexibility in different pieces of a project. It is yet another responsibility of the architect to determine on a case by case basis, what level of disassembly is necessary, whether it be; entire building : interior : structure : façade : or other specific entity.

## **Industry Precedent**

Because there are few examples of these processes in our own industry we must look elsewhere for models of efficiency through assembly. In the early 90's the automotive industry had a similar crisis of quality, construction, and productivity. The solution revolutionized, quality control and speed of production in the automotive industry. Car manufacturers design multiple vehicles on their lines to have interchangeable parts in order to produce fewer parts compatible with more vehicle types. BMW car parts either come from recycled products or the part is able to be recycled back into the pool of useable material. The industry historically produced and assembled each of the approximately 4,000 plus parts in one elongated process. They learned that spreading the assembly process out to approximately fifteen assemblies could create a shorter assembly sequence. By having each larger component arrive at the plant pre-assembled by a separate manufacturer quality control occurs prior to the final assembly, increasing production, innovation and

design. Ultimately this revitalization and redesign lowered cost and improved overall quality.

We not only look at the automotive industry, but even at products already used on or in our own buildings. A product referred to as Kee- Klamp, is used on buildings across the world as railings, fall protection, scaffolding and other safety devices. This system uses galvanized pipe to create a wide range of applications. It is not the pipe that is interesting, but the method in which the company has designed and offered over 90 different connectors and fittings. These connectors simply slide on, and tighten to the pipe, allowing the Kee- Klamp system to be configured, and re-configured an infinite number of times. It is necessary to take away from this system, the process of assembly. Because everything must slide on to the pipes at one time it takes more thought in preparation and design so that the designer is sure to have all the connectors not only on the pipe but also in the correct order. So we learn from this system, that a system for architecture may also need to carefully think about its own order of operations.

Much like the vehicle industry, building components could be pre-assembled. What if you could buy wall sections at home depot? Instead of building the typical eight by eight by ten wall system, stick by stick a builder could simply have them delivered to the site in unitized components already assembled and ready for implementation. This idea of pre-assembly versus site assembly is not an entirely new concept, we use this same inherent idea when we use Simpson Ties to pre-build roof trusses, or to lay plywood decking with clips. The amount of research and effort that has gone in to these several hundred connectors is quite amazing, and if we take those same ideas, we learn from

them, and we expand upon them, we will be able to create a system capable of dis-assembly, adaptation and change. We already know how to do this in architecture, we simply have not taken it to the next level where we could drastically change the amount of time it takes to erect a building. The prefabrication of components will not only reduce time, but will also reduce environmental waste both on the jobsite and in fuel costs related to the delivery of individual materials.

“The question for all engaged in design and construction is whether we have the desire, insight, and resourcefulness to seize the challenge that the current crisis affords.” - Stephen Kieran<sup>5</sup>

## A New Era

Changing the way we look at buildings, and the way in which materials are put in them will provide a more flexible, adaptive infrastructure establishing a new era in reusable architecture. This will result in buildings with an endless lifecycle. Although we as architects may come and go, our decisions while we are here can have lasting impacts, on industry, change, economics, and the environment. Many buildings have and will live for thousands of years others have and will be repurposed as other buildings (roman

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<sup>5</sup> Kieran, Stephen, and James Timberlake. Refabricating Architecture. New York: McGraw-Hill Professional, 2003.

spolio), and some will be recycled as raw materials. This last option, represents the most flexible and realistic method for diminishing the amount of waste we as designers produce over our careers.

The components used in a design for disassembly process are a symbiotic parasite. They need a host to survive. They have the capability of splitting off from their original host and counterparts in order to take part in multiple projects. Components and materials maybe able to evolve and have an elongated lifeline similar to a person. Materials would be born (milled or manufactured), they would live with their parents (their original building), they could have the potential to move out (renovations), those materials could then find their way in to a new home (a component in a new project), and finally they could be reincarnated (melted down, recycled, remanufactured). However, the difference in a material life cycle and a person is not only the length between events, but also what happens to a material after death. Once a material has “died”, and is no longer usable, it can again have a new life.

The recovery of materials by design for disassembly is intended to maximize economic value and minimize environmental impacts through reuse, repair, remanufacture and recycling. Additionally, we propose to use easily recycled materials, particular strategies for construction can eliminate adhesives and coatings, rendering more products, which can more easily be recycled. For example, wood materials can be turned into mulch or used in new composite materials, and metals can be reprocessed and manufactured in to new building components. Materials broken down to their atomic state can theoretically be reused ad infinitum through re-use or

remanufacturing. We can reduce the number of materials, which makes transportation to and from a construction site more efficient. Employing reversible fasteners, screws and bolts as opposed to nails, and using finished parts to ensure their durability and ability to be easily dismantled.

The recyclable building will be able to be assembled, and disassembled in ways allowing materials to be re-assembled, re-used, or repurposed. The recyclable building is imperative to re-establishing a continued existence for our resources and materials. A building that can be disassembled and reused will be instrumental in sustainable architecture and design. The recyclable building will not only change the way we think about materials and resources, but will also create an entire industry built around recycling, sorting, and designing using this theory. Two things are necessary in order to create a constant cycle of reusable materials: re-think the method in which buildings are assembled, and disassemble instead of demolish. The marriage of these two concepts will sustain the building industry and will ultimately take control of the amount of materials that are used and wasted.

Some components will be difficult to recover. It is a given that some material qualities may not be intact and at a certain point some materials do in fact become waste. This is unavoidable. However, there is a large percentage of waste to be collected, calculated and re-used or recycled. This is the target market, the items that can and should be used in a more intelligent manner. Although designers will always be challenging the ways materials are used and their lifecycles it is necessary to focus the concern on the largest and typically most important system: the structure. The structure of a building becomes the most important

part for such a system of disassembly and will lead to future development of additional disassemble-able configurations. A structural system designed for disassembly; through the method of assembly; with the lifecycle of the materials as a consideration will be changeable, adaptable and updatable beyond our lifespan. The structural components are the pieces of each structure with the most mass and density, capable of carrying larger loads, and maintaining their consistency over long periods of time. Other materials that are currently completely waste material will also need to be assessed for their value to the project and the planet. For example; drywall, there is virtually no second use for it. Once it is removed it has no chance for recovery or re-application. To address this and other such materials we, as design professionals need to begin to alter application methods, material content, and removal strategies.

The understanding of these theoretical solutions can only come from the direct implementation through a design problem and strategy. Exploring existing systematic structural solutions with disassemble-able properties proposes an intervention in the way buildings are assembled, used, changed, and adapted. We found a series of potential off-the-shelf systems, with particular connection typologies such as; Kee- Klamp®, Simpson Ties®, and Rexroth Bosch Group® provide the flexibility not only in assemblage, but also in design to formulate a systematic configuration of adaptable, changeable, updateable structure. In the exploration of all three systems one particular type of joint appeared as a figural piece. A type of u-joint, similar to that on a car was available in all three structural systems. A universal joint may be an

integral part of these systems; it alone, is flexible, changeable and reusable in a number of configurations. These systems would allow a designer, builder or owner to change their building as their needs changed. If their office were expanding, they could purchase additional units to plug-in to their existing frame system, likewise in a downturn the same could be accomplished by selling off components no longer needed.

Architects have been exploring the idea of pre-fabrication, module construction, and a kit of parts approach since the 1950's, however we are finally at a point where technology is advanced enough to support our endeavor. Kieren Timberlake is among the few who have explored this in recent years, and have been successful as a result of technology. Kieren Timberlake did something that we as architects have done for centuries; they saw a product being used in another industry, and experimented with it. Using Rexroth's Bosch extruded aluminum material they first designed and built the Loblolly House; a house mixed of pre-fabrication, on site building, and parts designed to easily go together or come apart. The first issue that arises as a result of this project is the foundation, the piles driven in to the ground is not a precision process, which is contrary to a system that is capable of dis-assembling. Their frame system of disassemble-able aluminum does very little for this project as a whole, it is simply there to slide in the pre-fabricated "units" or "cubes". These cubes are typical of the building industry, constructed of wood and nail, simply in a factory instead of on site. Except for the frame in which these rooms plugged in to this house became another immovable structure, it is the frame itself that is interesting as a disassembly system. The logic

imbedded in Bosch's frame is quite beautiful, the "T" bolt system allows anyone to easily put it together or take it apart. The largest problem with it is that it was not intended to be used in an architectural application. This resulted in the custom design of connective brackets and shear rods. These brackets that actually allow the house to be structural defy the logic of this "T" bolt system. These brackets require holes to be pierced in the aluminum, creating a problematic response for anyone attempting to re-use these parts when the building is dis-assembled. The adaptation of the frame is truly contrary to what a system like this wants to be. The system wants to be pure.

The loblolly house lead Kieren Timberlake to build the Cellophane house; an installation and experimentation at the MoMA: *Home Delivery* exhibition. This house is more successful in its use of the Bosch material as structure and frame, it does not use plug in style wood cubes to define the spaces inside. This system did become more pure, it progressed. Although it progressed and we can learn from this, it still struggles with real issues like insulation, material usage, most important



the envelope of the building. The truly unique thing that this building did and is able to do is that it was assembled very quickly, and at the end of the

exhibit, or the end of its life, it was taken apart, loaded in a semi trailer, and has the ability to be re-assembled on another site. We learn two important facts; the first is that other industries are far ahead of architecture in their simple logic of construction objects, and the second is that instead of adapting a system to architecture. Architecture must adapt and create its own system.

We can truly begin to control the entire process of both on-site and in factory assembly sequencing by borrowing another type of technology. By using data matrix bar coding we can label or tag every part and piece in our buildings. These data matrix allow each construction crewmember to scan them and access immediately not only the drawing for that item, but also where it is located, what it connects to and when it gets erected. Data Matrix bar codes are an arranged set of nodules arranged inside of a perimeter locator pattern. The data matrix can encode up to 3,116 . The bar codes consist of a hierarchical set of conditions; data regions, which surround nodules, set out in a regular array. Large bar codes can contain several regions. Each set of regional data is delineated by a finder pattern, and this is surrounded on all sides by a blank border. These bar codes are full of several sets of information. This information could be embedded in each piece of material on the job. Instead of retrieving a set of plans and locating each piece it is done very simply through the data matrix code and scanner. This will ultimately allow the assembly of a building to eliminate the time it takes to look at a set of plans and explain where parts and pieces go next. Everything can be controlled down to the sequence of assembly, and the process of documentation.

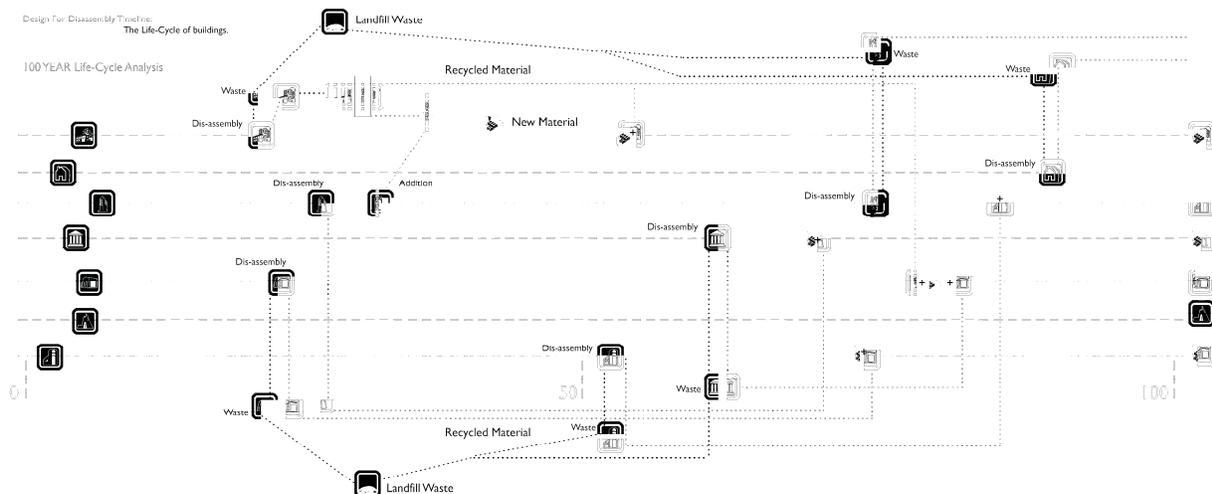
The building and design industry is not capable of changing and adopting this theoretical appliqué overnight. It will be a slow transition over time through the avenue of technology.

## Conclusion

Without a drastic change in the way architecture addresses waste we will ultimately drive our own obsolescence as a profession and as a society. In our lifetimes we will see materials become more scarce and inevitable dramatic price increases. A *Design for Dis-assembly* approach will not only sustain our environmental impact but also the economics tied to material waste. As the profession begins to adapt the way we think, we become responsible. As the profession as a whole becomes more responsible we will see building codes, design guidelines, and LEED organizations not only begin to support the movement, but to make efforts to guide this movement. The effort for this transformation will not just come from the architecture profession, but it will be a result of the entire industry, from building inspectors, to material and product manufacturers who must all be a part of this change. The key to the successful integration is architects, designers, educators and the profession of architecture must become the leader in this movement. It is now clear that we must be the instigators of this change.

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# LOW ENERGY DWELLING IN COLD CONIFER-FORESTED MICROCLIMATES: A THERMAL EFFICIENCY CASE STUDY

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**ABSTRACT:** A proposed carbon neutral dwelling in a cold region, alpine-forested microclimate is analyzed using a building energy analysis program and is redesigned to improve energy efficiency. The Passive House standard is used as a design guideline and a Passive House certified dwelling is used as a case study for comparison. By increasing thermal performance parameters of the proposed dwelling, energy costs are reduced by 67%. Achieving carbon neutrality in terms of building operation is now attainable.

## 1.0 INTRODUCTION

With the initiation of the 2030 Challenge and the increasing threat of environmental instability due to CO<sub>2</sub> emissions, in large part as a byproduct of the building sector, it is imperative that engineers and architects work together to increase knowledge and awareness of design practices and principles that reduce building energy use and continue to advance technologies that aid in a reduction of the burning of fossil fuels.

This research analyzes thermal efficiency strategies for a low energy dwelling in a cold region alpine-forested microclimate through a case study comparison of energy reduction methods and their resultant effect on a building's energy use. Specific strategies for building envelope thermal efficiency and passive heating will be explored in an effort to minimize energy consumption associated with thermal comfort of the proposed structure.

### 1.1 HYPOTHESIS

Proven passive design strategies are not sufficient in predominately cold alpine-forested microclimates. Designing for passive solar heating in these climates can actually degrade the building's performance as a result of low solar insolation and high thermal losses through the window glazing. Therefore, buildings in cold climates must rely on extensive insulation and minimal sources of heat loss. Windows on southern walls must include movable

insulation to cover apertures when there is no sunshine, while windows on non-southern walls must be minimized to avoid heat loss.

## 2.0 PROJECT BACKGROUND

In 2006, an interdisciplinary group of faculty and students from the University of Idaho began designing a carbon neutral campus at one of the university's field sites in McCall, Idaho. This campus houses the McCall Outdoor Science School (MOSS) and Environmental Learning Center. The goal is to redesign and rebuild the campus with the vision of the 2030 Challenge as a primary guide and motivation.

This research is a comparison between the first building designed for the McCall campus, a dwelling that will house up to 18 people, and the Waldsee BioHaus in Bemidji, Minnesota, the first passive house example in the United States. A preliminary study of the BioHaus and other passive house precedents indicates a reduction in energy use unlike any previous U.S. examples (Klingenberg, Kernagis, & James, 2008).

The two projects are analyzed for microclimate, site orientation, material selection, energy efficiency, and heating strategies. The BioHaus model's anticipated versus actual energy performance is a primary aspect of the inquiry. The BioHaus model and MOSS model are

analyzed using energy modeling simulation software to establish benchmark performance levels and goals.

### **3.0 MOSS BUNKHOUSE CURRENT DESIGN**

The MOSS bunkhouse is currently designed with straw bale walls and a SIP roof. The straw bale design was chosen for sustainability reasons. The straw is locally available and the building material is grown, not manufactured. This design has a wall R-value of R-30 and a roof R-value of R 45. The roof R-value could be increased by doubling the SIPs or by adding additional insulation within the ceiling space. Window area was maximized on the southern façade to maximize solar gain for winter heating. The windows on all other walls were optimized to reduce thermal loss while maintaining ample natural day lighting. A heat recovery ventilator (HRV) was intended, but not modeled due to software limitations. Space heating is accomplished by a biomass burner feeding a radiant floor heating system.

### **4.0 CASE STUDY SELECTION: WALDSEE BIOHAUS**

The Waldsee BioHaus in Bemidji, Minnesota is the first certified Passive House in the United States. The BioHaus, designed by architect Stephan Tanner, was completed in 2006. The BioHaus is home to the German Language Village of the Concordia Language Villages, and serves as an educational and environmental learning center (Klingenberg, Kernagis, & James, 2008). The energy performance achievements of the Waldsee BioHaus and the similarity of climate between Bemidji, Minnesota and McCall, Idaho drove the decision to utilize the BioHaus as a benchmark for design consideration and for comparative analyses.

#### **4.1 Waldsee BioHuas Building Envelope**

The BioHaus measures 54' x 51' and has an interior floor space of nearly 5000 square feet. The BioHaus is constructed of highly insulated wall and roof panels, and a well insulated concrete slab to combat the extreme winters (Klingenberg, Kernagis, & James, 2008).

Below grade exterior walls are constructed of insulated concrete blocks and an exterior insulation and finish system (EIFS), and finished internally with gypsum board

for a combined R-value of 55 (Klingenberg, Kernagis, & James, 2008).

First floor above grade exterior walls are constructed of 2" x 12" wood studs and water based Icynene spray foam insulation. The interior is finished with gypsum board and the exterior with Oriented Strand Board (OSB) and an 8" EIFS. The cumulative R-value is 70 (Klingenberg, Kernagis, & James, 2008).

Second story above grade exterior walls are constructed of 2" x 6" wood studs with water based Icynene spray foam insulation and exterior 2" Vacuum Insulated Panels (VIPs), which alone achieve an R-value of R-25.159 per inch. The interior is finished with gypsum board. This assembly has a combined R-value of 70 (Klingenberg, Kernagis, & James, 2008).

The lower roof over the apartment area is constructed of 12" TJIs insulated with water based Icynene spray foam insulation. This is then topped with a 2" VIP encapsulated between 2" rigid foam above and below for protection and to minimize thermal bridging. This assembly gives an R-value of 100 (Klingenberg, Kernagis, & James, 2008).

The upper roof assembly is constructed of 12" TJIs and 8" sleeper trusses with plywood sheathing on the exterior and gypsum board on the interior. 20" of water based Icynene spray foam insulation provides an R-value of 100 (Klingenberg, Kernagis, & James, 2008).

The 4" concrete slab is insulated with 14" of rigid foam for a system R-value of 55 (Klingenberg, Kernagis, & James, 2008).

#### **4.2 Waldsee BioHaus Windows**

Windows for the BioHaus are German sourced Müller Fensterbau Optiwin-brand 3 Passivhaus certified windows. These argon filled triple pane windows have wood frames and cork insulation and an R-value of 8. The ratio of glazing areas to above ground wall areas for south, north, west, and east walls is 48.9%, 16.5%, 26.4%, and 19.1% respectively. The south windows have operable external solar blinds to protect from undesirable summer heating (Klingenberg, Kernagis, & James, 2008).

#### **4.3 Waldsee BioHaus Ventilation and Heating**

To maintain high indoor air quality with minimal heat loss, the BioHaus receives fresh air year round through a 330' antimicrobial earth tube buried 8' to 9' below grade. The earth tube adds or removes heat from the incoming air by means of conduction to or from the roughly 55 degree Fahrenheit temperatures below ground. This pre conditioned air is further conditioned through a 85% efficient heat recovery ventilator manufactured by Lüfta. The combined system can warm cold winter -32 degree Fahrenheit air to 58 degree Fahrenheit before entering the building. This lessens the demand for a conventional heating system normally employed in this climate. Heating is provided through a ground source heat pump and passive-solar gain (Klingenberg, Kernagis, & James, 2008).

## **5.0 PASSIVE HOUSE, A HIGHER STANDARD**

### **5.1 Passive House Background**

A passive house refers to a well-insulated air-tight house with minimal thermal bridging, insulated glazing, and system energy recovery ventilation. The passive house became popular in the predominately cold Central European climate, where they could replace conventional heating systems with small electrical resistance heaters. These houses retained the heat from internal sources, such as people, lights and electrical appliances, as well as solar radiant heat through glazing. Heat recovery ventilators ensure high indoor air quality while recovering the heat otherwise lost through natural ventilation and exhaust fans. Early prototype homes in Germany could be heated with less than 0.9 watts/ft<sup>2</sup> of floor space. These figures represent a 90% reduction in energy consumption compared to a conventional home (Klingenberg, Kernagis, & James, 2008).

### **5.2 Passive House Standards**

The Passive House standards were devised and perfected by Dr. Heist, a German Physicist and professor at the University of Innsbruck, Austria. Dr. Heist received research grants to develop the Passive House Planning Program (PHPP), a very thorough computer simulated energy analysis software. In 1996, Dr. Heist founded the Passivhaus Institute (PHI) in Darmstadt, Germany. The Passive House Standard is the strictest energy performance standard in Europe (Klingenberg, Kernagis, & James, 2008).

### **5.3 Passive House Certification**

As of this writing, any Passive House certified building must use no more than 1.35 kWh/ft<sup>2</sup> (4.8 kBtu/ft<sup>2</sup>) for heating and no more than 1.35 kWh/ft<sup>2</sup> (4.8 kBtu/ft<sup>2</sup>) for cooling. Primary energy consumption for space conditioning, hot water, and electricity must not exceed 10.8 kWh/ft<sup>2</sup> (4.8 kBtu/ft<sup>2</sup>). Passive House certification requires modeling with PHPP. After construction, they must pass a blower door test, and they must be monitored using installed devices. The blower door test must demonstrate an air-tightness of less than or equal to 0.6 Air Changes per Hour at 50 Pascals (0.6 ACH@ 50Pa) (Klingenberg, Kernagis, & James, 2008).

### **5.4 Passive House for Extreme Climates**

Revised passive house standards are under consideration for northern Europe's harshest climates, such as Sweden and Denmark, where the strict energy performance requirements are deemed impractical (Nieminen, Holopainen, & Lylykangas, 2008).

### **5.5 Passive House in the United States**

The Passive House standard found its way to the United States after architect Katrin Klingenberg visited Europe touring Passive Houses. Klingenberg designed the first Passive House in the United States. This house uses 1 kWh/ft<sup>2</sup>/year for heating, although it was never officially certified (Klingenberg, Kernagis, & James, 2008). Klingenberg founded the nonprofit Ecological Construction Laboratory (e-co lab) in 2004. The Passive House Institute United States (PHIUS) was founded by Katrin Klingenberg and house builder Mike Kernagis in 2007. (Klingenberg, Kernagis, & James, 2008).

## **6.0 CLIMATE ANALYSIS**

Building energy simulation programs rely on user input climate information to model building energy performance. Climate attributes considered are: dry bulb temperature, relative humidity, direct solar radiation, diffuse horizontal solar radiation, wind speed (not essential but preferable), wind direction (not essential but preferable), cloudiness, and rainfall (not essential but preferable) (Autodesk, 2008).

### **6.1 Climate File Selection**

The US Department of Energy has climate files with the necessary attributes available for several locations in and

around Idaho, but not for McCall Idaho. To select a suitable substitute for the modeling program, climates of other sites in and around Idaho were compared to the climate of McCall using climate charts from the National Climate Data Center (NCDC). The NCDC has information for most cities across the US including McCall. The charts and data for McCall were compared to charts and data for Idaho cities that have climate files available from the US Department of Energy. The climate of Soda Springs-Tigert AP most closely resembles the climate of McCall. The Soda Springs-Tigert climate file was utilized for all analyses of the MOSS model. (NCDC)

## **6.2 Solar Radiation**

Passive design often relies on solar radiation for direct gain heating during heating months. Adjacent buildings and trees that obstruct the line of sight from the sun can reduce or eliminate the solar radiation that reaches the building. Building obstructions are easily identified and designers can and should plan accordingly. Predicting the amount of reduction of available solar radiation where trees are present can be challenging. Several research articles are available regarding the effects of tree shading in warm climates and at latitudes less than 40 degrees. An exhaustive search revealed no research conducted on the effects of tree shading in cold climates and at latitudes above 40 degrees.

The amount of solar radiation that reaches the building is dependent on tree canopy transmissivity. Tree canopy transmissivity is defined as the dimensionless ratio of solar radiation transmitted through the canopy to that incident upon it (Hardy, 2004). Canopy transmittance is a function of solar zenith angle and azimuth angle, canopy structure, tree height, and leaf area index (Hardy, 2004). Canopy transmittance ( $\tau_c$ ) is a measurement of incident solar radiation (Link, 2004).

Shading coefficients for 'leaf-on' trees range from 0.5 to 0.9 (Simpson, 1068). This translates to a 50% to 90% reduction in available solar energy for solar heating, or stated otherwise, only 10% to 50% of solar energy reaches the home.

To accurately model the thermal effects of a coniferous forest canopy, it is necessary to consider the angular and spectral distribution of the incoming solar radiation, and the effects of long wave thermal radiation given off by the trees

(Link, 2004). The referenced literature measured solar and thermal radiation under canopies in boreal coniferous forests in Saskatchewan, Canada. This forest consists of mature boreal jack pines with a canopy height of 17 meters (56 feet). The angle of incoming solar radiation was 19.1°. The incoming solar radiation was measured between 6-10 February 1994. The results indicate incoming solar at 15% of above canopy radiation, and the long wave thermal radiation from the trees was non distinguishable. Seasonal variations in the canopy structure are relatively small in conifer canopies; therefore, canopy characteristics were assumed to remain constant over time (Link, 2004).

## **6.3 Field Measurements of solar radiation**

Field measurements of solar radiation validate the findings of previous research were applicable in this scenario. Canopy transmittance measurements were taken at the McCall building site on October 13, 2008. Measurements were taken every thirty minutes between 9:00 am and 4:30 pm at the specific building site and at an unobstructed area adjacent to the building site. Sky conditions on this day were clear with exception of cloudy to partly cloudy skies between 10:00 am and 11:00 am. Measurements were taken using a Li-Cor PAR sensor. The Li-Cor PAR sensor measures irradiance in micromoles. The average canopy transmittance including the cloudy hours was 26.12%, while transmittance under clear skies (excluding the data points at 10:00 am and 11:00 am) was 24.25%. Light measurements were taken simultaneously with the solar radiation measurements. These measurements were taken using a Pasco LUX meter. The Pasco LUX meter measures irradiance in lux (lumens/square meter). The average ratio of lux at the building site ( $lx$ ) to lux in an open area ( $lx_o$ ) throughout the measurement period was 19.17% ( $lx/lx_o$ ).

The ponderosa pine trees at the MOSS model site are estimated to have a height in excess of 30 meters (100 feet). The additional height of the ponderosa pine canopy will further reduce incoming solar radiation.

## **6.4 Climate file modification for solar radiation**

Once a suitable climate model for the MOSS model was identified, that climate model was modified to account for the reduced solar potential associated with decreased tree canopy transmissivity given a dense coniferous tree canopy.

Building energy analysis computer programs do not yet have the ability to account for this partial reduction in solar radiation potential caused by decreased canopy transmissivity. Therefore, the climate data used in the analysis program required modification to account for this reduction. The climate model contains two data fields of solar radiation data: direct solar radiation and diffuse solar radiation. This research assumes an equal reduction in both direct and indirect solar radiation. It stands to reason that, if diffuse solar radiation under the canopy was not reduced by approximately the same factor as direct solar radiation under the canopy, the LUX ratio would not be similar to the canopy transmittance ratio. The direct and diffuse solar radiation values in the historical climate data were reduced to 20% of measured data to account for reduced canopy transmittance. Energy Analysis was performed using the original and modified climate files for comparison.

## **7.0 MOSS REDESIGN: PASSIVE HOUSE**

Initial modeling suggests that increasing the insulation value (R-value) of the MOSS building will yield the greatest savings in heating requirements and energy consumption. The straw bale and stucco wall construction was abandoned in favor of higher R-value 12" SIPs walls finished with exterior concrete siding and gypsum board on the interior. With an R-value of nearly 5 per inch, compared to the straw bale R-value of 1.36 per inch, the wall assemblies could be reduced from 22 inches to 14 inches while increasing R-value from R-30 to R-60. The roof R-value was also increased to R-100 by combining a 12" SIP panel with 10" blown in cellulose fiber insulation between rafters. The ceiling is finished in gypsum board for fire prevention. The original 4" concrete slab is maintained for its thermal mass value. The in-slab radiant floor heating is maintained, although now fired through a ground sources heat pump as in the case of the Waldsee BioHaus. An 85% HRV is also specified. The current HEED energy analysis modeling software is unable to account for the HRV energy savings at this time, although a new version may be available prior to the ARCC conference where the final findings of this research will be presented.

## **8.0 ENERGY PERFORMANCE MODELING**

Models of the Waldsee BioHaus and The McCall Bunkhouse were created and analyzed using HEED (Home Energy Efficient Design) software.

Initial modeling results indicate a direct correlation between heating requirements and building thermal conductivity (U-value), where halving the U-value halved the heating energy consumption. As in any conductive circuit, energy consumption is in direct relationship to energy transfer through circuit components. In the case of buildings, the U-value is comprised of thermal transfer through the envelope and outside air exchange. To minimize heat loss and gain, the U-value must be minimized.

### ***8.1 Modeling for reduced solar gain***

The building models were analyzed using both unaltered climate data and the climate data altered to account for reduced solar radiation caused by reduced tree canopy transmissivity. These analyses predict an increase in energy costs associated with heating and lighting the building. The building is naturally cooled in the summer and the analysis does reflect higher internal temperatures in the summer due to the increased solar radiation associated with tree removal. This would be a factor to consider in warmer locations where internal temperatures exceed the comfort range. In the current location, external sun shades can be used to reduce summer heating.

### ***8.2 MOSS Bunkhouse energy modeling***

HEED modeling the current MOSS bunkhouse design suggests an annual heating requirement of 39.34 kBtu/sf with the unaltered climate file and 43.44 with the climate file altered for reduced solar gain. As stated earlier, current software limitations prevent modeling the energy savings associated with the HRV unit. The reduction of solar gain indicates a 10.4% increase in heating requirements.

### ***8.3 Waldsee BioHaus Energy Modeling***

HEED modeling of the Waldsee BioHaus in Bemidji Minnesota indicate an annual heating requirement of 12.76 kBtu/sf/yr. Energy modeling of the Waldsee BioHaus by the architect using the PassiveHaus Planning Package (PHPP) suggest an annual heating requirement of 4.35 kBtu/sf/yr (Klingenberg, Kernagis, & James, 2008). The difference is likely due to the HEED software's current inability to account for HRV.

### ***8.4 Waldsee BioHaus in McCall Energy Modeling***

HEED modeling of the Waldsee BioHaus using the McCall Idaho climate files indicate an annual heating requirement

of 13.99 kBtu/sf/yr without considering tree canopy solar gain reduction, and 15.75 kBtu/sf/yr when using the climate file with 20% solar radiation. The reduction in solar radiation suggest a 12.6% increase in heating costs.

### **8.5 New Passive House Energy Modeling**

HEED modeling of the newly designed Passive House dwelling in McCall suggest an annual heating requirement of 13.00 kBtu/sf/yr with the unmodified climate file and 18.69 with the climate file modified for reduced solar potential. This suggests a 66.96% reduction in heating costs if solar radiation is unlimited by trees and a 56.98% reduction if solar shading is considered. When comparing the new design without limited solar availability to the original design with solar limited solar radiation availability, the new design achieves a 68.99% reduction in heating energy.

## **9.0 MATERIAL CONSIDERATIONS**

### **9.1 Structural Integrated Panel Systems**

Structurally Integrated Panel Systems (SIPS) achieve exceptional overall R-values because they are constructed and installed without studs that cause thermal bridging in conventional wall systems. Since top and bottom plates are used and window cutouts are framed, thermal bridging in the wall assembly is not completely eliminated, but is significantly reduced.

### **9.2 Thermal Bridging**

Thermal bridges are points in the building envelope where building elements with high thermal conductivity (such as studs) transmit heat through the building envelope. A code built wall with R19 insulation measures R22.43 through entire wall thickness and changes to R21.28 when 2x6" 16" OC studs are factored into the equation. A super insulated wall with R38 insulation (R41.43 through entire wall thickness) changes to R39.9 when factoring in 2x12" 24" OC studs. SIP walls can be constructed without studs, eliminating thermal bridging associated with conventional studs. Since top and bottom plates and window framing is still used with SIPS, not all thermal bridging is eliminated.

## **CONCLUSION**

Reducing energy consumption in the built environment is critical in combating climate change, and is best achieved by increasing the thermal performance of the buildings. Proven strategies are readily available and should be employed wherever practical. Designing to Passive House energy performance standards by constructing a super insulated envelope with minimizing thermal bridging, and using a heat recovery ventilator greatly reduces energy use and carbon emissions associated with building operation, while at the same time, ensuring high indoor air quality. Building energy modeling with an accurate climate file that considers solar radiation potential at the microclimate level helped optimize critical passive design strategies such as glazing quantities and orientation. After thermal performance is optimized, other means of reducing energy consumption can be evaluated and implemented.

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# Something Borrowed: Defining an Emerging Covenant between Architecture and Materials

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**Rashida Ng, Temple University**

## Abstract

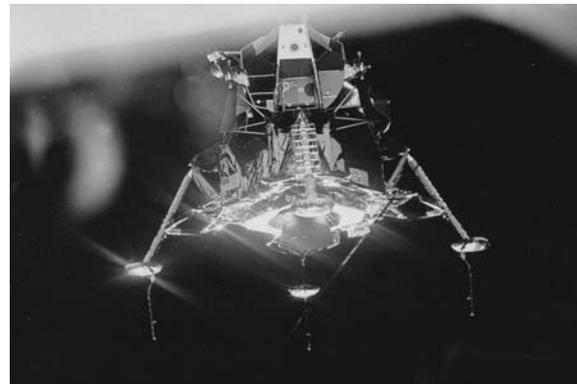
This essay will examine the historical precedent of borrowed material technologies in order to interrogate the role of research in stimulating the development and use of new materials within architecture. Architecture today is constructed in a world characterized by a rising influx of material inventions available within the global marketplace. As such, the selection of materials available is in a state of perpetual change. Although a precise explanation for this increase in materials is complex as the development is dependent upon economic, scientific, technological, and design-based factors, it is certain that the profession must adapt to this change. Material science advancements are becoming increasingly complex, while most products are made for other disciplines prior to their use in architecture.

Rather than providing a synopsis of new materials, this paper will scrutinize the possibilities for architectural materials research to contribute to a collective knowledge base that extends beyond the confines of traditional professional boundaries. As such, it will interrogate the latent potential of contemporary research-based design to stimulate sustained material and technological innovation within architecture and the constructed world by addressing this central question: what is the role of research within architecture of perpetual innovation?

## Introduction

Recent advancements in material science have introduced an innumerable range of new materials that continue to redefine our environs. Paralleling this increasing quantity of new materials is a renewed interest in the appropriation of material technologies from different disciplines into the realm of architecture, as even now most nascent material innovations are initially developed and utilized in applications other than buildings. As architects, we are inspired by the sensory properties of new materials and encouraged by their performance characteristics. Materials discovered by NASA's space program such as aerogel, a foamed glass product, and phase change material, a thermal storage wax, are promising alternatives

to traditional technologies due to both their technical and experiential attributes. Stimulated by the environmental mandate for sustainable materials, construction processes, and building technologies, much research is currently being devoted to the modification of these and other borrowed material technologies. The emerging covenant between architecture and materials calls for a new paradigm of interdisciplinary and collaborative research towards a future of sustained technological innovation within the profession.



NASA research for space exploration continues to stimulate material innovations.<sup>1</sup>

Achieving and sustaining technical advancements may prove to be a challenging endeavor as innovation within architecture is often depicted as a slow and protracted process obstructed by an attachment to tradition, custom and convention that routinely define the construction industry. Almost a century after architects such as Mies van der Rohe and his contemporaries embraced industrialization and the use of new materials and processes with bold declarations of a revolution on the immediate horizon, the rapid transformation of the construction of buildings exhibits characteristically slow change. Notwithstanding this banal history of material innovation, contemporary architecture is yet again

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<sup>1</sup> "Earth's Moon – Apollo 11," nssdc.nasa.gov, 24 January 2004, <[http://nssdc.gsfc.nasa.gov/imgcat/html/object\\_page/a\\_11\\_h\\_44\\_6574.html](http://nssdc.gsfc.nasa.gov/imgcat/html/object_page/a_11_h_44_6574.html)> (15 March 2010).

increasingly directed by the vast influx of newly developed materials and processes that are entering the global marketplace at a rapid and unprecedented pace.<sup>2</sup> Similar to many of the “new” materials developed in the Industrial Revolution, today’s emerging material technologies and processes are largely engineered within other knowledge areas, prior to their use in architecture. A detailed analysis of this historical precedent of appropriating technologies can be used to interrogate the current state of technological research on emerging materials, and to critique the future trajectory of architecture’s relationship with technology.

### Historical Precedents

Though largely discounted by the historical and theoretical discourse surrounding materiality in architecture, it is notable that architecture has procured material innovations from other disciplines for centuries.<sup>3</sup> This process, often coined as ‘technology transfer’ is characterized by the re-appropriation of materials and techniques from one discipline into another.<sup>4</sup>

The practice of technology transfer dates back over 5,000 years and has hastened the use of a multitude of materials that are now commonplace within the profession, including kiln-dried bricks, reinforced concrete and plywood. The method of firing bricks within a kiln was derived from the ancient process used in Mesopotamia to produce ceramic pottery.<sup>5</sup> Although developed and refined in our industrial world, the benefits of a controlled curing process to harden clay into bricks is still valued by modern day society as bricks are one of the most ubiquitous materials used for construction today. Similarly, the invention of reinforced concrete can also be traced to the gardening industry. Beginning with the inclusion of a metal mesh to improve the strength of concrete flowerpots, Joseph Monier, a French gardener, is credited with the innovation ultimately leading to the development of reinforced concrete. Following soon thereafter, François Hennebique, an

engineer and builder, extended this idea into buildings through the addition of bent reinforcement bars within floor slabs in the late nineteenth century. However, widespread use of this newly developed ‘liquid stone’ was not possible until the engineering methods to evaluate and predict the behavior of reinforced concrete systems was discovered in Germany in the early 1900s.<sup>6</sup>

The aforementioned precedent of the entry of reinforced concrete into the construction industry persuasively illustrates the need for a comprehensive knowledge base initiated by interrelated advancements in material composites, engineering technologies, as well as material science. Comprehensive understanding of both quantitative and qualitative aspects of emerging materials is required in order to realize innovative applications for the use of these new materials within architecture. This example is of consequence due to the technical merits and superior tensile performance of reinforced concrete as its invention signified a critical moment in architectural history that spawned an era of experimentation and formal investigations. Furthermore as reinforced concrete was widely heralded as a revolutionary invention within the profession, it quickly assumed a central role in the theory, technologies, and design put forth in the Modern Movement. In the decades that followed, the profession devoted itself wholeheartedly to the complete and honest consideration of the use of this new material, exploring the aesthetic aspects of the material in pursuit of formal perfection, while neglecting to keep pace with the subsequent material advancements that followed.

The aircraft and boating industries offered similar imported material technologies, including plywood and aluminum, both of which were produced in large quantities following the end of the Second World War. Modern plywood originated in The Havilland Mosquito, a British aircraft made entirely of wood that was used extensively in combat missions during the war. As the use of plywood in the Havilland was considered experimental, production of the plane was initially halted during the war in order to focus on existing and more conventional designs. Permission to build the planes was later reinstated owed to the fact that it utilized molded plywood, a “non-strategic” material that was

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<sup>2</sup> Sara Hart, “New Technologies Create New Challenges,” *Architectural Record*, 1 February 2006, Lexis-Nexis. (10 March 2010).

<sup>3</sup> Martin Pawley, “Technology Transfer,” in *Rethinking Technology*, ed. William W. Braham and Jonathan A. Hale (New York: Routledge, 2007), 298.

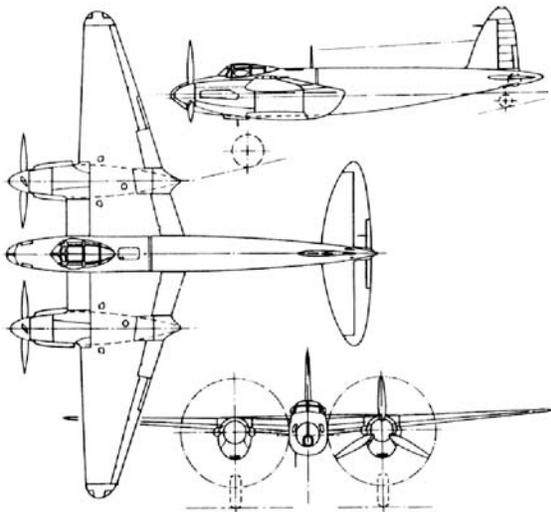
<sup>4</sup> *Ibid.*, 297.

<sup>5</sup> Richard Weston, *Materials, Form and Architecture* (New Haven: Yale University Press, 2003), 20.

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<sup>6</sup> *Ibid.*, 34.

available in sufficient quantity during the war.<sup>7</sup> The production of molded plywood monocoque shells utilized wood veneers alternatively laid with casein glue into a reinforced concrete mold. The molds were filled with an inflated rubber bag exerting pressure as the wood dried for 24 hours.<sup>8</sup>



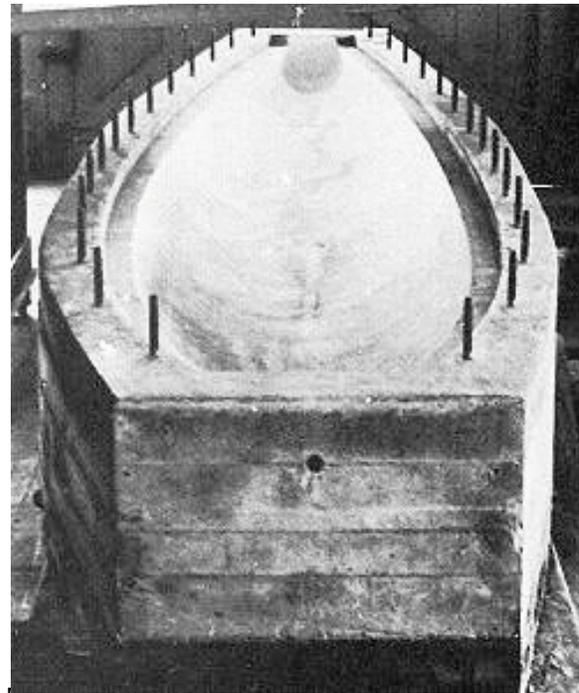
Plywood can be traced to the Second World War aviation technology.<sup>9</sup>

After the war ended, the new material of plywood came into mainstream use in the buildings of the 1950s. Similarly aluminum, which first appeared as foil for candy wrappers in 1912, was confined to the structural uses within aircraft until post war times. Similarly, the manufacturing infrastructure of aluminum boomed after the war, with the number of smelters increasing by seven fold, as aluminum was introduced to the building sector in cladding and curtain wall systems. Yet, the use of aluminum within these products fell short of fundamentally altering the building industry as a whole.

<sup>7</sup> "De Havilland DH 98 Mosquito," aviastar.org, <[http://www.aviastar.org/air/england/havilland\\_mosquito.php](http://www.aviastar.org/air/england/havilland_mosquito.php)> (15 March 2010).

<sup>8</sup> "Molded Plywood Construction," aviation-history.org, <<http://www.aviation-history.com/theory/plywood.htm>> (12 March 2010).

<sup>9</sup> "De Havilland DH 98 Mosquito," aviastar.org, <[http://www.aviastar.org/air/england/havilland\\_mosquito.php](http://www.aviastar.org/air/england/havilland_mosquito.php)> (15 March 2010).



Molded plywood was fabricated utilizing a reinforced concrete mold.<sup>10</sup>

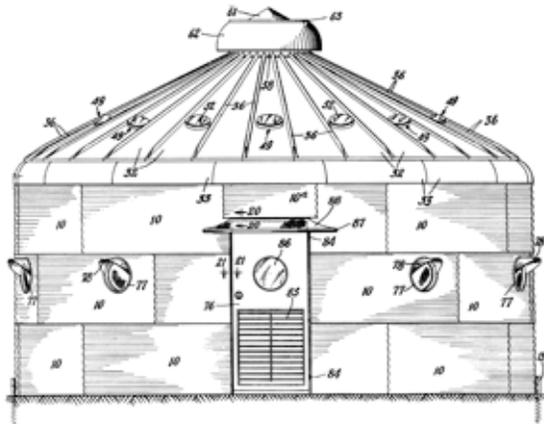
## Research and Innovation

Despite the arrival of a considerable post war manufacturing and production industry, architecture largely experimented with materials invented in the late nineteenth century in relative isolation from the continual advancement of scientific and technological research that was embraced by other industries. Buckminster Fuller, one of few notable defectors from this modern trend towards "formalism and illusionism," proposed to keep pace with the advancement of material technologies at that time. His well-known 1927 proposition for the Dymaxion House, a radial plan that utilized a metal cladding system adapted from aircraft technologies of his era, utilized many of the emerging technologies of his era.<sup>11</sup> Though two prototypes were constructed, Fuller's plan to build the house in mass was never realized. Even after the arrival of a substantial

<sup>10</sup> "Molded Plywood Construction," aviation-history.org, <<http://www.aviation-history.com/theory/plywood.htm>> (12 March 2010).

<sup>11</sup> Peter Reyner Banham, *Theory and Design in the First Machine Age* (New York: Frederick A. Praeger, 1960), 326.

engineering and manufacturing infrastructure following the war, the light frame and monocoque enclosures from the aircraft industry failed to introduce the level of sustained innovation that was technically feasible.



Buckminster Fuller's Dymaxion House utilized aircraft technologies and new materials.<sup>12</sup>

*"Despite the spectacular output of synthetic materials and new structural technologies that marked the post-war period, [Modern architects'] palette remained limited, as did that of their immediate successors...It was precisely because the sons of the pioneers concentrated on formal inventiveness rather than exploring the process of technology transfer that had given them new ways to build, that Modern architecture died of ignorance while new information was exploding all around it."<sup>13</sup>*

In the quote above, Martin Pawley is unambiguously critical of Modern architecture for failing to keep tempo with the rate of technological material advancements of the mid-twentieth century. In this 1987 essay, he writes with disappointment of the missed opportunity for sustained material innovation during this time, while simultaneously acknowledging the immensity of such a task. Admittedly at the turn of the twentieth century, few architects could have predicted the ensuing inundation of technological

advancement that followed and continues to accelerate through today. In consideration of two seemingly irreconcilable trajectories of innovation, one belonging to technology and the other belonging to architecture, it might seem fair to conclude as Banham asserted that, "what we have hitherto understood as architecture, and what we are beginning to understand of technology are incompatible disciplines."<sup>14</sup> Yet, evidence of the coincident encounters between the two knowledge realms bears much evidence in dispute of this theory.<sup>15</sup> Although architecture and technology have at times experienced periods of ambiguity and uncertainty, the interdependence of the two is certain.

### Sustained Technological Growth

Due to the lack of attention given the phenomenon of borrowed technologies within architecture, evidence of the relationships between the complex set of the factors that produce periods of technological growth as compared to periods of technological stagnation is scarce. Pawley summarizes the motives for technology transfer as the resultant of "serendipitous curiosity on the part of individuals" or "serious marketing effort by corporations intent on developing new outlets for materials or techniques."<sup>16</sup> In acknowledgement of the mounting importance of shared technologies, Martin Pawley called for a complete history and documentation of this "technological and methodological" trend.<sup>17</sup> Absent this account, the most comprehensive study of this can be found in economist Marian Bowley's 1960 analysis, in which she examined the forces of technology transfer that create material innovations within the building sector.

Though completed half a century ago, Bowley's research still offers relevant empirical evidence of the factors that serve to stimulate innovation today. In addition, the fact that this account of the architectural profession is written through the voice of an outsider, the observations and conclusions included seem unbiased and without underlying prejudice or motive. In this study Bowley defines four rationales for the introduction of material

<sup>12</sup> "The Dymaxion Dwelling Machine," bfi.org < [http://www.bfi.org/our\\_programs/who\\_is\\_buckminster\\_fuller/design\\_n\\_science/dymaxion\\_designs/the\\_dymaxion\\_dwelling\\_machine\\_by\\_j\\_baldwin](http://www.bfi.org/our_programs/who_is_buckminster_fuller/design_n_science/dymaxion_designs/the_dymaxion_dwelling_machine_by_j_baldwin) > (15 March 2010).

<sup>13</sup> Martin Pawley, "Technology Transfer," in *Rethinking Technology*, ed. William W. Braham and Jonathan A. Hale (New York: Routledge, 2007), 299.

<sup>14</sup> Peter Reyner Banham, *Theory and Design in the First Machine Age* (New York: Frederick A. Praeger, 1960), 329.

<sup>15</sup> Martin Pawley, "Technology Transfer," in *Rethinking Technology*, ed. William W. Braham and Jonathan A. Hale (New York: Routledge, 2007), 300.

<sup>16</sup> *Ibid*, 297.

<sup>17</sup> *Ibid*, 304.

innovation into the built environment: newly defined market requirements, an increased desire or need for a variety of choices, routine and incremental product developments and finally, an aspiration for material substitutions.<sup>18</sup> This study offers much to our understanding of the outside commercial forces that serve to encourage sustained innovation within the building sector. Today, the requirement for more sustainable construction processes remains a primary stimulus for innovation as considerable funding is directed towards this area of materials research.

Architecture has enjoyed a complex - and dubious - history with technology as the schism between art and science has historically instigated a competition, each battling for greater significance within the profession. Yet presently, theoreticians and technologists agree that the profession is facing a grand challenge of unprecedented magnitude as the social and environmental consequences of our buildings is called into question. As buildings today account for almost half of all energy consumption worldwide.<sup>19</sup> Therefore the time has come to elucidate the relationship between architecture and its technologies in response to the critical task at hand.

Although the complexity of today's materials and fabrication processes have increased exponentially as compared to the issues brought about by the adoption of aluminum and reinforced concrete, the environmental stakes are higher as well. The immensity of today's issues of sustainability and ecological design demand advanced performance of buildings that rise to the technological challenges dictated by this grand environmental challenge. As such, it is no longer advisable - or possible - for architecture to sit idly on the sidelines as the pace of technological change races by. Indeed, the global mandate for a sustainable approach to the use of natural resources in buildings requires a persistent commitment to technological innovation.

Innovation and creativity, in thought, process, form, material, and system, is central to achieving the goals set forth by the movement for more sustainable built environments. As such, the historical phenomenon of borrowed material technologies provides a central link to

the creation of a shared knowledge base that is created across multiple professions and areas of expertise. The pressure for environmentally sustainable architecture reaffirms the need for interdisciplinary fundamental research by engineers, ecologists, economists, entrepreneurs, scientists, and architects. In order to fundamentally change the way we build buildings, we must fundamentally alter the means by which we create knowledge within the profession towards the creation of a new paradigm of constructing the built environment. Embracing the forces that encourage the importation of external technologies and the processes through which they are adapted within the profession will provide a means of sustaining technological growth.

### Contemporary Challenges

*"Indeed, when one evaluates the diverse and fantastic range of materials available today, one realizes the extent of humanity's unwavering pursuit of innovation. Rather than a fixed catalog of products, one sees a constantly shifting array of materials, which offer continual improvements upon known standards or render those standards obsolete."<sup>20</sup>*

As avowed by this quote by architect Blaine Brownell, architecture today is constructed in a material world that can be characterized most simply by its continual expansion. The material influx that began after the Second World War has only increased in its intensity through the first decade of the twenty-first century. Although a precise explanation for this increase in materials is complex, industry experts estimate that "more new products have been developed in the last twenty years than in the prior history of materials science."<sup>21</sup>

Therefore, in addition to the need for more interdisciplinary research, this explosion of materials also warrants the development of a more flexible organizational system. As a result of the influx of new materials, there is the growing sense that our traditions of cataloguing, organizing, and conceptualizing material products within architecture and design-related fields is no longer adequate, or even capable of keeping pace with the material innovations that

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<sup>18</sup> Marian Bowley, *Innovations in Building Materials* (London: Gerald Duckworth & Co. Ltd., 1960), 400-406.

<sup>19</sup> "The Building Sector: A Hidden Culprit," architecture 2030.org, <[http://www.architecture2030.org/current\\_situation/building\\_sector.html](http://www.architecture2030.org/current_situation/building_sector.html)> (12 March 2010).

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<sup>20</sup> Blaine Brownell, ed., *Transmaterial: A Catalog of Materials that Redefine Our Physical Environment* (New York: Princeton Architectural Press, 2006), 6.

<sup>21</sup> *Ibid.*

have occurred of late. New material technologies have evolved from static entities, which can be catalogued by a simple system such as the Construction Standards Institute classification system, into dynamic units with responsive, intelligent, and dynamic properties, so-called 'smart materials.' The inherent difficulties in classifying smart materials are echoed in the complexities of constructing a comprehensive definition of these nascent technologies. Smart materials and technologies can be defined as "a molecule, a material, a composite, an assembly or a system." Yet regardless of scale they are defined through their distinctive behavioral properties characterized as time-based, self-actuated, selective, direct, and transient.<sup>22</sup>

This entire field represents contemporary technology transfer as the invention of smart materials is attributed to two chemists, Jacques and Pierre Curie, while current research in these areas is shared primarily by mechanical and electrical engineering disciplines.<sup>23</sup> But, this contemporary example of technology transfer demonstrates critical evolutionary maturity as compared to the technologies borrowed a century ago. In direct contrast to the invention of molded plywood and reinforced concrete, the technological knowledge base of smart materials is being developed simultaneously, often even collaboratively, with architectural applications. This time-based shift towards the concurrent creation of a collective knowledge base marks a key advancement in the relationship of architecture and its technologies. Information-age advancements, including the Internet and other computerized technologies facilitate this type of coincident research.

## Applied Design Research

Other computerized innovations, including digital design and fabrication equipment, have radically altered the relationship between architects and materials. As described by architect and educator Lisa Iwamoto, "Digital fabrication...has spurred a design revolution, yielding a wealth of architectural invention and innovation" in which "the architectural project is a form of applied design

research."<sup>24</sup> These pioneering processes have allowed architects to reduce the knowledge gap between the virtual and the physical, allowing for iterative experimentation and prototyping of material constructs at full scale in direct translation from architectural representation to physical artifact. These current prototyping processes are rapidly evolving and shaping the manufacturing processes of the future. Similar to contemporary research on smart materials, the transfer of fabrication and manufacturing technologies occurs simultaneously and incrementally, for small and large-scale projects. The digital interface supports the exchange and cross-pollination of multiple disciplines in an increasingly seamless process of virtual exchange and design refinement.

In contrast to the large-scale manufacturing research put forth by progress in digital fabrication, nanotechnology operates at atomic and molecular scales. These modern advancements in science promise to facilitate innovations in material properties that begin where traditional materials approach their basic limitations. To that end, this newly emerged discipline is inherently cross-disciplinary through its origins in biology, physics, and materials engineering. Although a newly arrived discipline, nanotechnology poses a great opportunity to invoke a paradigm shift in the ways materials are conceived and engineered in response to the critical need for sustainable technologies in the future.<sup>25</sup> Despite the inherent invisible nature of nanotechnology as the scale of nanoparticles is too small to scatter light, these micro innovations promise to evoke great change in the built environment as this emerging area provides a new place for architectural research in the immediate future.

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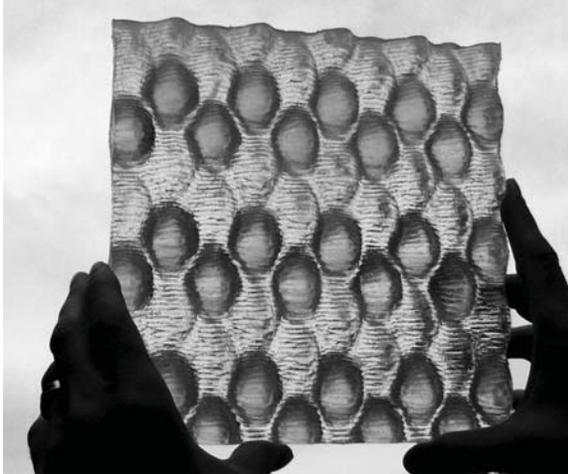
<sup>22</sup> Michelle Addington and Daniel Schodek, *Smart Materials and Technologies for the Building Construction Industry*, (Oxford: Architectural Press, 2005), 10-11.

<sup>23</sup> Ibid.

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<sup>24</sup> Lisa Iwamoto, *Digital Fabrications: Architectural and Material Techniques*, (New York: Princeton Architectural Press, 2009), 4.

<sup>25</sup> Sylvia Leydecker, *Nanomaterials in Architecture, Interior Architecture and Design*, (Basel: Birkhauser, 2008), 8.



Energy storage daylighting panel utilizing phase change material, a NASA technology.<sup>26</sup>

## Conclusion

Contemporary issues related to the transfer of new material technologies reveal the pivotal prospect for research to stimulate architecture of sustained innovation. It is imperative that the profession recognizes the essential role of fundamental, applied, and design research as an embedded share of its pedagogical, academic, and practice-based approaches to architecture. At present, the exemplars of architectural research remain loosely defined without clearly specified technological and methodological objectives. Absent these goals, the discipline of architecture runs the risk of history repeating itself with present day architects being one day condemned for a missed opportunity to embrace technological innovation.

Since material knowledge simultaneously resides in multiple industries, the process of information exchange between the boundaries of individual disciplines is loosely defined and at times, indistinguishable. In direct contrast to the technology transfer of the last century, today's technologies are shared as multiple disciplines simultaneously consider the influence of a collective knowledge base, rather than those bound by strictly defined professional boundaries. Collaborative practices and academic research environments must recognize that

contemporary innovations will occur in disciplinary overlaps, rather than within isolated professions. The place for research for architects is at once scientific, experiential, ecological, material, built, and imagined. Future architects bear a responsibility to participate within the larger discourse surrounding material innovation and to contribute to research that forwards the creation of a future global knowledge base of shared information.

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## PRESENTATION SESSIONS | **TECHNOLOGY**

### Session Two

Moderator: Richard L. Hayes, PhD, CAE, AIA



# Architecture In The Wild (Architectural Research In A Digital And Global World)

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## INTRODUCTION

In order to define the place of architectural research, the paper uncovers in its first theoretical section some basic conditions of the relationships between theory and architectural practices. The first condition is that, together with education and legislation, architectural research is based upon a theoretical wisdom oriented to practice, predicted by Aristotle a long time ago. The second condition is the need for new theoretical architectural theories that inform the use of powerful design media in construction, as well as in the social use of space, transport, communication, etc. The third condition is that the specific place of research in architecture should be the research of *placeness*, where other experts do not easily replace architects.

Consequently, in a second section, the paper will analyze a concrete empirical example of research: the children conception of places to live in, in order to uncover the specific core of the research on architecture, where environmental research, cultural research, design research etc., are tied together. This core is made of pluridisciplinary knowledge coming from different fields, so architectural research should be open to all the new cultural, scientific, aesthetic and ethical inputs. Nevertheless, our aim is to show through an innovative qualitative methodology that the role research ought to follow the three basic conditions pointed out above, and that the architects are the best candidates to research on their own field of expertise.

Finally, in a third section, we present a possible analysis of this architectural research core. Naturally, there is no single way to proceed, no universal methodology. However, environmental, cultural or design research done outside the architectural research core do not necessarily improve architectural theories and practices from the core. We discuss the need for guidelines that uncover some basic concepts for architectural practices' analysis, both in design, in construction and in the use of space.. One of these basic concepts is the chronotopic dimensions of architectural design defined by Mikhail Bakhtin eighty

years ago. The analysis of these chronotopic dimensions can open a plurality of research topics and new dissertations. Research on architecture becomes useful and the feedback between theory and architectural design can be a reality

### *1. Research in Architecture: A Challenge that Goes a Long Way*

The difficulties to articulate research and architecture are not a new challenge for architects (Muntañola 2009). Richard Bodeüs (Bodeüs 1982) defined some years ago how Aristotle himself devoted a big part of their works on ethics to analyze in detail what are the key dimensions of this challenge. Some fundamental ideas by Aristotle are presented in the selection of quotes in Fig.1.

"In practical knowledge, as in architecture, in education or in legislation, the finality is not to arrive to the total knowledge of everything that is good, but to implement them in action."  
"In relation to these cases knowledge is not enough, it is necessary to be virtuous and to practice that virtuosity."  
"The science that is made of action laws about what should be done and what should not be done is the architectural science, the most excellent of all."  
"The transmission and communication of this architectural science demands knowledge besides virtuosity."  
"The sign that allows to differentiate between who knows and who does not know, is the capacity to teach and, for this reason, art, in relation to the experience, is rather a science."  
"Perhaps it is not impossible, but it is very difficult, to be a good judge of this architectonic science without an initiation to practice."  
"The architectonic wisdom and the practical wisdom must be closely related to each other, because, as in Pericles, wise men in relation to themselves are wise also for the judgment of the acts of others."  
"We go too fast in forgetting the past and too slowly in proposing a new future, a bad abstraction in both cases."

*Figure 1: Selected quotes from Richard Bodeüs (1982).*

These definitions by Aristotle look strangely familiar to our discussions about how to do research related to architectural design and planning. We will not reproduce here the possible philosophical implications (Muntañola 2004a, 2004b, 2005a, 2005b, 2005c).

However, it is important to insist upon the specific and common quality of architecture, education and legislation in the face of research (see diagram I). Diagram I shows the professions involved in the architectural wisdom. This common specific quality among these three professions is the space and time anticipation they need, that is, their chronotopic dimensions. This explains the difficulties encountered by architects when trying to conceive a unified theoretical field, they need to articulate

architectural theories and practices, which are two sides of the same coin. The specific quality of architecture should push architects to conceptualize a strong architectural research dimension, and a good feedback between research and practice that exists in other professions (Muntañola 2008, 2009a).

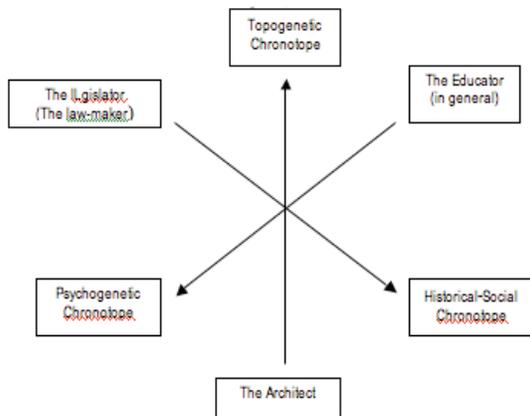


Diagram I: Three professions that share the same architectural wisdom. The chronotope is, according to Bakhtin, the articulation between physical space and time and social space and time structures.

We just need to take care of our specific synthetic qualities, since architectural design implies aesthetic, scientific and ethical (political) factors, altogether (Muntañola 2009), and this combination of factors is the only way to articulate design, building and dwelling by architects (Ricoeur 2003). In diagram II these three fundamental activities of architects are shown, and each one has a very different space and time dimension, that is, a different chronotopic dimension (Bakhtin 1990)

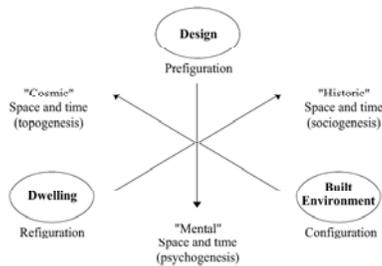


Diagram II: The three main dimensions of architecture as placeness.

In spite of the years separating today from the old classic Greek philosophy, the “architectonic wisdom” defined by Aristotle as the “key stone” of his philosophical

construction, still is a good starting point for our inquiry. Aristotle’s model applies to the relationships between architectural design and architectural research, as stated in five theoretical claims.

- 1) Architecture, education and legislation share a specific “virtuosity” (or wisdom). Because of this specificity the architect should orientate himself to “good practices,” not to some kind of theoretical knowledge of everything.
- 2) As a consequence, architecture, education and legislation should share an “architectonic wisdom,” (or virtuosity) in order to build a good city for everyone.
- 3) This “architectonic wisdom” that good architects must have, and also, analogically, educators and legislators, is based upon a “virtuous” link between theory and practice, between art and science, and, finally, between ethics and politics. This link demands, both, experience and theoretical wisdom in order to know how, when, and where to implement the right practice in the right situation.
- 4) A keen summary of these three conclusive points is the following general argument by Richard Bodeüs:

“Aristotle calls “architectonic wisdom” the function needed in order to uncover the best laws for a specific society, in the same way that the function of any “virtuosity” (in a common sense dimension) is to uncover and to undertake the best actions in each specific situation”. (Bodeüs 1982: 79)

- 5) The origin of this wisdom is neither “natural” nor “divine” nor caused by universal theoretical laws, is it simply “human.”

## 2. METHODOLOGY, FINDINGS & ANALYSIS

### *Diversity and Unification in Architectural Research: The Case of Education*

The name of this conference contains a valuable first step in order to reconsider the attitude of architects in relation to research. Seven branches, or research topics, are tied together by the special role of *placeness* as the kernel of these branches (see diagram III).

We will try to examine this concept in the analytical section. But first we will present some results of a research on architectural child education and we will see how diagrams I, II and III apply to the empirical data collected.

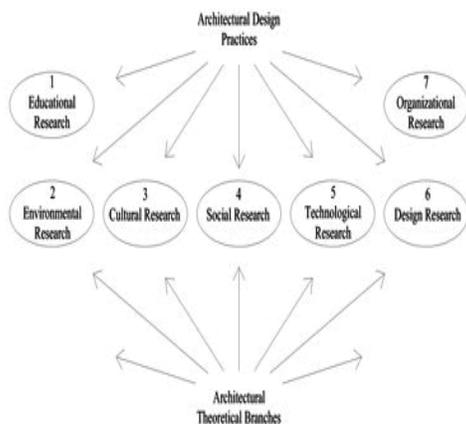


Diagram III: The seven branches of applied research in architecture

2.a. METHODOLOGY

The methodology has been carried out in different countries (Muntañola 1980, 2007). We present here two examples, recorded in 2007 by a PhD student, of children's conceptions of places to live in from two different schools in Barcelona (Fig.3a-3b). The whole research analyzed six schools and in each school three different groups of children from 6 to 12 years of age were asked to participate. Each group included from 4 to 6 children, half boys, half girls. They are asked to build a city with a wooden block game without any other order. The video of a single process, and twelve of them were recorded, two for separate age groups in each school, lasted approximately thirty minutes, including preparation, construction and verbal explanation of the city model. The two groups analyzed here (see Fig. 3a, 3b, 4a, 4b) represent two very different kinds of cities that correlates with two very different kinds of social interaction (see analysis point 2.b) and also with two diverse school curriculums. A broader description of the methodology is in Muntañola (1973).

The findings were analyzed with a qualitative analytical tool for audiovisual data, ELAN®, software developed by the Max Planck Institute for Psycholinguistics, for gesture and small-scale interactions. Systematic audiovisual analysis needs a strong model or codification to start with, in order not to get lost with the data. Our units of analysis were labeled Activity Recurrent Episodes (or ARE) [activity occurrences that are judged to be significant happening in the learning context and that are delimited by a change in theme (Barab, Hay & Yamagata-Lynch, 2001: p. 66). Through the classification of (or ARE), we traced the directive interactions between the children

when constructing the city. We looked at the type of interaction (unisex or mixed), the modalities of communication involved (speech, touch, gesture, gaze, movement), and the moments for joint action, when the children moved blocks and planned the ideal city collaboratively. In Fig. 2 we see two snapshots of two sampled schools, both private schools located in Barcelona. The children came from upper class urban families, so they had a similar social background, We coded and analyzed in depth two representative schools of the overall sample (6 schools in Barcelona) dividing them into two categories, A and B, depending on their resulting cities, monological or dialogical ( see Fig. 3a-3b).



Figure 2: A snapshot from the ELAN® software for qualitative analysis.

2.b. FINDINGS

Our descriptive analysis of the interaction differences between the two types of schools is summarized in tables 1 and 2.

Interactive Activity	SCHOOL A		SCHOOL B	
	Duration (In seconds)	% Total Duration	Duration (In seconds)	% Total Duration
Collab_girls	789.6	43.5	102.7	17.4
Collab_boys	253.2	13.9	76.1	12.9
Collab_mixed	772.9	42.6	411.3	69.7
Total Duration	1815.7	100	590.1	100

Table 1: Distribution of children interactions by gender and school.

Comparing schools A and B, we see how the main type of interaction by gender varies: in the first schools, interaction takes place mainly among girls, with a 43,5% of all interactions, closely followed by girl-boy collaboration in a 42,6%, and a residual exclusive boys collaboration, 14%. In the second schools, the main collaboration is mixed, with almost a 70%, with a low 17% girls collaboration second, and a similar residual masculine collaboration as in school A, around 13%. From here we see how in schools like type A, the interactions were strongly polarized, with high girls' interaction and very low masculine interaction. This fact alone makes us categorize A as having a less of a real and meaningful interaction for design. In school B, the boy-girl interaction dominated. Taking into account that all groups were composed by 3 girls and 3 boys, it is apparent that school B types displayed closer transgender interactions, as a group, which also shows in Fig. 4a-4b. The children from the type B school pose as a group next to their city, while in school A each kid stands next to his or her individual construction. Nevertheless, in both cases some common identification was expressed since the participants created a name for the city that integrated all the group components.

Collaboration Modalities (in %)	School A			School B		
	Girls Collab	Boys Collab	Mixed Collab	Girls Collab	Boys Collab	Mixed Collab
Planning Action	22.6	0.0	26.9	26.6	0.0	35.4
Building	55.6	0.0	27.0	73.6	100.0	44.6
Passing Blocks	21.1	94.7	33.7	0.0	0.0	20.0
Question	0.7	0.0	5.5	0.0	0.0	0.0
Comments	0.0	5.3	6.5	0.0	0.0	0.0
Total Duration	100.0	100.0	100.0	100.0	100.0	100.0

Table 2: Distribution of collaboration modalities by type, gender and school.

If we look into the modalities of collaboration by gender, in table 2, we see how the distribution of modalities also varies by type of school. Both groups of girls' interactions have building as the main interaction. However, while in schools B it represents a 76,6% of the total girls'

interactions, in schools A this percentage goes down to 55,6%, while 21,6% goes to passing around the blocks necessary for individual construction, which represents a lower level of coordinated actions. The second most common interaction is planning further actions, which implies common negotiation of what ought to be built, how, and where. The percentages are 22,6% of all girls' interactions for schools A, and 26% for schools B, so it is higher in the latter. In all schools the girls' interactions show a high level of joint action at the imagination level (coordinating intentions to decide what will be built next), with a lower involvement in actual building and higher involvement in the preliminary and secondary coordinated actions of passing around the building blocks in school A.

The large difference comes in the boys collaboration group, which is the less collaborative group, as shown in table 1. In school A, 95% of the interactions amounts to the peripheral activity of distributing blocks, while 5% amounts to comments related to complaints, critical comments and emotional interjections about the others' behavior. Those are cases of very low meaningful interaction. In school B, 100% of the boys' interactions amounts to building, which indicates a higher level of interaction than the other school. Interestingly, in none of the schools there is an exclusive masculine interaction directed to planning, which is dominated by girls.

Finally, in the third group of interactions, which are those that cross gender boundaries and that we consider as indicators of higher interaction levels of and distribution of cognition, we see important differences. In school A the main type of interaction is passing blocks, that we classified as lower-level and less central type of collaboration, with 33,7% of total girl-boy interactions. In contrast, in school B the main interaction is building, with a clear 44,6%. So not only the collaboration boy-girl is higher in school B than in school A ( 69,7% for B and 42,6% for A), but also in school B this collaboration seems to involve the central process, the building. Accordingly, the planning activity, which is also key to the building process as it involves the joint formulation of desires and decision-making, is more represented in school B (35,4%) than in school A (26,9%). Finally, while in school B comments and questions are not recorded as a single type of interaction (they do occur simultaneously to other types, such as building or planning), in school B we find an approximate 12% of verbal interactions that consist in questions about the identity or function of a construction built by an individual child, which can evolve in a suggestion of change of function or a negotiation of its physical location.

Fig. 3a and 3b show different types of cities built by groups of children from two different schools. The differences in types of cities come from the type of

interaction that each school establishes in the social life of the school as the chapter 2.c. explains.

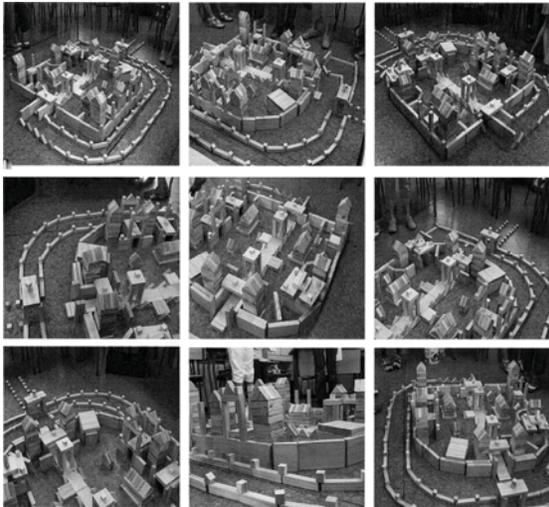


Figure 3a: Dialogical cities built by school A.

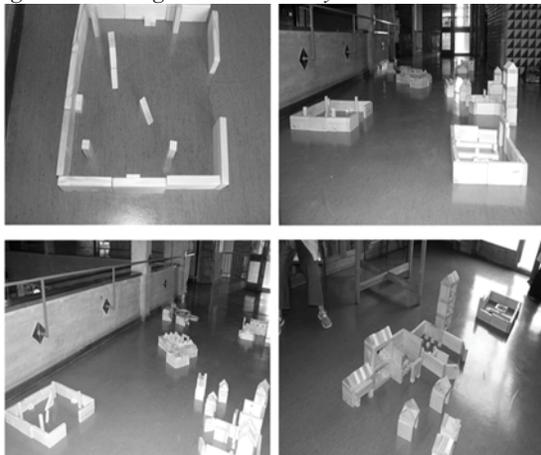


Figure 3b: Monological cities



Figure: 4a



Figure: 4b

Fig. 4a shows a dialogical city, with children gather in a group and close to the city. Fig. 4b is a group of children that build a monological city. They do not look to each other, each child is alone and close to the building he has built.

## 2.c. ANALYSIS

These findings point towards a correspondence between the type of interaction and the resulting city that is effectively constructed. In spite of the concrete quality of this research focused on class activity in schools, the outputs explained in diagram IV and in table 3 go beyond any pedagogical consideration. The correlation between social intersubjective relationships and physical spatial and temporal object forms is extremely powerful, investing architectural design and planning with strong socio-physical significance and an ethical dimension.

	Monological City "A"	Dialogical City "B"
Number of different elements	10	60
Parent participation in the school	Does not exist	High participation
Organized visits and celebrations	Does not exist	Many
Theatre	Does not exist	Very important

Table 3: Cultural dialogical differences in children's conceptions of cities in relation to the curriculums of the schools

In this sense, architecture is made of socio-physical coexistence. One of the outputs of this research has been the key indicators included by UNICEF in 2009 in the environmental evaluation of child friendly cities (Aranda & Muntañola, 2009). Presented in table 4, they are a good example of these specific qualities of architectural research too. Extremely different dimensions of human life are necessarily tied together in the children's use of real cities. Each indicator in the table 3 belongs to a different branch in diagram III. The life of children is affected by the combination of all these indicators. We have uncovered in this way a nice example of the interrelation announced by Aristotle between education, urban policies and architecture of our cities.

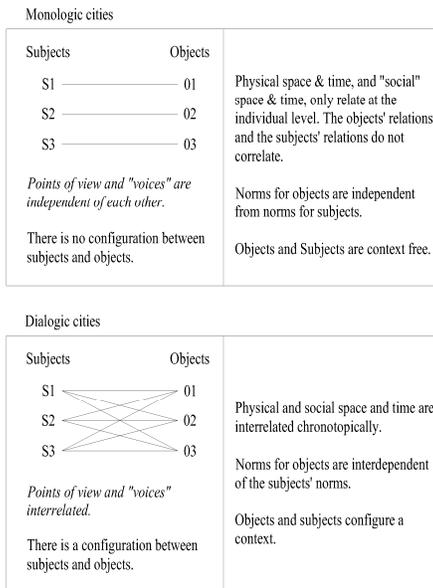


Diagram IV: Sociophysical structure between subjects and objects in monological or dialogical cities

As Bill Hillier (1996) claimed, architectural theories are non-discursive, that is, are not unified scientific theories but constructions, jumping between practical treatises and general conceptual frameworks. Feedback between art and science is always found in architectural theories. In diagram III we see how different research branches are useful for a better architectural practice and theory, if, and only if, they are somehow coordinated with the other research branches. This is true, not only in childhood, but in adulthood too, which is a harder task.

Finally, in Fig. 5 we reproduce the pathological dimensions shown by "wild children" according to Linnaeus, in the seventeenth century in Sweden. The father of the modern natural sciences summarized several cases of wild children around the world at that time. He points out to the need of social interaction for the child development. There are specific human qualities of the human body that cannot develop in wild children (Linnaeus, 1758). It is very clear that these pathologies are closely related to social cultural space and time dimensions embedded in architectural and city planning design shown by educated children. Also we can consider these pathologies, both as a proof of the social "external" and "extended" awareness, and as a confirmation of the role of the human body's inner qualities in order to avoid these pathologies regardless of the specific cultural situation they are. In some sense, all these facts seem to be positively related with the recent hypotheses by Andy Clark (2008) on the specific role of the body in the development of human consciousness. If the embodied

hypotheses in cognition are true, then architecture and *placeness* should re-occupy, again, its role in the life scenario. According to Andy Clark:

the body is the locus of willed action, the point of sensory-motor confluence, the gateway to intelligent offloading, and the stable platform whose features and relations can be relied upon in the computations underlying some intelligent performances (2008: p. 207).

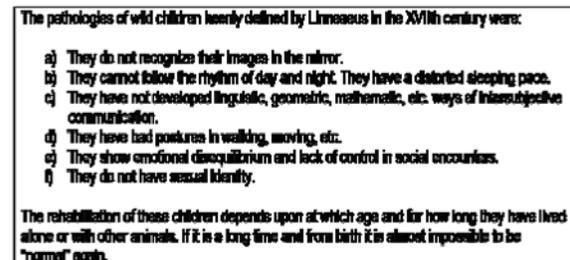


Figure 5: Cultural pathologies of wild children according to Linnaeus (1758).

Indicator	Theoretical branches (Fig. 10)	Definition	Limits & actions
I-1 Noise levels	2,5,6	Noise as harmful for children.	Noise Measure Limitation: If it impacts human conversation (40 Db)
I-2 Pollution	2,5,6	Pollution of air, water, earth and materials within a populated area.	Normal environmental controls, e.g. prohibition of asbestos, arsenic, polluted water, etc.
I-3 Electromagnetic Radiation	2,5,6	Harmful installation of aerials, high-voltage lines, etc.	Min. Distances. High voltage. Aerials: 200 m.
I-4 Safe playgrounds	4,1,5	Playgrounds near residential areas.	Max. Distance between dwellings. Max. Size
I-5 Safe routes between main community areas	4,3,6	The importance of daily routes for the community.	Max. 15 mins. on foot or 2 km, or well-planned school transportation.
I-6 The school as a dynamic center	1,3,6	Schools are open to the community as social agents.	List of major activities at, or around schools.
I-7 Public facilities for all age groups adapted and organized for children's use	4,3,6	Promoting the use of facilities by different age groups.	Public facilities within walking distance.
I-8 Child friendly public services	4,3,6	Adaptation of services for all age groups.	Facilities for the youngest age groups, adequate supervision, information/communication.
I-9 Adequate privacy at home and in community	4,1,5	To ensure privacy as child grows, in accordance with each age needs.	From 7 y. of a: privacy at home; from 12 y. of a: privacy in quiet spaces and in public areas.
I-10 Judiciousness of built areas and the countryside	2,3,6	To ensure optimum spacing between built-up areas and countryside.	Min. distances to garden areas or non-asphalted areas. Easy access to countryside.

Table 4: Ten indicators of urban quality for the assessment of child friendly cities (UNICEF 2010).

### 3. The Place of Research and the Research of Place

The ideal for our architectural research in the next future is described in diagram V. The right function of this diagram implies a permanent feedback between research on architectural design and practice on the one hand, and between research on theories and applied research in the different branches of diagram III, on the other hand. As we have pointed out, applied research in each research branch needs to be connected with the other dimensions of practice, in one way or other. The role of theory is not only to allow this connection, but to push for it to make it real. This is an explanation not far from the present discussions on the mind and body interactions, or on the anthropological development in social cognition (Hutchins 1995), or on ecology and environmental sustainability. However, the situation is far from being ideal in current architectural research. Theoretical and practical misunderstandings, and the individualistic structure of our profession, much more oriented towards competition than to cooperation and participation, hinders architectural research (Muntañola 2009). In diagram V some improvements from previous decades in architectural research, psychology, cognitive science and the remaining social sciences are shown. Some theoretical branches interact with the applied research branches, and the beginning of a feedback between practice and theory can be uncovered. These three new perspectives are:

- A) Intersubjective social (historical) architecture  
Dialogical social chronotope (sociophysical): (Bakhtin 1990) (Hillier 1996) (Leddy 1994).
- B) Intersubjective mental architecture  
Mind and machine interfase (psycho-physical): (The Extended Mind) (Clark 2008).
- C) Intersubjective cosmic architecture  
Byfunctional psychosocial feedback: (Gottlieb 2003) (Langer 2004).

Can we by seek a “unification” between these three theoretical branches (Rapoport 2008). Placeness is always the key, but we should be very careful at this point, because we could “reduce” practical architectural design to a virtual cosmic ghost, to a machine-like mental tool, or to a Hegelian aprioristic social system, in the three cases it is a deterministic architectural research fiasco. We should analyze each city or territory, that is, each place, as an articulation between research and practice, and among all the dimensions in diagram V, but this articulation is different in each place, and the global dimensions should never eliminate the specific qualities of it. In order to escape from that fiasco, we can, for now, confront architectural practice with these three theoretical branches, trying to look for one common “architecture” between them. Diagram V shows one manner to get to this fundamental link. It is not surprising that the link reproduces the three old dimensions of architecture.

However, there are new dimensions that should be taken into account First of all, there are historical (social), cosmic (natural), or mental (ideas) dimensions that architects should apriorically take into consideration. First, we can speak of an open system in the shape of social or neuronal networks (Latour 2005). Second, architecture is present in our society, in our environment and in our mind. The key point now is to uncover the interplay between these three “architectures,” not far from the way social history or mental cultural memories and utopias are built and analyzed. Another way of considering this interplay is the relationships between three different research settings: The educative setting (design), the urban social setting (dwelling), and the professional setting (building). Paradoxically many PhD dissertations on architectural practices end up going down this theoretical path without really being aware of this three-dimensional articulation. Architectural research should introduce awareness in graduate studies in architectural education and environmental evaluation in general, as shown in diagram V. Of course, we can argue that awareness alone does not guarantee improvement in architectural design, but we have no choice: our civilization needs awareness in architecture, in sustainability (global warming), , in economics (the financial globalization), etc. In spite of having survived until now without it, we need awareness because of our accelerated technological development and social cultural transformations from modern to global cultural social interactions. Culture today is different and needs an extra awareness factor in order to be able to forecast a better future for children.

We will end our paper as we began, in a homage to Plato's prediction in *Timaeus*, when he analyzes *placeness*: And there is a third nature, which is space, and it is eternal and admits no destruction, and provides a home for all created things, and is apprehended when all sense is absent, by a kind of spurious reason, and is hardly real, which we, beholding like in a dream, say of all existence that it must of necessity be in some place and occupy space... (*Timaeus*, 52b).

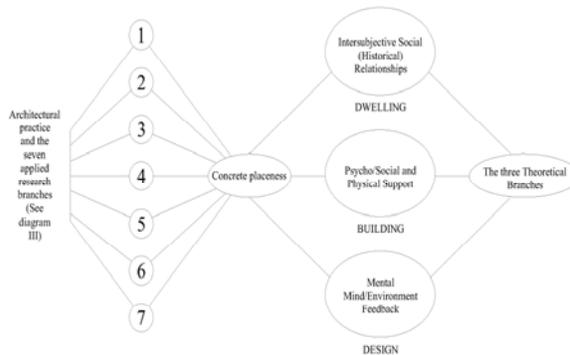


Diagram V: Research and practice in Architecture from a dialogical perspective.

## CONCLUSION

Research in architecture can be very diverse. In any case, the aim is to facilitate good architectural planning design practices. The six research domains and the three theoretical paradigms indicated in diagram V, should always point towards a better understanding of architecture as a conception, a construction and a better use of places to live in.

Social interaction, as the children conceptions of cities indicate, is the kernel of architectural research. However, it is a very specific “architectonic” view of social interactions, because we are seeking an interphase between the social space and time dimensions of physical spaces, and the physical space and time dimensions of the social behaviors, meanings and values. This crossing process is what we have defined as a “chronotopic” sociophysical interaction.

Hence the act of design, the act of construction, and the art of dwelling are coordinated by the same “architectonic wisdom” forecasted by the old Greek philosophers. As Paul Ricoeur defined very clearly, there is a hermeneutic cycle between the three architectural acts that constitute *placeness* in diagram II. As Mikhail Bakhtin insisted upon, each place is produced by a specific intersubjective architectonic agreement (or disagreement) manifested by a specific chronotopic dialogical structure made of physical and social space, together with the time conditions.

In other words, research on what an architectural place is, or should be, leads us towards the same architectonic wisdom that converts it, builds it and uses it, and there is no way to escape from the chronotopic and hermeneutic qualities of this research.

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## **Interactive Information Model for Digital Fabricator**

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### **Abstract**

This paper describes the research of parametric and procedural modeling techniques associated with digital fabrication and form-finding within architectural design. The outcome of this design procedure surpasses traditional views of an optimized single solution that travels down a linear pipeline – architect, engineer, contractor and fabricator - to seek approval from various design professionals before fabrication begins. Instead, this approach offers an interactive information model which contains parameters that perform actions based on the specialization of various design professionals. Within a parametric field, the information model instantly acknowledges any errors in the design or fabrication process. The quantity of these interchangeable parameters is proportional to the number of constraints and regulations that the actors and the building must meet. This model can be easily unfolded into an open-end non-linear design loop that manifests optimized solutions which are achievable in a “file-to-factory” scheme. This new approach of using non-linear procedural modeling to generate parametrically negotiable solutions across various design professions are explored in two experimental projects that are described in the paper. With the procedural modeling of the MathMorph project, a large

quantity of spatial arrangement solutions grew out of a fixed set of parameters defined by mathematical equations. Randomness, noise, permutation and recursion were introduced into the form seeking and fabrication process that yielded novel design solutions represented both digitally and physically. With laser cutting technology, Swell\_Fab.Lab project, a digital prototype of a parametric information model was generated to simulate all aspects of surface properties before fabrication and installation.

### **1. Non-linear Interactive Approaches in Information Modeling**

Traditionally, the design process of the architectural industry utilizes a linear approach to incorporate various actors into a design/build system. The system breakdown of actors begins with the architect who then interacts with the owner and consultants. After the architect completes the design and construction document as a part of legal document, are then mainstreamed after bid to the general contractors. Then the general contractors and sub contractors are responsible for completing the construction and ultimately deliver the building to the owner. This linear process does not encourage an interdisciplinary collaboration to evolve. In the bidding process, it is common for a contractor to take the design as a finished product without negotiate or propose alternative solutions (fig. 1: top). This separation eventually results in a high cost to correct any early design issues in the later construction phase. “Without a broader system, the drive for form has been listless, lost in self-referential exercises, meaningless outside the field of architecture itself. Instead, architecture should perform rather than simply form; structurally,

environmentally, economically, programmatically, contextually, or in multiple formal arenas.” (Meredith 2008).

By investigating a non-linear approach to building information modeling (BIM), the model manifests into a parametric system that is controlled by various professionals. Many early design and fabrication issues can be solved by capitalizing on the dynamic interaction between the designer and fabricator. The evaluation of the information model depends partly on the feasibility of a form, based on if it satisfies the functions and conditions within the actors’ profession, and partly on its aesthetic value, which is subject to all reviewers.

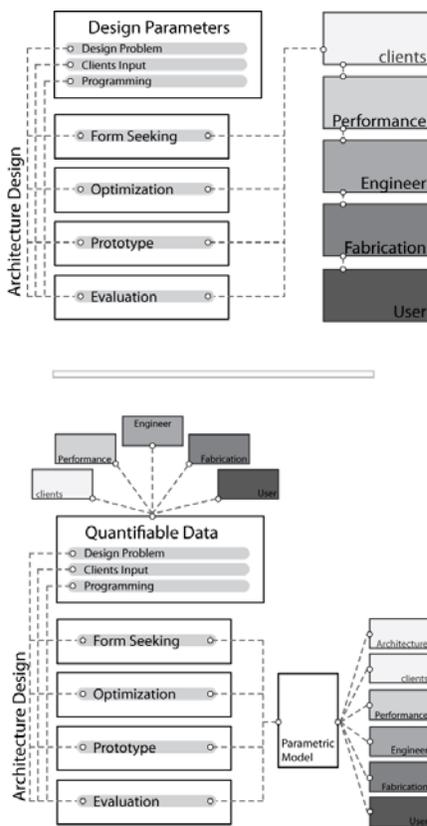


Figure 1: Top: Traditional workflow in AEC. Bottom: Non-linear Information Model

A non-linear approach (fig. 1: bottom) is optimized by the processing of configured components that are developed by each of the actors. The quantity of these interchangeable parameters is proportional to the number of constraints and regulations that the actors and the building must meet. The information model is developed by combining these components into one parametric system that seeks form and fabrication. This dynamic process surpasses traditional linear approach to design and build by looking at the power of collaboration to drive the information modeling.

## 2. Non-Linear Modeling – Form Finding

The use of various modeling programs, from procedural modeling tools such as Grasshopper for Rhino and Houdini to algorithm and equation driven modeling in Mathematica and Mel Script, allow for several design and fabrication components to act parametrically with one another. Exploring the parametric computing and fabrication techniques, with the emphasis on the potential of fabricating forms, is a complex and dynamic way to produce architectural novelty and originality. An architectural form grows into a synthetic information model, which exists for a meaning far beyond aesthetic values. Within these modeling programs, several variations of form-finding emerge. Each of the form-finding techniques can be either used independently or in combination of another.

### 2.1. Panelization + Tessellation

Panelization or tessellation, as a form-finder, is a generation of division points upon a surface. Once the points have been defined, the surface is populated with a new set of connecting geometries that have no

overlapping elements or an absent of surface elements, this processes leaves a faceted surface that is determined on the amount of division points that are generated. A known or unknown pattern can be developed from panelizing or tessellating a surface. The panelization and tessellation can be parametrically controlled through surface manipulators that allow variable changes in terms of the division of points. A surface can have an increasing level of complexity, by either panelizing or tessellated, that fluidly enhances the curvature by dividing the surface into smaller segments. This division of a surface can take the form of many different geometric or organic patterns. Different algorithms can be applied to the surface in order to change the tessellation. Through this form-finding method, highly complex surfaces can be easily constructed by breaking apart the connected geometries. The individuality of each pattern may be fabricated and labeled through digital fabrication.

Algorithms and codes can parametrically control the individual surfaces and prepare them for fabrication, while simultaneously placing limitations on the design due to structural constraints. "Digital technologies have revitalized the design world's interest in patterning and tessellation because they afford greater variation and modulation through nonstandard manufacturing, even as they provide an inherent economy of means. Working digitally enables movement from one representational format to another – for example, from digital model to vector-line file to manufacturing method.

This series of translations allows for a more fluid fabrication process while significantly reducing the labor associated with taking one type of design medium and turning it into another." (Iwamoto, 2009). An example of the fabrication preparation would be a tab system that can be added to each of the panels. The tabs would allow for the panels to be connected by folding them to

an appropriate angle in order to meet the neighboring panels (fig. 2). This fabrication method also allows for an individual to realize a new pattern that emerges from the tabs being folded about an axis on the individual panels. When utilizing a tab design several components are able to be parametrically controlled. The tab offset distance and the angle of the tab ends can be controlled to meet a user's desirer.

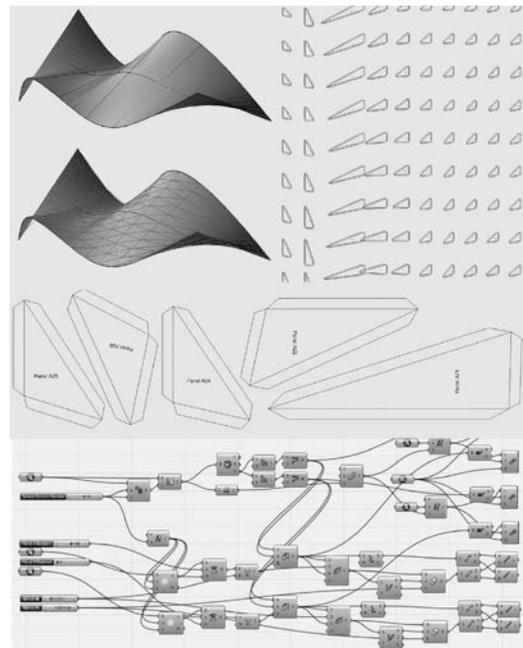
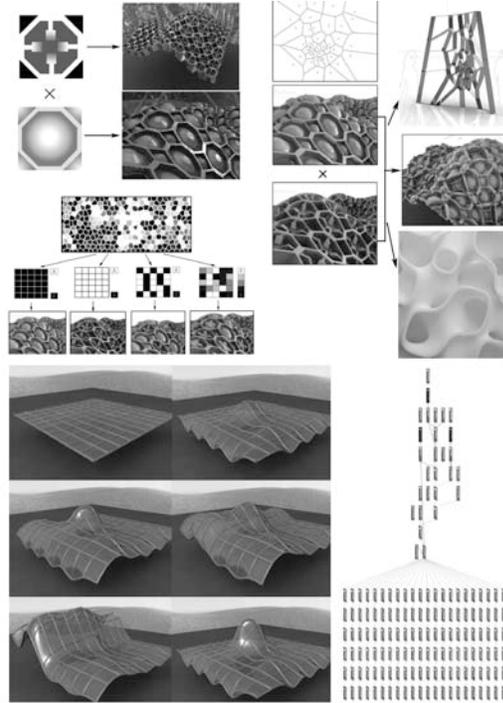


Figure 2: Panelization of surface showing tab system and cut diagram – script built to input any surface

## 2.2. Permutation

Permutation, as a form finder, is explored by defining a node network and variables with digital models. By generating a node network, the information modeler allows for a mapping or cross-referencing process to evolve within a single information model. Permutation is a computational approach that defines

the relationships between nodes in the network with other nodes in the same network. This algorithm allows for form-finding to output several generations that are considered to be an offspring of one another. For example: In the pursuit of finding form, a user may be inspired by the genetic algorithm that simulates the reproduction of biological organisms. By using a non-linear information model, one is able to combine and merge existing forms / solutions to generate new solutions with inheriting features. In another words, the population of the new solutions is “built up” by “mixing” the gene of survivors. The specific characteristics of each offspring forms are inherited from both parent forms through their control nodes. Each node’s spatial value carried in parent forms is passed to their children’s related node with a randomly assigned weight. For instance, various program and scripts were utilized to create the first generation of the following roof surfaces (Fig. 3). A prototype matrix was created to drive the deformation of target geometry mesh. A large quantity of the “children” roof surfaces was produced from each pair of “roof” parents. The first child was identical to parent-A, while the last child was identical to parent-B. Other children were just the mixture of parent A and B with a different weight combination.



*Figure 3: various projects completed by authors using permutation in several non-linear models*

One can apply this method to “breed” forms across several generations. Generating several generations of forms is possible because of the parametric control over the number of elements input into the system. For example, several ideal roofs were selected from the second generation based on aesthetics and reviewers’ criteria. These “survivors” then blended with each other again and generated the third generation.

While the forms are being generated, the algorithm is also relying on the fabrication process component to eliminate the solutions that cannot be fabricated due to the constraints that are inputted. This form finding method allows for a non-linear information modeling process to work parametrically and remain selective in its outputs.



mathematical data. This data can range from material size, machining limits, to cutting tool sizes and tolerances. All these raw data can be viewed as a logic that places limitations onto a mathematically driven form.

### **3. Digital Fabrication as an Integrated Entity**

Digital fabrication is the static manifestation of the dynamic digital world. The architectural field is realizing the potential of digital technologies that can further the current construction processes of artifacts. Digital fabrication serves as the linking entity between the architect and the manufacture processes of “file-to-factory”. “The close relationship that once existed between architecture and construction (what was once the very nature of architectural practice) could potentially reemerge as an unintended but fortunate outcome of the new digital processes of production.” (Kolarevic, 2003) By utilizing digital fabrication as an integral entity in the design process, the architect has the ability to design parametrically with instantly knowing the limitations of the current manufacturing technologies, “therefore, digital fabrication technologies introduce a number of realistic considerations into a digital-design process; nevertheless these constraints bound the range of design possibilities but in the same time they provide tangible and generic means for design actualization.” (Dritsas, 2002).

The marriage between the digital world and fabrication needs to have a seamless transition that allows designers not to have to learn the language of computing but utilize the tools presented by manufactures.

#### **3.1. A New Modeling Procedure**

Digital fabrication is made possible by the transferring of g-code – computing language - from a digital model to the fabrication machine. The introduction of these new manufacturing processes into the architecture field has allowed for a new craft of model building to emerge. Today, it is possible for the architect to manifest their designs at a micro scale that has the same precision of the fabrication industries' full scale construction. The gap between the digital and the physical realm is narrowing due to the design practice having an increased accessibility to CNC mills, laser cutters and FDM printers.

The design process can greatly benefit from learning how to utilize these digital fabrication processes such as CNC, laser cutting, water-jetting or milling machines. These fabrication processes favor models to be investigated by either paneling or serial study techniques. These techniques can be used to manifest a model that portrays far more information than the architectural models of the past. Laser cutting and CNC milling utilize a subtractive process of material in order to manifest the artifact. Fused deposition modeling allows for artifacts to be grown in a serial process that acts in an additive process of materials. The benefit of FDM fabrication is having the ability to generate fluid models that are impossible to manifest utilizing traditional hand making modeling techniques. Due to the advancement of digital technologies, architecture models now represent more than the typical volume, scale, void or programmatic diagrams.

Using precision of digital fabrication to produce models allows for more information to be examined in physical model format – wind testing, structure and responsive performance. This new modeling procedure has worked as a digital learning tool for the construction

processes and also serves as an efficient way to transfer construction documents into full scaled manufactured parts.

### **3.2. Scalability – Exploration of Micro to Macro**

Digital fabrication has given architecture the tools needed to manifest the conceptual ideas into the built environment. Architects must understand the importance of the digital fabrication machines minimum and maximum allowances. Part of the design challenge, when designing with digital fabrication as a component in the information model, is to be able to realize the conceptual idea with the allowance of the current fabrication tools such as laser cutter and CNC mills. “Designing manufactures allows us to posit an investigation of the exhibitive act of architecture and of its processes within the framework...” (Costa 2003). The massive scale of architecture trumps the micro scale of most digital fabrication machines.

Over the past several years, designers have showcased the ways to build from a micro scale and produce the macro scale. By exploring the ways in which the designer can utilize the current fabrication machines, to produce at a macro scale, will inevitably progress the current construction processes and allow for digital fabrication to be an integrated component into the design process. As the architecture field continues to exploit these digital fabrication technologies, the only question that continues to emerge is that of scalability.

## **4. Experiments of Non-Linear**

The combination of form-finding and digital fabrication can have a major impact on the current design processes. The following two projects utilize

non-linear information modeling processes to manifest designs that embark on the conceptual age.

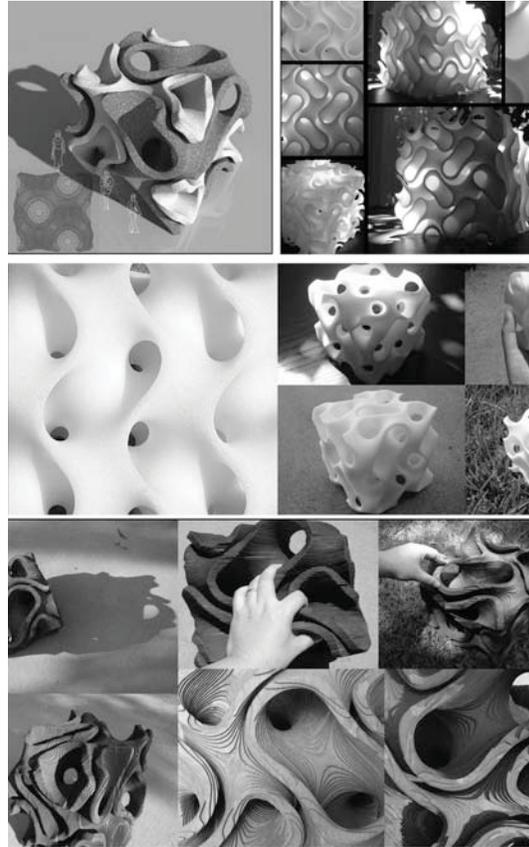
### **4.1. Mathmorph**

The name "Mathmorph" combines the notion of “mathematic” with the notion of “morphology. This project focuses on the study of “mathematic” as an embedded variability of spatial arrangement with procedural model. The influence of digital media and information technology on architectural education and practice is increasingly evident. Digital technology has reconditioned the design process that establishes new processes and techniques of fabrication. This reconditioning has influenced how we operate as architects. Today, architectural design and building construction are increasingly aided by and dependent on digital technology. These technologies allow architects to foresee the appearance and predict the performance of proposed buildings. Mathmorph proposes an interdisciplinary research in digital fabrication of unconventional 3D forms on a conceptual design level in order to explore their features in interacting with people and their potentials of being used as architectural forms. It describes an experimental approach which facilitates 3D form generation, visualization and fabrication. First, a series of computer models were generated using computer algorithms, and mathematic equations<sup>ii</sup>. Secondly, a series of 3D models were generated by importing these computer algorithms and mathematic equations into 3D programs. These computer models were fabricated as physical prototypes by the FDM systems, CNC machine, and laser cut machines. The purpose of this part is bi-fold. It does not only inspire designers to use unconventional 3D forms in architectural design, which has traditionally been restrained by the difficulties in

design and visualization, but also tests the possibility of these unconventional 3D forms in being manufactured as physical prototypes.

The use of these mathematically driven forms can generate porous structures that are non-site-specific and allow for maximum heat gain/loss and natural wind-flow. By interlocking two forms the generation of natural program issues solve themselves; for example a mix-use program naturally forms based on the two independent forms. The computational approach to design allows for two areas of interest in the architectural field to combine: digital form finding and digital fabrication.

A series of abstract sculpture designed with the focus on its potential transformative spatial layout was also explored. The generation of an abstract mathematic form using equations was studied. These forms showed the unlimited possibility of interlocking / intertwining between solid form and void space. We adapted several variables to control the repetition and resolution of these interlocking spaces, by an exhaustive combination of several variables values. From a large number of outcomes, only several ideal spatial arrangement solutions were selected by reviewers and then used as the genotype for the next operation.



*Figure 5: Mathmorph project - digitally fabricated prototypes*

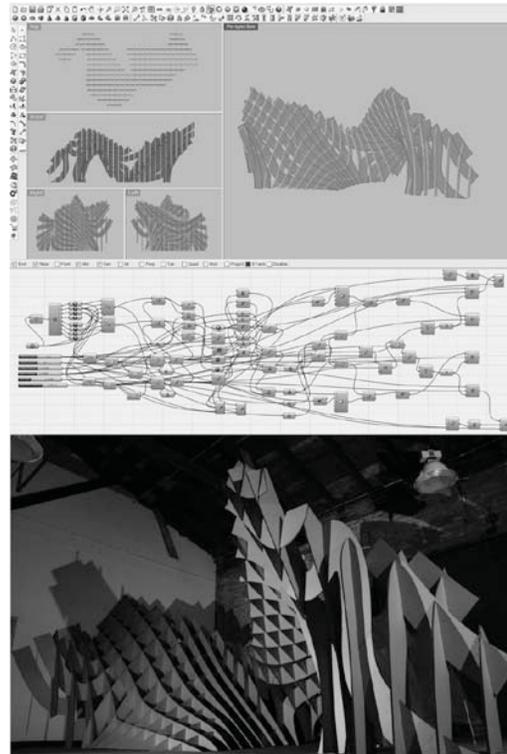
After exporting this parametric model into 3D programs, the continuation to building its procedural network was allowed through a non-linear information model. A sequence of deformation and control nodes were added. This additive information evolved independently in order to yield a more fabrication friendly form. As a result, we created a high degree of complexity and explored the dynamic possibilities of spatial arrangement with relatively simple input information. In this process, the information model demonstrated itself with a great power and an unlimited potential of form exploration from sets of parameters. The reviewers selected the desired control nodes and

manipulated them to create the new spatial organization. This processes verified that a parametric model can be optimized by the limitations of digital fabrication. In the final step, a slice node was introduced into the network as a static representation for laser cutting (fig 5). The contouring process produced the file documentation that was needed to digitally fabricate the form. The parameters of the laser cutter and 3D printing were well integrated into the information model. Another input variable, *time*, as the 4th dimension, was also added to snapshot all the layout possibilities into a motion. Expressions were evolved and various spatial arrangements were produced as the value of *time* was smoothly animated. Hundreds of the contour lines for laser cutting were captured into a single morphing animation.

#### **4.2. SWELL – Fab.Lab**

Swell is an interdisciplinary collaborative effort of student in four different majors; Architecture, Industrial design, Furniture design, and Graphic Design. The objective of the project was to design an installation that encompasses the visitor within the space and allows for people to be submersed within the context and alter an individual's typical journey. Swell poses a fabrication challenge that deals with scalability. The design problem was that the only digital manufacturing tool available is an 18"x32" laser cutter.

The solution of the author in this scenario was to generate a surface parametrically that would be sectioned and fabricated in a half-lap style joint (fig. 6). The designers wrote a grasshopper script that took into account the individual panel that would be laser cut in order to verify their size compared to the laser cutters bed size. A non-linear workflow provided limitations of the surface and also allowed for fabrication to be rapidly assessed in the early design phases.



*Figure 6: digital design built from Grasshopper script<sup>iii</sup> to built installation*

The design of the digital fabrication installation began with two lines that manipulated the gallery space. By parametrically controlling the surface, the design group was able to generate the most feasible and interactive surface possible in terms of fabrication and scale. The surface was developed through a grasshopper script that generated horizontal and vertical ribs - contours. For fabrication processes, the script assessed each rib and broke them down into sections that could be laser cut using an 18"x32" laser bed and cut to precision based on the chosen material thickness. Once the ribs were laser cut, glue was applied to piece them together and ultimately creating the whole rib. Finally, the ribs were slotted together to

allow for an installation to manipulate the built environment. The objective of the installation was to maximize the space that it would occupy with the least amount of material and investigate the scale that could be cut using an 18"x32" laser cutter.

## **5. CONCLUSION**

### ***5.1. The benefit of Non-linear Information Modeling***

It is proposed that this information model has the potential of being used as a resourceful tool for achieving diversity and complexity in form generation and fabrication. With a minimum input and knowledge of details of all the individual professions, this model becomes one that allows an individual to seek novel and buildable designs. It is the seamless transition between the human brain and the computer processes that allows the architecture field to reach new innovations. These nonlinear information models can be utilized as a platform for future research to build upon. By utilizing interactive information modeling, an individual is realizing the marriage of the dynamic digital and static physical world through an interdisciplinary collaboration that emerges in the architecture field.

The goal of these two projects was to create an engaging experience where architects could control the generation of novel 3D forms in a dynamically changing network. The enormous speed of digital system processed hundreds or even thousands of possibilities in a relatively short period of time. Since forms were generated very quickly, it is advantageous for the designers to choose from a large candid pool instead of carefully adjusting a few models.

In terms of 3D morphology, these processes were considered as psychological change rather than just a

form seeking method. "It assists human to observe various possibilities which may not have been thought about before" (Kalay, 2000). With this synthetic approach, we could "consider architecture as a form of artificial life" (Frazer, 1995) and generate creative design solutions. In terms of cooperation, the ability to generate a shared parametrically controlled model often sparks new ideas and directs team members to further exploration simultaneously and collaboratively. Without knowing the details of other parametric nodes outside of the actors focus, designers can easily create a large quantity of forms with a relative short design period and get optimized solutions by concentrating on their "assigned" components.

This process could be considered as a system for helping architects with creative explorations. As fabrication technology matures, it might even be considered as a system which adapts to test various manufacturing system automatically. In either case, it allows the user, computer and fabrication machine to interactively work together in a new way to produce results that no single actor could easily produce alone.

### ***5.2. A New Architectural Language - Fabrication***

In order to have architecture re-claim the "master builder" status, designers must learn how to work at a collaborative level and speak the language of digital fabrication. In the past, the traditional language of architecture was expressed through highly annotated section and elevation drawing. Today, the importance of understanding how to model in three dimensions has become an essential portion of an architect's tools to represent their designs. With a new form of representation emerging in three dimensions, the architect must now learn to speak the language of fabrication that will translate three dimensional models

into a machine language – g-code – and allow for a physical realization to manifest. By designing a system that allows for fabrication to be a vital input in the beginning design stage will allow for the architect to speak the computing language. It is then that the architects' documentation is not needed in traditional drawings, but instead translated into the computing language of the machines which allows the designer to again be the one who narrates the construction process without any misinterpretations. (lynn. 2008) Architecture is becoming an interdisciplinary collaboration. The basis of this collaboration will excel when the architect speaks a new language that exploits the idea that the collective whole is more powerful than the singular.

### **5.3 The Constraint of Non-linear Information Modeling**

Compared with the success of BIM within the AEC industry, one constraint of the non-linear information model for digital fabrication comes from the missing of “performance analysis nodes”. In our experiments, we can only apply this network to generate various forms and then test their performance afterwards with performance simulation software such as EcoTech or IES. Form fitness evaluation was exclusively applied outside the network. Neither Mathmorph model nor Swell model “seeks” forms based on the performance criteria.

This constrain could be overcome by filling the gap between the slow complex evaluation routines and the large quantity of solutions quickly generated from the network. In an ideal design environment of generating pleasing and complex forms, designers and fabricators will be able to continuously optimize computer's exhaustive search and modeling power by

monitoring the form's structure performance, air dynamic, material cost and other analytical components. Thus, guiding the form seeking process within architectural the known concepts and rules. Once this process is achieved, the information model can be used as a synthetic assistant and driven force.

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<sup>i</sup> Paine's machine made sculptures with various forms driven by the mutation, similar as the identical embryos can be developed into different cells. This genetic-transformation philosophy can be traced back to his earlier projects like New Fungus Crop, and Amanita Field. Although they were created with totally different approach (SCUMAK is Mechanical and New Fungus Crop is botanical), these projects share a similar configuration that is heightened by examine the relation between individual and group, the contrast between the

various outcome and predefined procedure. In Paine's sculpture making machine, auto-mechanical and computer controlled manufacturing technology resembles nature such as Chaos theory, which was executed in the computer programming level to produce unpredictable geometric forms.

$$\begin{aligned} & \text{ii } \sin(2*x) * \cos(y) * \sin(z) \\ & + \sin(2*y) * \cos(z) * \sin(x) \\ & + \sin(2*z) * \cos(x) * \sin(y) - 0.06 + \cos(2*x) * \sin(y) * \\ & \cos(z) \\ & + \cos(2*y) * \sin(z) * \cos(x) \\ & + \cos(2*z) * \sin(x) * \cos(y) \end{aligned}$$

iii Portions of Grasshopper script taken from Andrew Payne of LIFT Architects

# **Understanding and Representing Urban Heterogeneity: The Case of Waste Collection in São Paulo**

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## **Abstract**

How is it possible to take into account the architectural and urban complexity, which encompasses multiple issues, from technical ones to social or sensory ones, within an integrated research process? How is it possible to combine multiple disciplinary approaches (cultural, social, environmental, urban, and design) and scales (from the body one to the district or the city ones) with a single representation means? And finally, what kind of method can address these complex problems and however remaining “thrifty”?

In this paper, we will describe a recent exploratory research work that intended to address all these issues at once. The main result consists in proposing an integrated methodology for analysis and representation. In our view, considering together these two domains is a way to take into account multiple research fields without having a more influential one, by keeping strong ties between field observation and results construction. In the end, graphic representation appears to be not only a means (for describing, understanding, planning and so on), but also a proper result to the architectural and urban research realm.

## **A specific research process made to deal with urban complexity**

As the paper's title suggests, we intend to consider urban area as something that deals with heterogeneity and complexity. Indeed, urban space, as well as cities, brings together constructions, networks, people, environment, policies, flux and so on. For that reason,

research on such space proceeds from differentiated disciplines and epistemologies. There arises a question we will to ask: how is it possible to take into account several matters – which are constitutive of cities, as well as of everyday dweller's experience – in a single process? Furthermore, how is it possible to address environmental, urban and lived-experience issues at once, knowing that such domains already drive their own sciences and practices?

Situated in the field of architectural and urban atmospheres (or ambiances), which crosses disciplinary boundaries by encompassing perceptible, social and built space, we tried to address this problem in an ongoing research work which assumes that it is doable to encompass multiple dimensions, problems and point of views through the single means of graphic representation. We can go as far as to say that graphic representation is expected to function as a common language between approaches that produce knowledge on space – despite their differentiated methods, theories or even epistemologies. Given that, we shall ask what kind of result could be obtained from a sociologist, an atmosphere scientist, an urbanist, a political scientist, an inhabitant, etc. who are asked to draw together on a unique sketch concerning a particular area of study?

In despite of having tried to make scientists drawing and designing, we implemented a method that makes use of graphic representation in order to provoke debate between inhabitants, scientists and experts, designers and political representatives on a particular area of study: the case of domestic waste in São Paulo (Brazil)<sup>1</sup>. Our objective consisted in finding a way to understand and represent architectural, urban, social, environmental and sensory issues linked to this case, in terms of relationships between inhabitants and garbage, considered at different scales.

## **Methodological & Design Hypothesis**

Having in mind the will to gather, understand and represent a multiplicity of relationships between man and air (or atmosphere, or ambiance, depending on the chosen focus), the design hypothesis is to draw urban sections of studied area. This graphical hypothesis is driven by the impossibility for plan view (i.e. maps) to represent air and people relationship to it, as well as situated practices. At the contrary, sections allow representing air, bodies, and built forms at any scale: from usual architectural section to landscape section. Such a proposal allows thereby representing sensory dimensions at a large scale.

Also, before representing arises the problem of data collecting. Willing to put together particularly different kinds of data and approaches we needed to choose a method that is able to put together:

- objective and subjective data,
- "environmental" and "sensory" analysis,
- "overhanging" and engaged point of views.

To do that, two ways were followed:

- concerning "objective" data (i.e. related to environment, built forms, measures etc.): taking into account of already constituted knowledge such as maps, official measures, technical and research reports,
- concerning "subjective" data (i.e. practices, inhabitants narratives etc.): producing original enquiries (that we will develop further in the next chapter).

By doing so, we take account of the "objective" data in order to constitute a *context*, in which we dispose "subjective" data then describing *situated practices and stories*. These data are collected thanks to inductive methods in order to stay as close as possible to situated narratives.

Following the ways opened by American anthropologists from the 40's and 50's, inductive methods were notably formalized theoretically within the works of Howard S. Becker, or Anselm Strauss<sup>ii</sup>. Inductive approaches allow to situate (to put into context) people accounts and practices. Indeed, in this work, people narratives and practices make especially sense if they are located because it seems to be an appropriate way to understand and represent the urban heterogeneity. This means that the work on site possesses a primary position. The analysis results then from the data, pictures, statements and explanations of people living and working (...) gathered during the fieldwork. The knowledge of the place emerges from the place itself. The analysis and the representation are linked and take place in the same drawing process.

### **Retracing São Paulo Waste's narratives**

What thus does it mean to approach by inductive means, issues related to waste in an agglomeration such as São Paulo? We approached this topic by trying to understand the "story of domestic waste", starting from their production at inhabitants places to their ending at sanitary landfills. Three objectives drove the fieldwork:

- Retrace waste's stories: by interviewing inhabitants, local experts and administrators; visiting waste treatment factories and sanitary landfills; following garbage trucks, and so on.
- Understand local and global controversial issues linked to garbage.
- Represent space, waste's stories, and environmental, "atmospherical", social and architectural issues at the same time.

For that, the "waste's narratives" were collected from their production places to its end, in one of the city sanitary landfills. Through the topic of waste's stories, the urban heterogeneity and complexity are reached, involving many spatial scales and numerous stakeholders. Indeed, there are many levels of understanding the waste's narratives.

#### ***From the global city level...***

São Paulo is the greatest metropolitan area of South America. In the year 2009 the city counted more than 11 million inhabitants and spread out 1523 km<sup>2</sup>. Because of its huge dimensions we could not take the whole city for an object of study.

In order to understand and represent the topic of waste's story we focused on the journey of garbage trucks, from city center to the sanitary landfill, passing by a key place. This place, called *Transbordo*, is an open building where little trucks gather the waste and transit it into bigger trucks. This journey is about 35 kilometers and it takes around one hour to drive, depending on the traffic. The main road, and its surroundings have been considered more as a continuous space-time line than as an area of study. This journey is the larger scale of the research object.

By considering this scale, we were looking for potential differences between the various districts crossed by the journey of waste.

Along this road, how is the waste's story evolving? Do the urban shape, the street mesh, the legal or illegal status of the constructions, and the social and economical levels of the populations have an impact on the waste management?

Are there some places where the waste management question is more controversial than some others?

#### ***...To the local and individual level***

We also wanted to understand and represent the story of the waste from local and individual points of view.

How inhabitants deal with the waste? How does the connection work between the inside of the buildings and the public space of the street? What is the transition between private management of the trash and public waste management? Are there some intermediate stakeholders between inhabitants and waste management workers?

In addition, we wanted to reach the understanding of the particularities in the different districts crossed by the waste's journey. We were wondering about the nature of the impact that waste topic has on the ambience of the place.

How the rhythms created by waste (like the frequency of waste collection) have an impact on the inhabitants' or streets' or districts' life? What are the material and immaterial spaces taken by the waste? Does it have a negative impact on surroundings (bad smell, animal attractiveness, air pollution...) and how people deal with that? What kind of differences can we notice on waste management by people living in collective buildings and people living in single houses?

We didn't want to address all these problems in a global way. First of all, in order to grasp the ambience of the places we had to focus on body scale and then to go on

site. Also, we were not technically able to approach this phenomenon from a big scale (and are not convinced of its necessity and/or accuracy). We could benefit from ten days only to follow the waste's journey, go on site, make the fieldwork (photographic survey and interviews) and then, analyze the data and represent it.

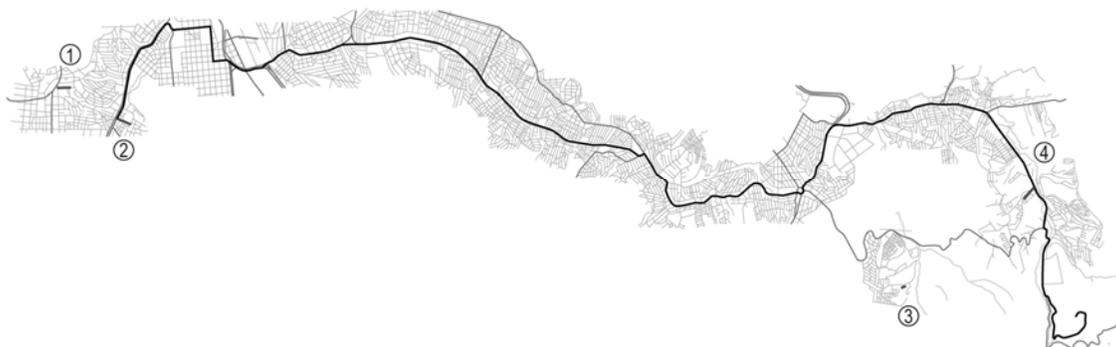
In order to study several declinations of the waste's story along the main road taken by the waste trucks from the city center to the sanitary landfill, we decided to select and focus on four different streets. These streets are situated along the main road. From them we will draw four urban sections.

The selected streets present different aspects. First of all, the places are at different distances from the city center. Two of them are close to the historical center of São Paulo, and others are few kilometers away from the sanitary landfill, at the East of the metropolitan area.

We can also see certain differences like the accessibility of the district, the urban shape, the period of urbanization, the waste collection system and devices, the economical situations of the population, and the more or less legal status of the constructions.

In order to gain knowledge about individual behavior linked with waste topic we selected these places by the possible interviews that we could arrange.

### **Selected places of study**



*Figure 1: Map of East part of São Paulo agglomeration. The thickest line represents the way followed by garbage trucks from transbordo (#2) to sanitary landfill (spiral at the right end of the line).*

Vila Mariana (#1 on Fig. 1 and 2) is a central neighborhood in São Paulo. Rich buildings and houses are located along a sloping street. We were able to interview someone living in a rich and secure building where the access is controlled by a guard. We also interviewed an employee of this building whose job is to collect twice a day the waste on every doorstep, to stock it and select it in the basement, and carry it out on the collecting days (three times a week).

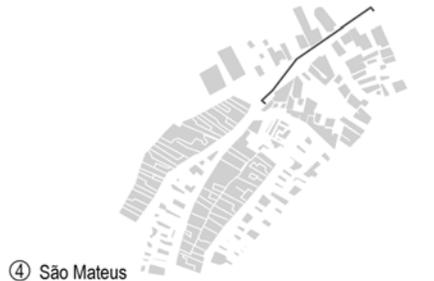


Figure 2: Block plans of the four selected neighborhood. The sections lines are represented in black.

Santos-Imigrantes (#2 on Fig. 1 and 2) is further away from the city center. The *Transbordo* is located in this neighborhood. We interviewed there an inhabitant and an employee of a wealthy condominium and a woman living in a house who is a member of an association fighting against the *Transbordo* because of its negative impact on surroundings. This controversial issue moves the district's life.

The *favela* São Francisco (#3 on Fig. 1 and 2) is the frame of the third urban transect. This slum is an illegally urbanized site counting numerous poor habitations. This district is hardly connected to the road network system. In this place, waste collecting devices have been placed depending on the possible access points. Indeed, there are only two garbage disposals for the whole population. We interviewed a couple of inhabitants and a social worker.

And finally, São Mateus (#4 on Fig. 1 and 2) district is situated closely to the sanitary landfill. This fourth urban transect crosses an old favela where construction has been legalized since about twenty years.

### From waste's narratives to their representation

The use of urban sections has been developed in some other research works before the São Paulo study case. One of the difficulties revealed by these previous works is that technical drawing of architectural section is somehow not easy to be understood by everyone (even for architects or urbanists, this mode of representation remains sometimes hard to understand at a first glance). There is a graphic code that needs to be known by the viewer, and some people who are not familiar with this representation code misunderstand the drawing.

Furthermore, we didn't have access to any blue prints, detailed maps of São Paulo or construction licenses files. We then didn't choose to draw detailed and technical sections of the urban reality. Instead, we decided to represent the profile of the four selected streets for technical and communicative reasons in order to be understood by everyone.

Representation method is closely tied to the fieldwork we have done. We went only one time on site and consequently needed to be very careful about the fieldwork. The same work method occurred for every urban transect. On site, we chose the exact path of the transect, took precise pictures in order to create photographs collages, interviewed inhabitants, employees dealing with waste management, local

experts and administrators. We located particular shapes, dimensions and spatial situations of garbage cans, and took information concerning time and type of waste collection. We also tried to understand the potential environmental impact, the ambience created by

the waste's story, and the controversial issues specific to each place.

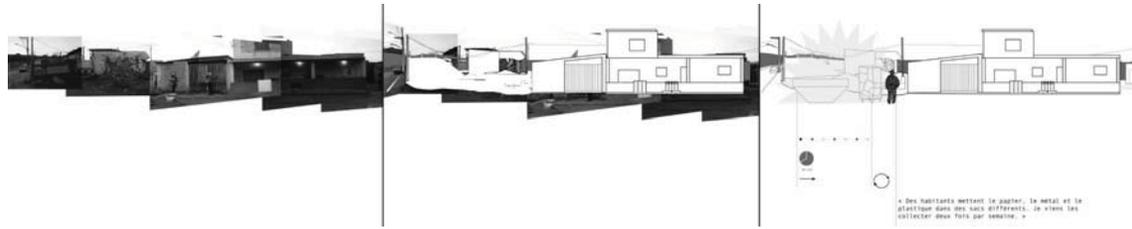


Figure 3: Three stages of section construction: 1/ photographs collage; 2/ drawing shapes and background; 3/ placing people, uses and discourses.

### **From field surveys to section construction**

After obtaining all these data we started the section representation. First, we created the photograph collage for each urban section that would be the base of the drawing. From this photograph collage we drew the street profile. The drawing, consisting of simplified representation of buildings, doesn't have every architectural details, but it allows to apprehend the global urban shape. Architectural volumes and their apertures (doors and windows) give information about the rapport to the street.

At the second plan, we represented the background shape, in order to understand the urban context, and contrasts with the street is the object of study. Thanks to this background we can see if the urban density of the neighborhood is low or high, if the street is surrounded by natural or urban components.

Then, we decided to place the electricity poles to show the unity and the continuity of the street. We also decided to trace over cars in order to be able to understand the existence of parking places, circulation or pedestrian areas.

We also placed the garbage cans so that we can understand their implication on different levels. It doesn't involve the same things if the nearest garbage can is at the doorstep, in the building's basement, in the street or in the next street. For example, at São Francisco *favela*, there are only two garbage cans that are situated at the end of the urbanized area. It is not the same situation

that in Vila Mariana's building, where inhabitants can put down their personal waste on the doorstep. In that case, inhabitants' contact with waste is shorter and requests less effort. At one place people just need to open their door, at the second, they need to walk about ten minutes and by any weather. People interviewed at the *favela* explain that the geographical situation of the garbage cans has some environmental impacts: sometime, some people prefer to trough their waste in the river next to their home because it is closer than the garbage can. On the other hand, people are recycling directly the waste, selecting food waste to give to their chickens.

Then, we tried to translate discursive information selected from interviews to understandable drawing elements. Two kinds of stakeholders are represented in the urban transects: inhabitants and employees dealing with waste management (truck drivers, building's cleaning employees, *Transbordo's* administrators...). Every person drawn in the urban sections represents someone who we interviewed and who has given us some precious information about his professional or dwelling habits. A graphic transcription of temporal information concerning waste collection indicates the time and frequency of it (private or public collections). The same for the nature of waste: have they been selected or no?

Finally the urban transect is a hybridization of different type of information concerning the place: inhabitants and workers speeches retrace the past and present story of the place, drawings give a representation of the physical morphology of the space, measures indicate the temporality linked to waste's topic.

**A hybrid tool for spaces of complexity: representing for understanding and debating**

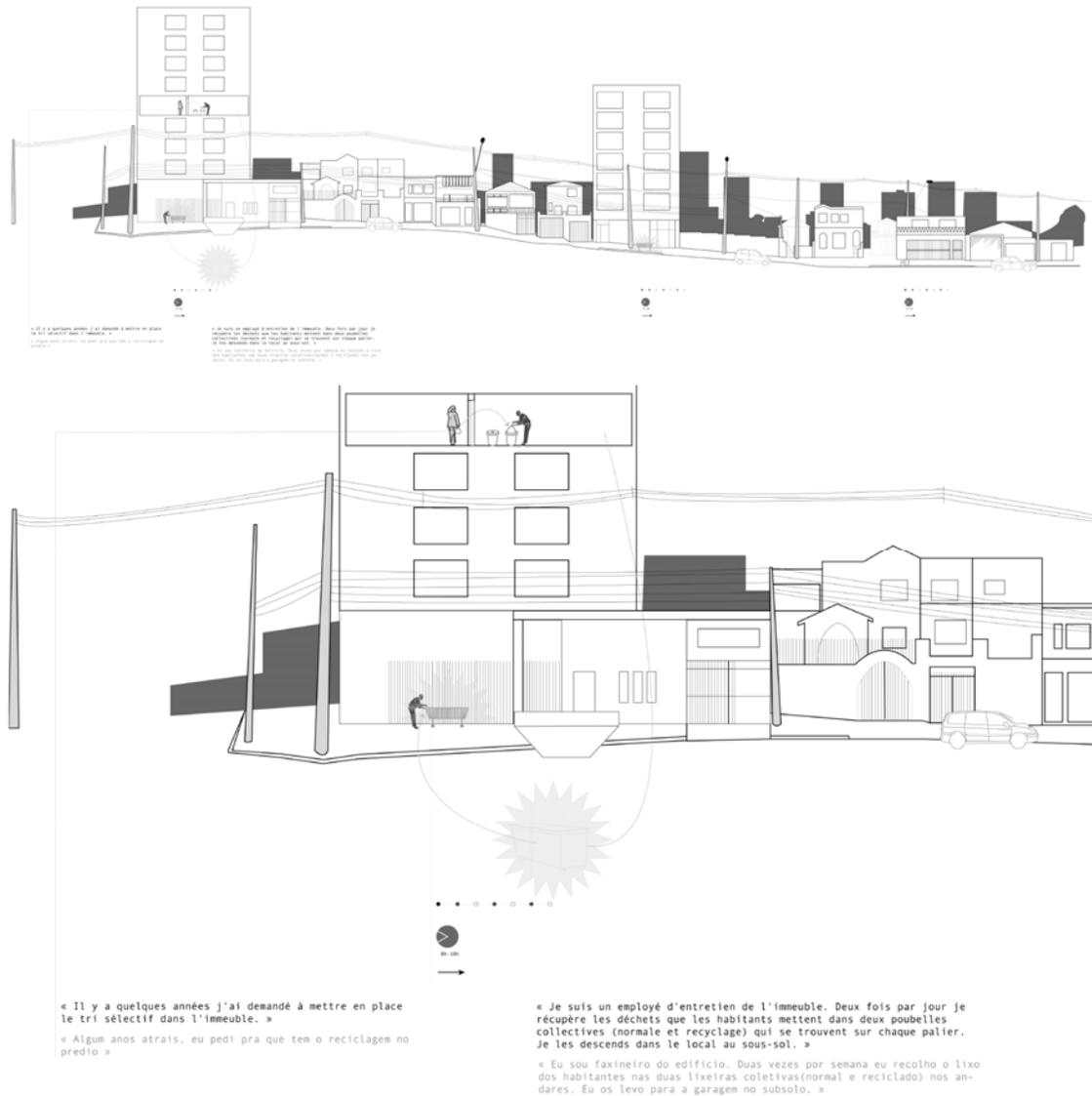


Figure 4: Section #1 – Vila Mariana: Full section and zoom. The length of the printed drawing was over 2.5 meters.

At the beginning of this paper, we asked ourselves what kind of graphic representation could result from a design process in which actors with different expertises and different relationships to the field would be able to draw?

The main result consists into bringing our fieldwork results through design by representing different but interwoven understanding levels (related to space, uses, atmosphere, environment, policies) by the way of a

unique graphic means, thereby without needing additional layers, related notes or whatsoever.

The figure 4 (above) shows one of the sections we designed. In this one, we see: a street, built profiles, the inside of a flat, garbage cans, people and their practices, words of people, timetables of garbage trucks and so on. The chosen mode of representation allows speaking for these different types of data, thus mixing different kinds of approaches from technical or political ones, to situated narratives. However, this section is very simple and seems to show a lack of information. This has to do with two expectations we had:

- showing a synthesis of the information collected in order to avoid to surcharge the view,
- leaving some empty space in order to let viewers shifting from this role to a more active one (e.g. by giving the possibility to draw, or write on the section).

These two expectations are related to the will to make use of the sections not only as a descriptive means, but also as a public debate tool. We tested this hypothesis by presenting the sections in a public seminar in São Paulo a couple of days after having it produced, and it indeed provoked discussion. Two main positive results emerged from this public presentation:

- people that are not familiar with architectural representation were able to understand the sections very easily because of their non-technical appearance;
- people were thus able to identify themselves to the represented neighborhood and started immediately to talk about their own experience to complete the sections or to refute what they are showing.

Furthermore, another point emerges from these representations. At the opposite of the map, or of the classic architectural and technical section, the sections are not panopticons. They do not give the possibility to see and understand everything at once. Indeed, the linear representation of urban sections created from the streets profile, and the inscription of situated people narratives implies to take time to read the drawing, and to move around to have close or wide views. Then, people who face these documents used to shift from being spectators, to be active readers, or even actors of these. Such a process allows the introduction of a cinematographic dimension in the representation that is not linked to the fact of drawing panoramic views. The necessary linear reading of the drawing introduces

indeed a narrative dimension created by the spectator/actor him or herself. Maybe, the next step of such a comprehensive method for understanding and representing is to be usable for participative city planning.

## Notes

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- <sup>i</sup> This work is part of a wider research program dealing with atmosphere related issues: Nicolas Tixier (dir.) *et alii*, *L'ambiance est dans l'air. La dimension atmosphérique des ambiances architecturales et urbaines dans les approches environnementalistes*. Research contract PIR Ville et Environnement – CNRS – PUCA, 2008-2009. The project is still under way (2008-2010). [www.pirve.fr](http://www.pirve.fr)
- <sup>ii</sup> BECKER H.S., « Inférence et observation participante. Fiabilité des données et validité des hypothèses » In Cefaï D. E., *L'enquête de terrain*, Paris: Éditions de La Découverte/M.A.U.S.S., 2003, p. 350-362 ; STRAUSS A., *La trame de la négociation. Sociologie qualitative et interactionnisme*, Textes réunis et présentés par Isabelle Baszanger, Paris: L'Harmattan, 1992, 319 p.



## PRESENTATION SESSIONS | **DESIGN**

Session One

Moderator: Valerian Miranda, Assoc. AIA



# Architectural Research and Representation: Expressing Sense of Place Through Storyboarding and Animatics

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## ABSTRACT

A consistent challenge within the design fields is the identification of appropriate research methodologies. The issue of representation has few precedents in other fields; it is unique to design and can be used as a research tool. In this paper, we will discuss the use of representation as a research tool to investigate and express a sense of place in the early stages of urban context analysis.

Human experience always occurs in a place and our memory of any experience is always place-specific. Emotional response is intrinsic to place experience and place memory. The *emotive place* captured in life stories is what contains the meaning of place that needs to be responded to by architecture. Life stories evidence significant urban paths, collective rituals, views, the relevance of no-longer existing buildings and qualities of a place in general. In the case study presented in this paper emotive space evident from life stories analysis, typically expressed in a written form was represented in storyboards (sketches used in film planning) and animatics (a moving storyboard).

The graphic notation of the storyboard encouraged the sequential exploration of architectural space. It also identified significant elements and points of view that articulated space and events. The storyboard representation had certain limitations when expressing physical space qualities since, as in any sketch, it expressed space schematically with very little definition on light, textures and materials. The animatics was more

effective when expressing the emotive space as it included audio and time. The use of storyboards and animatics can be thought of as a simple design exercise that is part of the design process or it could be considered research about the remembrance of place.

Conference theme: Innovative approaches to architectural education

Keywords: architectural education, research, storyboard, animatics

## INTRODUCTION

One of the key challenges is that research in architecture focuses more on efficiency and reliability of building design than on the social, cultural and psychological factors contributing to the sense of place (Ragheb 2009). We propose that this has been, in part, because of the challenge in identifying appropriate research methodologies and underestimating the role of representation as a key component that overlaps research and design. We argue in this paper that exploring non-traditional means of representation, such as storyboards and animatics, has value in the development of research to facilitate design (research “for” design), and research to investigate design (research “into” design). The described case-study illustrates the theoretical framework involved in developing representation as a research tool for/into design

## REPRESENTATION

Representation is central to architects as they use it to establish dialogues during the design process. Sometimes these dialogues are intimate wanderings through one’s thoughts and at other times they are a way of communicating design features to team members and clients. During this dialog, choosing one type of representation significantly influences the outcome of the project, since the choice inevitably enhances one design solution over alternative options (De la Puerta 1997). However diverse and versatile such representations might be, they inevitably rely on architectural educational and professional practices, which are well-rooted in the Cartesian paradigm. It presents physical elements in space, independent from one another, in an exterior world

that can be observed and represented objectively. In this type of space, there is no contemplation of how the multisensory perception or the individual's significance influences the understanding of place. On the contrary, vision becomes a way to acquire objective knowledge, predominant over the other senses. Historically, the architectural discipline reached this stage during the Renaissance. The perspective method with its monocular vision and mathematical structure of depth became the way of representing and knowing about space (Pérez-Gómez and Pelletier 1997). Traced to Plato's concept of space, a third element placed in the chiasm of being and becoming, space has been systematically reduced to its representation. We have to wonder how we can aspire to retrieve the status of presence to architecture (Pérez-Gómez 1994).

In 2005, Nanda and Solovyova argued for the need of a systematic language to depict the experiential knowledge in architectural representation. There is an established graphic language to represent design elements, but no conventions for expressing "sequences of concurrent actions, feelings, and thoughts associated with given behaviour patterns and given users, and the real-time sequential description of multisensory physical environments as experienced in movement" (Thiel 1997, 4). In other words, traditional architectural representation can describe the material nature of designed space but not the sequential experience of quality of place. Or putting it in Waterworth's words (1997), architectural representation describes form rather than content. This lack of notations for experiential knowledge challenges the architect's ability to account for meaningful collective experience of people inhabiting the place during the design process.

In this paper we explore a novel approach to representing a sense of place through storyboarding and animatics. The case study described further in the paper, firstly involved the ethnographic inquiry into the site for a project (traditional to the social sciences) and secondly the translation of the meaning and quality of place as experienced and remembered by the locals via storyboard and animatics. Storyboard and animatics provided a translation of the sense of place to architects and designers by using the account of life stories of residents of the site and converting them into a visual representation. The key differentiator of between traditional representation and the approach proposed in the case study is the efficacy in capturing the emotive place, or communicating emotional

experience, which is tied closely to the remembrance of place.

## **EMOTION AND THE REMEMBRANCE OF PLACE<sup>2</sup>**

Juhani Pallasmaa (1996) accurately noticed that a functional building is not yet architecture. To become architecture, the functional building needs to have both 'atmosphere' (Zumthor 2006) and meaning. Actual experiencing and remembering of the experience are essential for construction of meaning in general (Langer 1980; Gendlin 1962). The meaning of a place is a "qualitative totality of complex nature" (Norberg-Schultz 1980). Naturally, the meaning and understanding of *place* is essential for architectural design (Downing 2000; Lawson 1997). Frances Downing (2000, 83) stated this more emphatically when she wrote, "Design is an act of understanding and pragmatic use of past experience to identify, peruse, and imagine possible futures." Any human experience always occurs in a place and our memory of any experience is always place-specific. Emotional response is intrinsic to place experience and place memory.

Emotions play an important role in perception, understanding of place, and the construction of memory. Tuan (1977, 9) said, "the given cannot be known in itself. What can be known is a reality that is a construct of experience, a creation of feeling and thought." Philosopher Robert Solomon restated the same idea more simply (2007, 1): "We live our lives through emotions, and it is our emotions that give our lives meaning." It is almost impossible to recall a single instance of living that does not involve an emotion. Emotions are central to the meaning of experience because they are expressions of how we understand that experience. People need explanations of important events in their life. Positive explanations help us sustain our belief systems in an orderly manner, and reinforce a coherent sense of personal identity, as well as feelings of personal efficacy. Acceptable explanations satisfy personal and social criteria, even though such explanations may change with time. We have emotional relationships with other beings, things and places. Social relationships are influenced by objects and spatial environments "just as the meanings of objects or environments and people's interaction with them are constituted through social processes and always exist in specific sociocultural contexts" (Lupton 1998, 137).

Rachel McCann (2005) wisely noticed that “place is an empty container for experience.” The ‘stabilizing persistence’ of places housing experience contributes powerfully to their intrinsic memorability. “We might even say that memory is naturally place-oriented or at least place-supported. Moreover, it is itself a place wherein the past can revive and survive.” (Casey 1987, 187) Perception of place gathered from senses and accumulated personal experience are an important part of the emotions inspired by a place. The power of place is most fully manifested at the moment when place and body fuse and lose their identities (Casey 1987). When this happens, the expressiveness of place can no longer be contained by simple parameters; the emotional becomes the moving force and the place achieves significance and memorability.

Humans are social beings and we have shared cognition (Resnick 1991). Architects share these conceptions and knowledge of the world, meanings and beliefs. However, some of the major design failures like Le Corbusier’s Pruitt-Igoe or buildings rated on The Architecture Hate page (<http://www.bbvh.nl/hate/>) happen because the architect misunderstands or ignores the values of the culture and the place. Such negative examples of architecture make very clear the importance of the architect connecting to the emotive and meaningful existing place in which architecture is to happen. One way of establishing shared meaning is through understanding values of the culture and space and associating those values with architect’s own experience. Casey (1987) calls this *familiarity* and “body memory establishes familiarity that is requisite to the full realization of place memory” (193). In architecture, familiarity allows the embodied understanding of place to be projected into other places by an imaginary inhabitation of them.

One of the key challenges in architecture today is the lack of tools through which an experiential understanding of place can be achieved, communicated and translated into design. We argue here that this understanding and its subsequent communication, is a research directive that feeds both concept and design. In the case of architecture the search for knowledge is anchored both in the external world of brick and mortar and in the internal world of experience and memory. A designer’s experiences and values influence the solution to an architectural problem, and thus, different individuals provide different solutions to the same problem. This, we argue, is the familiarity that Casey mentions: a highly personalized account of emotive

place that we are tapping into as designers during the creative process. We further contend that familiarity with place is a research directive that involves a deep understanding of place from multiple perspectives (user and designer) and adequate, new means of representation would help create more meaningful designs. In this paper we present a case study that describes how design students achieved an “empathetic” familiarity with the site by fusing their own experience with that testified by the locals. The case study also reports the results of using experimental means of representing the emotive place through storyboards and animatics.

## STORYBOARDS AND ANIMATICS

Films share with traditional Cartesian representations a monocular vision and the verisimilitude that accompanies the projective method. As an audience, we engage with film easily: have you ever felt, after watching a good movie that you have been to another time and place? You have been seated in the movie theater, quiet and in the dark. However, it feels as if you have been to the place the movie sought to take you, enduring the hero’s misfortunes, and rejoicing in his victories. Such a movie feature is relevant to the architect since it provides representations of place which expresses place through the experiencing of the *other*. A case could be made that this *other* is nonetheless mediated by the film director’s interpretation. Similarly, architects also creatively interpret the needs of the other, the prospective user, into their designs. Therefore, film offers a representation that could become helpful to architectural designers in expressing the meaning of emotive places.

Films have been linked to architectural research from several perspectives. The most common practice is introducing film into architectural education for film analysis. There are several studies that center on the graphic codes and formal guidelines for design (Brady 1997; Bridges 1993; Diprose and Hotten 1999; Flanagan 2001; Mark 1997; Rafi 1998; Sabater and Gassull 1992; Temkin 2003) from which the instructor could base the film analysis. Faculty could also lead a discussion based on approaches about architecture as set design (Ramirez 1993; Vila 1997), or resort to pragmatic studio applications aimed at developing architectural projects (Cairns 2007; Knox 2007). Other approaches lead to establishing rules of form generation through relating space and events in film (Tschumi 1996). During film analysis, instructors could also

resort to texts that elaborate upon the emotional experiencing of place portrayed in the movies (Ábalos 2000; Brott 2008; Murphy 2006; Pallasmaa 2008). However, most of these endeavours use films to represent and produce architectural forms from spaces expressed in the films rather than explore the idea of existing emotive place.

Even though we engage in film narrative without any effort, once we look at the film's planning of the scene, we realize how a film's representational codes are distinct from real life perceptions. Such codes involve not only culturally perceived indications (like high-contrast lighting for mystery and murder) but also narrative strategies and, most importantly for us designers, a way of organizing the visual sequence. In film, audience identification, and playing of character's gazes (expressed in the shot/reverse shot montage) are supported by nontrivial codes of manipulation of the image sequences. Understanding the distinction between real life perceptions and the filmic representation of place is fundamental when speculating on the potential of such representations in architecture. Furthermore, film manufacturing and production is highly specialized and time consuming. Architecture requires tools that would allow a designer to experiment with visual narration in a fairly quick production.

Storyboards are drawings produced for planning film scenes in order to establish preliminary views of the narrative sequence. Being fast linear sketches, storyboards are similar to croqui in art and architecture. Storyboard is a sequential mock of a scene permitting to plan for views, framing size, angle, movement and dialogs of the characters. Animatics or animated storyboard produces a qualitative change in perception. Time and movement, which was perceived imaginatively in the storyboard, is now explicit. Animatics, although sketchy, simulates rhythm, montage sequences and transition of the film.

What can storyboard and animatics offer architectural design? They incorporate the concept of scene: a place signified by the emotive perspective of the narrator; the place where design occurs. From this starting point the designer can rethink place from the user's subjectivity (Aroztegui, Garcia and Lopez 2009), and thus provide an alternative representation that can capture the expression of familiarity of emotive place.

Films allow the designer to acknowledge the other (users' social representations and their experiencing of space)

which leads to the potential of incorporating the other into the architect's creation. Thus, working with film in architecture could (1) strengthen the importance of the target subject of the architect's work, and (2) allow for the expressing of emotion, a dimension understated in traditional architectural representations. In other words, by focusing on film, architects can focus on the other (the human beings they envision will experience the building or design) should be the center of our profession. Architectural practice should not only involve the knowledge and content belonging to the profession, but also the ways of acknowledging the individual subjectivity of the other, the person and context we address as professionals in order to produce relevant architecture.

Tapping into this subjectivity of the other is a key research directive for design. Just as the sciences strive for pure objectivity, design should strive for multiple subjectivity. The case study below will articulate how a representational tool, storyboarding and animatics, can facilitate an understanding of this multiple subjectivity. This would then become a tool for both research and design, without the formal delineation of the two.

## CASE STUDY

The case study involved a two-week exercise led by Carmen Aroztegui in a studio of second year architecture students from *Universidad del Bio Bio*, Chile<sup>3</sup>. The case study explored tools of representation, storyboard and animatics, to investigate and express the sense of place in the early stages of urban context analysis. It used the ethnographic method of collecting life stories of local people that were later represented in storyboard and animatics to transition to the design<sup>4</sup>. The students' assignment was to design a space in Lota, a former mining town in Chile that has been in depression for the past 13 years due to closing of the mine. Lota has strong community identity that evolved over 150 years of mining. In the exercise students had to define the site, the user and the design program. This definition had to emerge from analysis of the place and its needs.

In a traditional approach, designers analyze visible features of the city: buildings and space proportions and human interaction with the place. Sketches typically represent subjectively understood place and events. This traditional approach excludes local people's meaningful construction of place.

Students approached the project by first interviewing Lota's locals. They conducted open-ended interviews prompting for significant events in Lotinos' lives and places where these events happened. Interviews did not collect factual information and focussed on the subjective meanings of events and places. Interviewing became a way of reaching out to other people's feelings and values, a way of understanding Lota as an emotive place.

The emotive place evident from life stories of Lotinos could be typically expressed in a written form of a 'thick description' (Lincoln and Guba 1985), a method common to social sciences. However, the students needed means of representation in which concepts and information could be expressed into images and three-dimensional models.

After the interviews, students brought their experiences back to the class. They were confused and overwhelmed by the generosity of the Lotinos and their willingness to share their stories. From each interview they drew several versions of storyboards. At the end of two weeks, the students presented their animated stories. Their animatics resulted in a wide variety of narrative strategies. Some preferred an intimate but yet documentary-style voice that presented the facts and historic imagery of Lota. Others preferred fictional narratives relying on classic storytelling with an emphasis on the story (Fig. 1). Yet other groups approached the fiction by emphasizing the perceptual impact of the narrated spaces (Fig. 2).

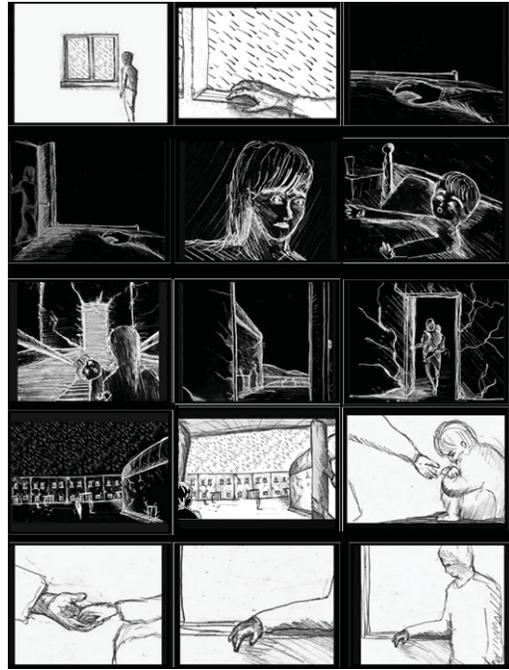


Figure 1: Screen capture of animatics "Terremoto" [Earthquake].



Figure 2: Screen capture of animatics "Abrigo negro" [Dark Shelter].

The approach to programming through ethnographic interviews exposed the traditional approach as pragmatic and need-based. Interviews deeply moved students and let them connect to the place. Not constrained by building functional requirements, the students could set free their designs from measurable and objective preoccupations. Their animatics brought to life fictional voices into imagined places. Events and characters' lives constituted the place.

The storyboard indicated a conceptual shift from usual architectural sketching. In sketching the interpretation of place is largely observational and is interpreted from the subjective perspective of the observer. However, in the case of storyboards it was based on the analysis of life stories. The drawings incorporated the explanation of others' meaning and atmosphere of place. The sequence of drawings recorded significant moments in place and scripted the fictional modes of dwellings. The notation of the moving frame also allowed incorporation of what was outside the frame challenging the totalizing vision of the traditional sketch. However, the storyboards emphasized the narrated event more than the feeling about the place. Since storyboard is schematic, space qualities were communicated in a very limited way, with little light and material definition. Another limitation seen in the studio experience was that students did not utilize the full potential of the storyboard: they did not incorporate the concept of the out-of-the-frame-space. In other words, students did not grasp the expressive potential of designing place accounting for movement (of the camera or the characters) and audio typically implied in the storyboard notation.

The storyboard did encourage the sequential exploration of architectural space through recognition of elements and viewpoints of the place and the events but the animatics was more effective in expressing emotive place and its important features. Inclusion of audio, time and images with color and light variation allowed for an in-depth exploration of the atmosphere of the place and relating to qualities of place and spatial sensations. It is important to note that inclusion of time in animatics did not necessarily entail creation of a continuous special path but revealed how the place is configured through film montage. The students realized the difference between the real time experiencing of place, which implies a continuous visualization and the filmic codes of representation in the montage produced by

a fragmentary superposition of visuals. The animatics resulted in persuasive account of lived places. Animatics offered exploration of augmented reality experiences since it expressed both place and time with multiple layers of information richly depicting qualities of place and its significant elements. Understanding and trying to convey the subjective dimension of place in the animatics made the designer connected to the place with his/ her own memorable experiences that were unavoidably evoked by the record of other's life stories. This connection made the place familiar, in an empathetic manner; fusing the person of the design student's self with the other. Students interpreted what they learned about Lota through their own past experiences, memories of place and significant events of their lives, and this construal became a fertile ground for translating the experience into new designs full of meaning.

Below is one example of connection to the place through one student's own memorable experience that inspired the design. The student, Aberto attended the emotional aspect through programming. His group interviewed a Lotino who remembered the daily arrival of his father, home from the mine, through a corridor in his home. This Lotino was a hair stylist and regretted not becoming a miner as his father. He remembered his childhood, when his father would return exhausted from work and how he paid little attention to his children. The boy was eager to welcome his father since it was the only moment of attention he received. The corridor, otherwise understood as an architectural type articulating public versus domestic space, was signified by the memory of this event. The interview incorporated a traditional architectural feature of Lota, the corridors of the popular housing pavilions. The animatics told the story in a flashback expressed in black and white linear drawings and showing in red the main character remembering his childhood (Fig. 3).

After the animatics, Alberto went back to Lota to identify a specific location to develop his project (Fig. 4). He sketched several places and decided to work at the end of one corridor's pavilion. Alberto reformulated Lota's corridor, its morphology and emotive content, in the context of a daycare. Alberto's design of the daycare was not a place of abandonment but of family reunion, a place of mingling of parents and children (Fig. 5).



Figure 3: Screen capture of animatics “Hijo de minero” [Son of a Miner].



Figure 4: Alberto's sketch of the site.



Figure 5: Photo composite of Alberto's project.

his design elaborated upon the remembered emotional content of a traditional architectural feature of Lota, the corridor's pavilions. However, the studio overall experience was over a short time frame, and left much of the potential of exploration of place in storyboards and animatics untapped. One feature that remained unexplored was the fact that some students were uneasy by the uncertainty of the subjective exploration. Although all the students reached the design phase, some students had difficulties dealing with not knowing where this exploration was leading. The analytical process of architecture design gives the *impression* that creativity is a linear flow. Embracing subjectivity upfront was disturbing and students with strong analytical skills did not see much value in the exploration. The experience, however, did not seek a method to replace factual information that typically describes an architectural project rather it looked at ways for the designer to add another qualitative layer intended to capture meaning of the emotive place of others and potentially a conscious process of transforming that sense of place into the 'atmosphere' (Zumthor 2006) of new design.

## CLOSING

Representation, when reduced to expressing the visual appearances of space, takes away from place's experiential dimensions. Often designers (and design students) find themselves placed in the crossroads between representing form and eliciting presence. Our paper suggests a tool that can be used by students and professionals alike to articulate this crossroad and make it a launching point for design. The verbal-visual combination exploration of people in place. In the case study, we explored the potential opportunities and shortcomings of representation borrowed from film. We argued that film allowed the expression of emotion in place. Furthermore we suggested that the emotive place was one that accounted not only for the designers' remembrance, but the subjectivity of the "other", the user, who remembers the same place filtered through his or her emotions. The experience aimed at articulating the representation of what students experienced when they were empathetic to users.

Though methods borrowed from other disciplines (social sciences and film) presented certain problems described above, the combination of ethnographic study with storyboarding and animatics definitely allowed students to submerge in the place (design site). They not only understood the values and emotive place of the locals but

also established a connection to the place through their own emotions and memories, familiarity. Conversations with users of the place allowed grasping the true meaning and sense of the place essential for creating architecture. Storyboarding and animatics provide means of prioritizing the collected data and emphasizing the important in a format comprehensive to designers. These representations are useful for translation of meaningful experiences into a building form. Unlike the traditional approach of recording the understanding of place through sketches (necessarily from a specific point of view) storyboard and animatics allow the designer to analyze and experience place through multiple perspectives: that of the other (the user) and fuse it with their own personal narrative. This multiple subjectivity is arguably more objective than a purely personal recording of what a designer “sees”. At the same time, it is more experiential and emotive, since it contains not just a recording of the physical environment but of the life stories contained in it.

More investigation of the method is necessary. It would be beneficial to repeat this case study with experienced architects and designers to assess its effectiveness as a tool for design practice vis-à-vis a tool for design education. Previous empirical studies confirm that architects intentionally or unintentionally rely on their own memorable experiences when designing (Downing 1989, 2000; Israel 2003; Solovyova 2010). The need for notations of place quality, and participants “environmental personality” in the experiential environment has been explicitly expressed (Thiel 1997). Currently in architecture there does not exist any strategies for the assessment of qualitative and phenomenological qualities of place, or means for the cognisant transition from comprehension of the sense of place to a newly designed experience. Ethnographic study has been validated as an interpretive naturalistic approach to a subject matter embracing meaning in context (Groat and Wang, 2002). The fast paced world design is often focused exclusively on the functional needs and precedents are analyzed for formal elements to describe the design. Inherited from reductionist understanding of functionalism, modern architecture dismissed subjectivity and enthroned ‘objective’ scientific methods into our discipline. Architecture became a pre-ordered commission indifferent to the cultural values and emotions of its users. Borrowing from qualitative research to inform the design can help establish a balance.

Ethnographic study captures the meaning and the sense of place but does not offer the means of representation that can allow a designer portray the findings in a format effective for design. Until architecture develops its own research and representation methods borrowing from film seems like a sensible option. It is vital however to adapt borrowed methodologies to the unique context of design. Storyboarding and animatics, within an overall ethnographic approach, allows a means to capture and communicate multiple perspectives in the experience of place. This can be a vital tool for designers. Furthermore, it allows a method of ‘digesting’ qualitative information common to other social sciences and presenting it in a manner comfortable to designers.

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#### END NOTES:

1. Posdoctorado FONDECYT 3090014
2. This section is based on the Doctoral dissertation of Irina Solovyova (Texas A&M University, 2010)
3. The studio was led by Prof. María Isabel López and Prof. Rodrigo Lagos.

4. A detailed description of the case study can be found in "Storyboarding and Animatics in Architectural Education" by Aroztegui, Garcia and Lopez, 2009.

# **A Design Research: The creative cognitive approach in the processes of shaping and making of a place**

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## **Abstract:**

Creativity is a capability dominated by all humans, and is a natural part of the thinking process. Creative ideas are often generated during conceptual design which is the first step in the design process. Designers think about new concepts and develop them into design options. The creative cognition view of creativity provides a strong foundation for analyzing the conceptual design process because it utilizes basic cognitive mechanisms to explain how individuals create. One basic goal of the creative cognition approach is to improve understanding of creative process by using the methods and concepts of cognitive science. The present research aims at examining the creative cognitive process of an architect during the act of designing a house for her/himself. In order to investigate the contents of a thought process, protocol analysis method will be adapted to this experimental study. The evaluation will be structured on the action categories defined in cognitive research in design that covers physical, functional, perceptual and conceptual manners. This research lies within the scope of examinations of cognitive process of an architect for crystallizing design ideas in early design processes.

**Keywords:** creativity, cognitive process, protocol analysis, creative cognitive approach

## **Introduction**

Creativity can be characterized as a complex activity, consisting of a special form of problem solving (Newell et al., 1962). The designers' mental representation evolves as the problem solving progresses. Therefore, each designer constructs his or her own representation of the design problem and deals with a problem that has become specific to him or her (Simon 1995). In practice, different designers, supposedly solving the same design problem, reach different solutions (Bonnardel and Marmeche 2005).

Attempts to understand and promote creative thinking have focused on a number of descriptive models. Rosenman and Gero (1993), for example, classified the

procedures that might occur in creative design models into four groups: combination, mutation, analogy, and first principles. Gero (1994) added emergence to these groups. Hennessey (1994) focused on the assessment of creativity by examining the relationship between ratings of product and process creativity. Dorst and Cross (2001) also studied this relationship, and using protocol analysis in their empirical study, evaluated the observations in a model of creative design as the co-evolution of the problem and solutions spaces. They claimed that the process of evolution, as driven by a reaction to surprise, could be considered as creativity in the design process. In architectural design processes, Akin and Akin (1998) analyzed the discovery of a creative solution that corresponds to the sudden attainment of an insight in the sketch of a design problem that was structured with several restricting frames of reference. Akin and Akin (1998) later suggested that *"the cognitive processes observed in these design fields closely resemble processes that play a role in a number of the traditional art fields such as music, writing, painting and sculpture"* (pp. 129–130).

## **Cognitive Stages of Creative Problem-Solving**

Design, a field that inherently involves a creative problem-solving activity, necessitates the making of decisions in order to fulfill certain objectives. Over the years, several different models have been proposed to explain the process of creative problem solving. In fact, these models are not extremely different from each other and have quite a lot in common. The first of these models was originated by Wallas and consists of four stages: preparation, incubation, illumination, and verification (Hasircı and Demirkan 2007). Plsek (1997) claimed that, in establishing the stages of creative process, many models use the common theme (such as Bandrowski's, 1985, Model for Creative Strategic Planning; Barron's, 1988, Psychic Creation Model; Fritz's, 1991, Process for Creation; Treffinger and Isaksen's, 2008, Creative Problem-Solving Model; Koberg & Bagnall's, 1981, Universal Traveler Model; Osborn's, 1953, Seven Step Model for Creative Thinking; Rossman's, 1931, Creativity Model). On the other hand, Finke et al. (1992) propose Geneple, a general model of creative cognition that can be applied to the conceptual design of products. The model consists of preinventive structures, generative processes and exploratory processes. This approach is based on the experimental methods of cognitive science. The aim of this approach is identifying the specific cognitive processes and structuring that contribute to creative acts and products and to develop novel techniques for studying creativity within the context of controlled scientific experiments. A central feature of the

creative cognition approach is that it ties in with current research in traditional areas of human cognition and cognitive psychology (Finke et al., 1992). That findings of creative cognition research can have important implications for both advancing our understanding of creativity and for extending current methods and ideas in these traditional areas. In fact research in some of these areas, such as imagery, categorization, and problem solving, has already begun to move in the direction of exploring creative cognitive processes (Smoliar 1995).

Creative ideas are often generated conceptual design—the first stage in the design process. Designers think about new concepts and develop them into design options. The creative cognition view of creativity provides strong foundation for analyzing the conceptual design process because it utilizes basic cognitive mechanisms. Different designers have different creative abilities, but all designers use the same cognitive process (Benami 2002). Based on all these information, it can be admitted that creativity is about the designer cognitive mechanism. In order to reveal the data that affects the design process and measure the creativity, cognitive actions are needed to be investigated. As set out here, cognitive actions needed to be defined by a logical research method.

### **Cognitive Actions**

For to identify the cognitive actions of a designer, coding scheme is used that enables to systematically code cognitive actions of designers from video/audio protocols. The coding scheme has produced relatively similar results, even when used by different analyzers (Gero and McNeill 1998).

The purpose of the analysis was not to directly obtain results with full generality but to assess whether this type of approach could produce useful results. The results of protocol analysis studies and coding of designers' cognitive actions led us to evaluate sketching using concepts from mental imagery processing.

Based on literature analyses four types of actions has been developed for the case study: physical, perceptual, functional and conceptual. This classification was obtained by revising Suwa and Tversky's (1997) information categories in such a way that the four categories correspond to the levels at which incoming information is thought to be processed in human cognition. Past literature in cognitive science supports the proposition that information coming into human cognitive processes is processed first sensorily, then perceptually and semantically. Physical actions correspond to sensory level, perceptual actions to perceptual, and both functional and conceptual to semantic (Suwa, et al. 1998; Ketizmen 2010). All action categories can be seen at table 1.

### **Physical Actions**

As Suwa, et al.,(1998) states that the first category, physical, refers to actions that have direct relevance to physical depictions on paper. There are three types of actions. Physical actions are divided into three categories, which are 'draw', 'modify' and 'copy' actions (see Table 1). These actions have been referred to as "P"-actions (as it is the capital letter of "physical"). They had also 'look' actions and actions that were related to motion of pen or hands, but the present experiment did not employ those subcategories of actions.

### **Perceptual Actions**

This action category is divided into three, which are named as features, relations and implicit subcategories. As described in Suwa et al. (1998) features refer to visual and spatial attributes of depicted elements such as their shape, size or texture. The second class defines spatial relations among elements such as connectedness, alignment, and remoteness. There is also an actions related to implicit space. These actions have been referred to as "Pe"-actions (as it is the capital letter of "perceptual").The subcategories and the corresponding cognitive actions can be seen in Table 1. These subcategories were selected from Suwa et al. (1998) and Bilda (2001), and were revised and new subcategories added in meaning identification to fit this study's situation.

### **Functional Actions**

This category is divided into two subcategories named as 'implement', and 'thought' functions. 'Implement' refers to the functions related to implementation of functional criteria that the designer makes up in his/her strategies. The subcategory thought functions, is related to the functions, which the designer thinks of during the design process. The functions (Table 1) were selected from Suwa et al. (1998) and Ketizmen (2010) were revised in meaning identification to fit this study's situation.

### **Conceptual Actions**

The fourth category, conceptual, refers to cognitive actions that are not directly suggested by physical depictions or visuo-spatial features of elements (Suwa et al. ,1998). The first three categories are taken from the research made by Suwa et al.(1998) and Ketizmen (2010) were revised in meaning identification to fit this study's situation. The C4 category has added to this action in order to fulfill the all the conceptual action of a designer.

Category	Sub-category	Codes	Description
Physical Actions	Draw	Pa	Making new depictions (drawing lines, walls, things which are object, furniture, etc.)
		Pb	Depicting a symbol that represents a relation.
	Modify	Pc	Writing words for describing the thoughts.
		Pd	Revising the shape, size, or texture of a depiction.
	Copy	Pe	Erasing a depiction / delete a wall or object.
		Pf	Tracing over a depiction on a new sheet of paper
		Pg	Description of an object in a space.
Perceptual Actions	Features	Pea	Attending to the feature of a new depiction (shape, angle, size, texture)
		Peb	Attending to the new feature of an exist depiction
	Relations	Pec	Creating or attending to a spatial relation between two space components or area
		Ped	Creating or attending to a spatial relation between the present and past.
		Pee	Attending to the location of an object in a space component.
		Pef	Discovering an organizational relation between things/objects
	implicit	Peg	Impose the meaning on the formerly described relations.
		Peh	Emphasize the feelings about a space.
		Pei	Emphasize the features about a space.
		Functional Actions	Implement
Fub	Associating a new depiction, feature or relation with a specific function that was previously thought or newly discovered.		
Fuc	Re-interpretation of a function		
Fud	Permanence of a function		
Thoughts and functions	Fue		Thinking of a function independently of depictions.
	Fuf		Remembering a function
	Fug		Describe a new function.
Conceptual Actions	Self evaluations	C1	Set up goals
		C2	Retrieve knowledge
		C3	Make preferential and aesthetic evaluations
		C4	Make socio-cultural evaluations

Table 1: Cognitive Actions

## The experiment

The design task of the experiment was “designing of a house” that reflects the designers herself. The experiment conducted around a table. During design process the one year experienced architect express her ideas loudly and all the process recorded. After finishing

the sketch problem, the participant was asked to explain her design decisions and preferences. The process went on like an interview to let the designer evaluate her design and at the same time to gain a previous insight on the designer’s view.

## Protocol analysis results

In order to investigate the contents of a thought process, protocol analysis method is adapted to this experimental study. The evaluation is structured on the action categories defined in cognitive research in design that covers physical, functional, perceptual and conceptual manners.

The frequency with which functional, perceptual, physical and conceptual actions occurred throughout the design process of the architect was examined. She produced six pages of sketches. The rectangular closed shape in Figure 1 is the property line of the site given to her. She was asked to arrange a home for herself. Also given was a pair of parallel lines representing a public road that runs from the south of the site to the west. She stated in the report that each Figure presented a distinct design phase in the process. Figures 1 and 2 involved analyzing both the site and the design requirements. Figure 2 was the phase to roughly arrange things on the site. This arrangement became the basis of all the subsequent pages. In Figure 3, she explored one possible design based on the arrangement. In Figure 4, she tested another way. In Figure 5, she worked on an accurate building plan based on Figure 4. In Figure 6, she worked on a building plan based on Figure 3. For each page, the sum total of occurrences of physical, perceptual, functional and conceptual actions are determined. The cognitive actions used during the design phases with their explanations can be seen in table 2. Table 3 shows, for each page, the ratio of occurrences of each type of action to the total number of occurrences.

In figures 1 and 2, physical actions were dominant while functional actions were less frequent. In Figure 3, functional actions occurred more frequently than in the first two pages, and physical actions were less dominant. In Pages 4, 5 and 6, this pattern was more relevant. In Figure 6, functional actions and physical actions increased. Also perceptual and conceptual actions are dominant. This tendency is more than Figure 3. Actually, in the first half of Figure 6, she emphasized some of the basic arrangement she had made in Figure 3 and tried a new arrangement with which to explore a detailed building plan.

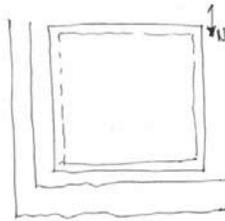


Figure 1

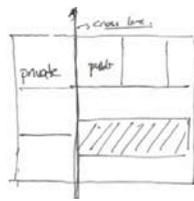


Figure 2

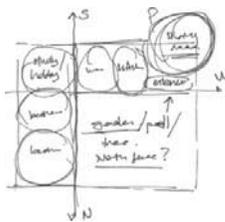


Figure 3

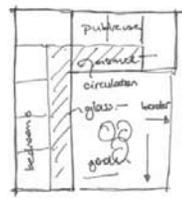


Figure 4

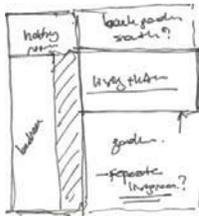


Figure 5

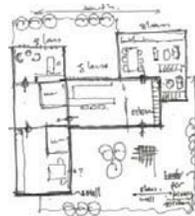


Figure 6

After these evaluations, all the actions observed in drawings are set on a table (table 2) with their explanations. With the help of verbal protocols, the actions are analyzed on each figure one by one. Afterward, the numbers of each action of the sketches counted. For example in physical action there are six "Pa" actions in sum. Furthermore, total numbers of each category noted, and the frequency of each have been calculated.

These findings have two implications. First, her design process contained three distinct phases: problem analysis, spatial arrangement, and functional exploration. Second, the occurrences of functional and physical actions capture the characteristic of each design phase. Perceptual actions occur more frequently in the phase of perceptual exploration than in other phases. Physical actions dominate in the phase of problem analysis. The phase of spatial arrangement is intermediate between the two.

Action s	Codes	Description	Pages
Physical	Pa	Drawing the border of the building area/ space/furniture	Figure1, 2,3,4,5,6
	Pc	Writing words for describing the thoughts.	Figure 2,3,4,5,6
	Pd	Revising the shape of the buildings.	Figure 5 and 6
Functional	Fub	Associating a new feature and relation with a specific function that was previously thought or newly discovered.	Figure 3,4,5 6
	Fuc	Re-interpretation of a function	Figure 4,5 6
	Fug	Describe a new function.	Figure 3, 4,6
Perceptual	Pea	Attending to the feature of a new depiction ( <i>shape of the building</i> )	Figure 4,5,6
	Peb	Attending to the new feature of an exist depiction.	Figure 3,4,5 6
	Pec	Creating a spatial relation between space components.	Figure 3,4,5,6
	Pef	Discovering an organizational relation between things/objects	Figure 4,5,6
	Pei	Emphasize the features about a space. ( <i>space arrangements</i> )	Figure 4,5,6
Conceptual	C4	Make socio-cultural evaluations ( <i>depicting the borders for privacy, territory</i> )	Figure 6
	C3	Make aesthetic evaluations ( <i>using glass and solid walls, form trials</i> )	Figure 4,5,6

Table 2: The occurrences of each type of action in each page

	Number of codes	Frequency
Physical	13	%29,5
Functional	10	%22,72
Perceptual	17	%38,6
Conceptual	4	%9,09

Table 3: The number and frequency of each type of actions

## Conclusion

In this study architect design thoughts in an architectural design task was examined by the method of protocol analysis. One of the main goals was the development of a set of cognitive actions into which the contents of participants' protocols can be fitted.

Another contribution of the present research is the investigation of the cognitive actions that are dominant in creativity. It is founded that architect is more able to think of shapes/angles and sizes, which are intrinsically visual attributes of depictions. Moreover, perceptual actions are seen as the prevailing action during the design process. This means, she focuses on the features of the space and relations more than the other activities. Especially, she refers to the meaning of spaces, abstract features and reactions. This means that she can pursue design thoughts more deeply within.

Besides efficient perceptual actions the other actions are also important in the design process. Design occurs

within all these actions and this can be admitted as the concrete indication of the creativity. And all these findings show that, creative cognition approach is the specificity with which it characterizes both the nature of basic cognitive processes and how they operate on knowledge structures to produce original and task-appropriate ideas.

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## Epistemic space / Spatial knowledge

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### abstract

This paper is the result of a one-year long research on the question of architectural research brought forward at the Lucerne University of applied sciences, department of architecture, in Switzerland. The result of this project is the book *Reasearching architecture*.

The motivation for this research program was the appointment to implement research in the curricula of former Swiss technical schools after the Bologna reform, and the consequent questioning of methods and goals for research, in particular for the department of architecture. However, the general discussions of the schools, as much as an analysis of the state-of-the-art of architectural research could not create a satisfactory ground for our school, as too many questions remained not answered. Too many different positions and different takes on the matter, despite the high amount of investigations, conferences and publications devoted to this subject.

Thus the necessity to pursue an in-deep research on what architectural research could be, to get over the simple distinction between *design as research* and *research about architecture*. That is, the distinction between an understanding of architectural design as form of research and an understanding of research that can only take place in scientific disciplines such as building physics or history of architecture. In our understanding, the whole process of design, from conception to realization, has to be considered as research. This lead to the main question, that is: if architecture is research, it appears evident that one has to look for the kind of cognition and knowledge that results from this kind of research. This is what the general discussion appears to be lacking, being too much concentrated on investigations on the nature of the research and on its positioning among science and/or art.

This was actually the same in the beginning of this research project, as it was based on the positioning of architecture between art and science, between myth and logos, but in a second moment we realized that the question of research should be rather posed in terms of what kind of knowledge results from it. This in turn would define the nature of the architectural research and not the contrary. As this knowledge is the result of the architectonic process of space production, it is assumed that space itself is the carrier of the knowledge, thus it can be spoken on the one hand of "spatial knowledge" for the knowledge that is gained in the (repeated) process of space-making, on the other the term "epistemic space", from *episteme* – knowledge, cognition – and epistemology, as the science of *how* spatial knowledge is produced, as the knowledge inherent in space, was coined. This knowledge can be decoded only by somebody who himself owns a *spatial competence* based on a spatial knowledge, that is by somebody who can read "space" and the methods and instruments that produced this space.

### Scientific research

Still, even if science is not the exclusive reference for an investigation of what research in architecture is, because of its historical and cultural dominance it cannot simply be put aside. In particular it calls for the question on how scientific research produces cognition and thus knowledge, in order to understand the difference towards the production of spatial knowledge. Looking at the scientific reference it has to be acknowledged, how what appears today to be an *immutable* model for cognition and knowledge, has not been the same before and could still change in the future. A look onto the etymology of words such as "research", "knowledge" or "cognition" shows that these were not always associated with the rational model, but had also more practice-based origins. The term "forschen" (to research in german) in particular, reveals these changes, as the word was used mainly in plural and coming from latin "poscere", it meant originally the search for something and had a juristic background. Corresponding words in other languages appeared only later. French "recherche" in 17<sup>th</sup> century and English "research" only in 19<sup>th</sup> century.<sup>1</sup>

The main difference between scientific and architectonic research lies on the fact that scientific research is goal-oriented, methodic and its results traceable and communicable, which architectonic research cannot be. The knowledge produced by scientific research is thus of a different order than the one produced by architectonic research. Furthermore, considering the classic distinction between basic-, applied research and experimental development for scientific research, it appears evident – and many critics have pointed this out – that architectural research resides somewhere between the two first ones, thus remaining in an oscillating position.

A last point that should be mentioned, concerns the "subject-object" question. Scientific research is normally based on a strict separation between a subject that promotes a research and the object upon which the research is done. Another

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<sup>1</sup> „Forschung“, *Enzyklopädie der Neuzeit*, Stuttgart/Weimar Verlag J.B. Metzler, S. 434

position, that of *sensual research*, postulates the necessity of a merging between subject and object, this obviously does not correspond to the rational claim of scientific research. Generally speaking, any research that is not scientific (discursive) is called intuitive and implies a different relationship between object and subject besides strict separation.

Besides this, there is another difference between scientific and architectural research that is directly related to the above mentioned methodic and traceable nature of scientific research. It concerns what is called "meta-knowledge of second order". Scientific knowledge does not only create knowledge on something but also knowledge on how this knowledge is gained. This is not the case for architecture, where knowledge is the result both of research and experience to a point, where the two can't be separated. Even though science too is not always rational in its procedures, at the end, the result and the methods must be integrated into the reflection and be understood a posteriori. In this sense it is interesting to refer to the work of Ian Hacking and his understanding of (scientific) experiment not only as confirmation but also as a performance of a theory, that is scientific research can take place as the verification of a set theory, but it can also be the result of a not yet rationally defined experiment that would be verified a posteriori. Or in his terms: "Science is said to have two aims: theory and experiments. Theories try to say how the world is. Experiments and subsequent technology change the world. We represent and we intervene. We represent in order to intervene, and we intervene in the light of representations. Most of today's debate about scientific realism is couched in terms of theory, representation, and truth. The discussions are illuminating but not decisive. This is partly because they are so infected with intractable metaphysics. I suspect there can no be final argument for or against realism at the level of representation. When we turn from representation to intervention, to spraying niobium balls with positrons, anti-realism has less of a grip. In what follows I start with a somewhat old-fashioned concern with realism about entities. This soon leads to the chief modern studies of truth and representation, of realism and anti-realism about theories. Towards the end I shall come back to intervention, experiment, and entities."<sup>2</sup> This obviously relativizes the claim of scientific rigueur for every step of a scientific research.

Another relativization of scientific rationalism come from what is called "constructive realism", a movement that asserts that scientific research never depicts reality, but constructs its own reality, which they call "micro-worlds"<sup>3</sup>. In relation to the dichotomy between what he calls scientific realism and its opposition anti-realism, Ian Hacking pleads for a third way.<sup>4</sup> In this sense, further references that question the "perfect" rationality of scientific research could be made, such as *Action Research* or *Grounded Research*, but these would not add anything to our claim, that spatial knowledge has to be investigated in its own terms and not in reference to scientific knowledge.

This underscoring of the importance of experiment for science has brought some interpreters to go as far as to confront it with design, as for example Glanville: „(Scientific) research (whether experiment or theory) is a design activity. We design experiments, but we also act as designers in how we act in these experiments. We design the experiences and objects we find through experiment by finding commonalities (simplification); (...). Thus, in doing science, we learn."<sup>5</sup>

### **Cognition/knowledge/performance**

Independently from the type of research – architectural or scientific – knowledge is the result of research and experience. From the above mentioned, it results how processes and practice becomes more and more relevant for an understanding of scientific research, acknowledging that science is not just a question of applying or verifying theories. Still, experience remains marginal, in the sense that scientists create an experience on how to formulate a theory or on how to successful construct an experiment, but this experience is marginal for the resulting knowledge. If we now look at architecture, we realize how here experience is much more important and how it is practically impossible to separate between research and experience.

It is interesting in this sense to refer to those investigations, which differentiated between two types of experiences and knowledge in relation to action. Such as Bertrand Russel (but one could refer also to the former investigations of John Grote

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<sup>2</sup> Hacking, Ian, *Representing and Intervening, Introductory topics in the philosophy of natural science*, Cambridge: Cambridge University Press, 1983, p. 31

<sup>3</sup> Wallner, Fritz G., Agnese, Barnara (Hg.), *Von der Einheit des Wissens zur Vielfalt der Wissensformen*, Wien: Wilhelm Braumüller, 1997

<sup>4</sup> "Scientific realism says that the entities, states and processes described by correct theories really do exist. Protons, photons, fields of force, and black holes are as real as toe-nails, turbines, eddies in a stream, and volcanoes. The weak interactions of small particle physics are as real as falling in love. Theories about the structure of molecules that carry genetic codes are either true or false, and a genuinely correct theory would be a true one. Even when our sciences have not yet got things right, the realist holds that we often get close to the truth. We aim at discovering the inner constitution of things and at knowing what inhabits the most distant reaches of the universe. Nor need we be too modest. We have already found out a good deal.

*Anti-realism* says the opposite: there are no such things as electrons. Certainly there are phenomena of electricity and of inheritance but we construct theories about tiny states, processes and entities only in order to predict and produce events that interest us. The electrons are fictions. Theories about them are tools for thinking. Theories are adequate or useful or warranted or applicable but no matter how much we admire the speculative and technological triumphs of natural science, we should not regard even its most telling theories as true. Some anti-realists hold back because they believe theories are intellectual tools which cannot be understood as literal statements of how the world is. Others say that theories must be taken literally – there is no other way to understand them. But, such anti-realists contend, however much we may use the theories we do not have compelling reasons to believe they are right. Likewise anti-realists of either stripe will not include theoretical entities among the kinds of things that really exist in the world: turbines yes, but photons no."

Hacking, Ian, *Representing and Intervening, Introductory topics in the philosophy of natural science*, Cambridge: Cambridge University Press, 1983, p.- 22-3

<sup>5</sup> Glanville, Ranulph, *Researching Design and designig research*, 1999, MIT, Manuscript

oder Hermann von Helmholtz), who already in 1911 differentiated between *knowledge by acquaintance* und *knowledge by description*, where the former is a knowledge that we obtain through personal experience and the later a knowledge that we obtain indirectly. Other examples are the differentiation between *knowing how* and *knowing that* by Gilbert Ryle in 1949 (*The concepts of the mind*) or the concept of the *tacit knowledge* by Michael Polanyi (1958). In more recent times sociologist Anthony Giddens makes a distinction between *practical* and *discursive knowledge*.

These are all attempts to differentiate between knowledge based on experience and a knowledge acquired through research. They help to understand better the case of architecture where normally, both conditions are equivalent.

If we look at the knowledge of architecture, that is based both on experience and research, it could be defined as "invention-knowledge" (*Erfindungswissen*)<sup>6</sup> that is, a knowledge that serves to invent solutions for always new tasks and projects. But how is this knowledge generated and how is it structured? Moreover if architectural research produces knowledge, this knowledge has in some way to be communicated, even if not verbally and even if indirectly. This implies the question of "continuation" or "sustainability" that will be of another order than the communication of scientific knowledge.

### **Iconic-/pictorial turn**

In order to better understand the question on how to define this spatial competence and on how to communicate spatial knowledge, it is interesting to refer to the ongoing discussion about the "image as carrier of knowledge". This investigates on how the creation and interpretation of images produces a "visual knowledge" that is not entirely communicated in words. Taking reference for example to medical images, it appears evident that doctors have to learn how to read certain images and that only through such a "visual knowledge" the information in the image can be depicted and transformed in a diagnosis.

This is one the keys of what is called the "pictorial" or "iconic turn".<sup>7</sup> Still the iconic turn can base itself on a long tradition of the analysis of image and their production, in particular stemming from art history and the tradition of *ekphrasis* (the description of a visual work) but also obviously from medicine. This does not appear to be the case for architecture, where almost no discourse on space has been brought forward the same way as was the case for other central aspects of architecture such as "structure", "form, or "envelope". Still, the same way as we can assume a "visual knowledge" we have to postulate the existence of a "spatial knowledge" that is gained through repeating the cycling process described above and which allows to read the "space" of other architect and to understand how this space was constructed.

### **Diagram**

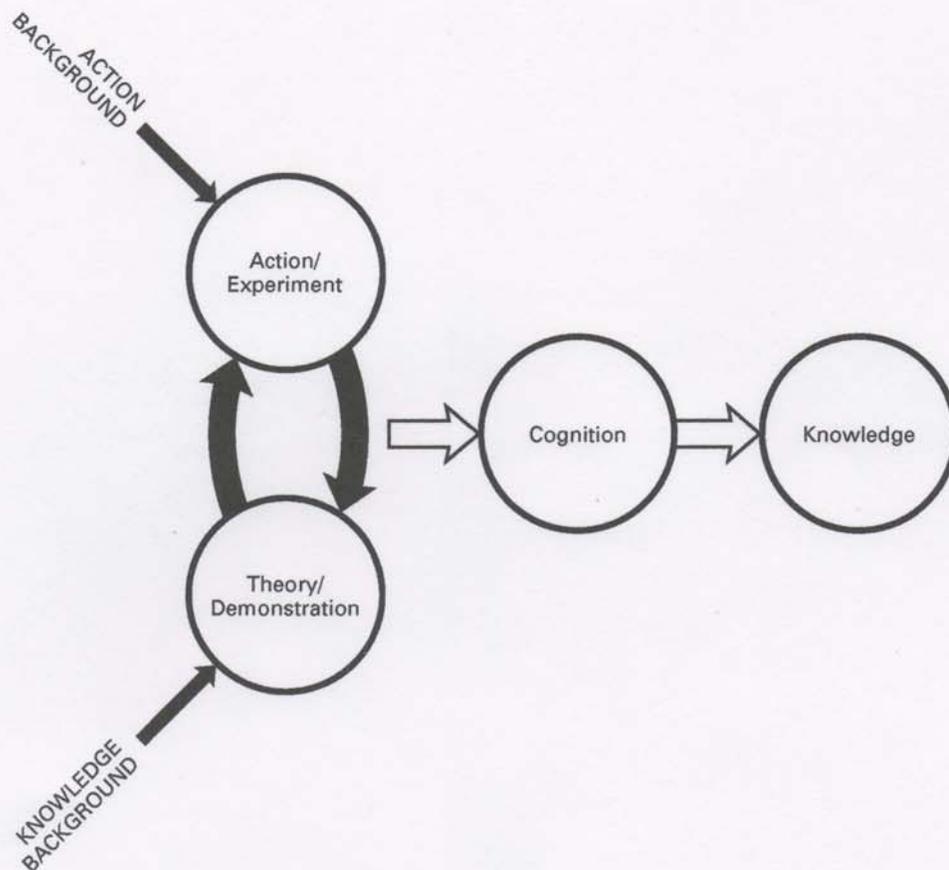
In order to investigate and to understand the nature of this spatial knowledge, the way it is communicated and how spatial competence is acquainted, we constructed a diagram that would reflect how knowledge is gained and that could be applied to different case studies.

A first diagram illustrates how knowledge is gained in a "normal" scientific research:

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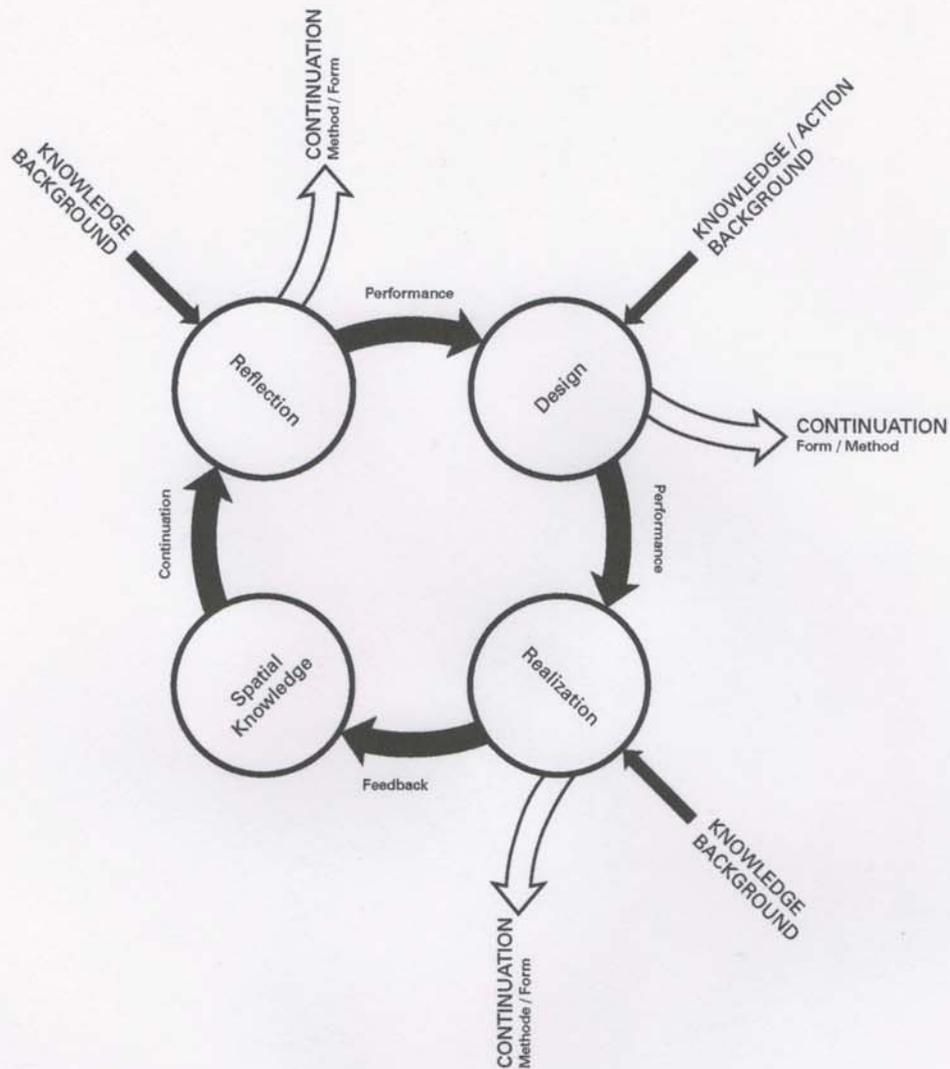
<sup>6</sup> „Erfindungswissen“, as illustrated by Brigitta Pfäffli, in: Pfäffli, Brigitta, *Lehren an Hochschulen, Eine Hochschuldidaktik für den Aufbau von Wissen und Kompetenzen*, Bern: Haupt Verlag, 2005

<sup>7</sup> The term „pictorial turn“ was introduced by W.T. Mitchell in 1992; the term „iconic turn“ was introduced in 1994 by Gottfried Boehm

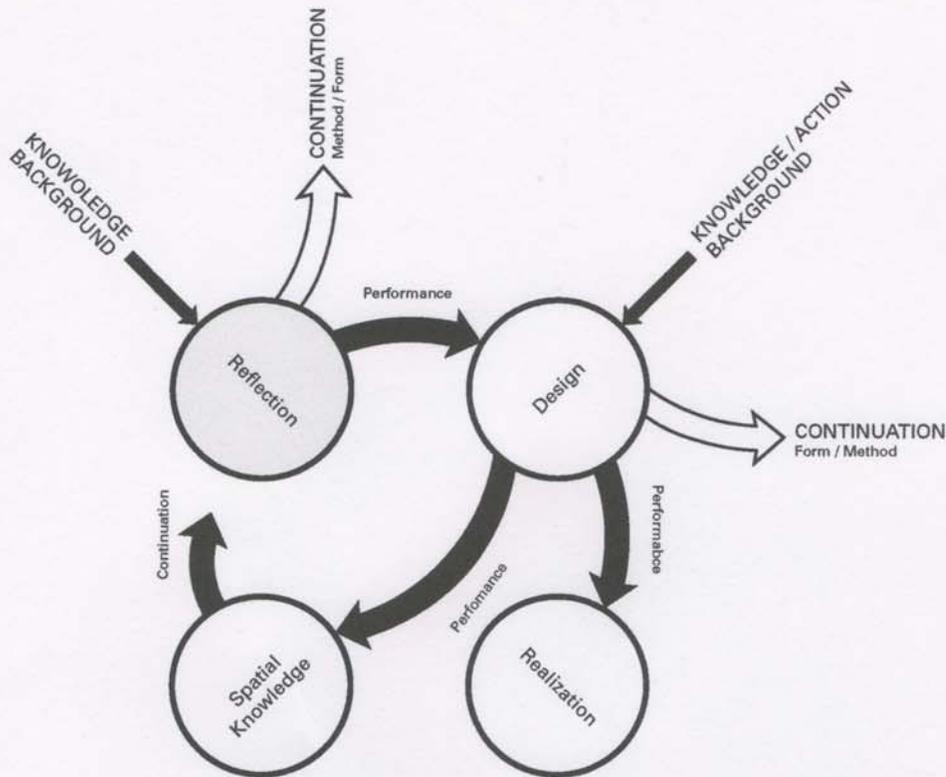


Through the interaction of experiment and theory – in whatever constellation – a cognition is produced that, if it corresponds to scientific criteria, results in a scientific knowledge.

If the same type of representation is applied to architectonic research, we have the following cycling model resulting:



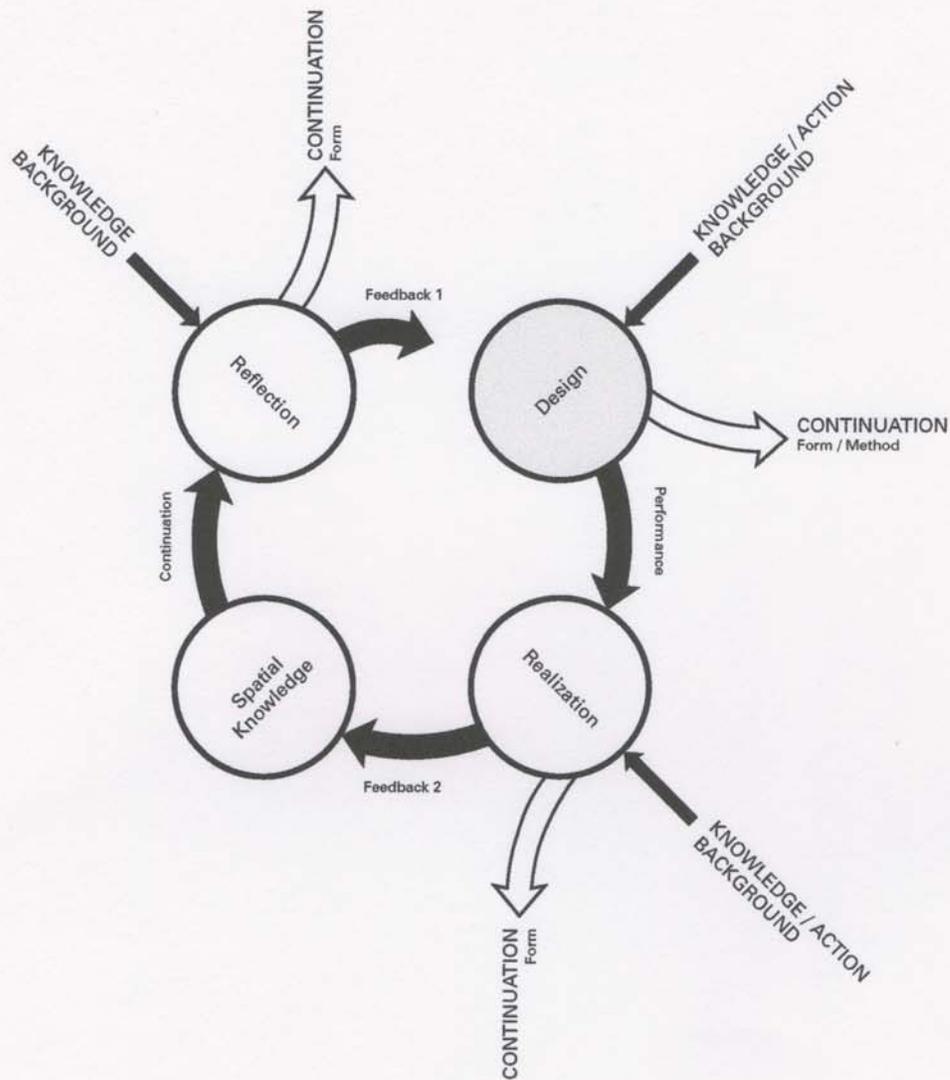
Basically every architect can have his "starting point" in a different node – Reflection, design, Realization – in order to obtain spatial knowledge, he has first to set a goal for his work and to find the instruments to fulfill this goal, secondly he has to run through this process several times acquiring the necessary invention-knowledge that allows him to respond to ever different tasks and projects through his methods and instruments. Thirdly, his knowledge has to be communicated and find a continuation through other architects.



In the case of Peter Eisenman, the cycle starts with his reflections – which are not a theory in the scientific sense, even if they might appear as such sometimes – and proceed over the design, back to the reflection, while realization is less an interest of his work in the sense that there is no much knowledge gained (except for questions of complexity). The starting point of Eisenman's work is a critique of mimetic representation and the attempt to introduce "modernist" thought into architecture. In order to do this, he mainly works on references to linguistics, literature (theory) and philosophy that he tries to implement in his projects (or to implement contents associated or announced by these references). In order to do this he clearly is focused on finding methods and instruments which could help him to do this. Due to the different influences at different times and the consequent shifts of paradigms, his work is particularly "didactic" as it reveals for every phase this quest for a translation. As an overall instrument, the diagram – to what he dedicated a book in 1999, *Diagram diaries* – is what allows him to merge influence and project and at the same time represent his processual design method. The diagram came mainly through the influence of his mentor in Cambridge Colin Rowe (and thus indirectly through Wittkower), already his Phd was based on a diagrammatic analysis of several architecture masters.

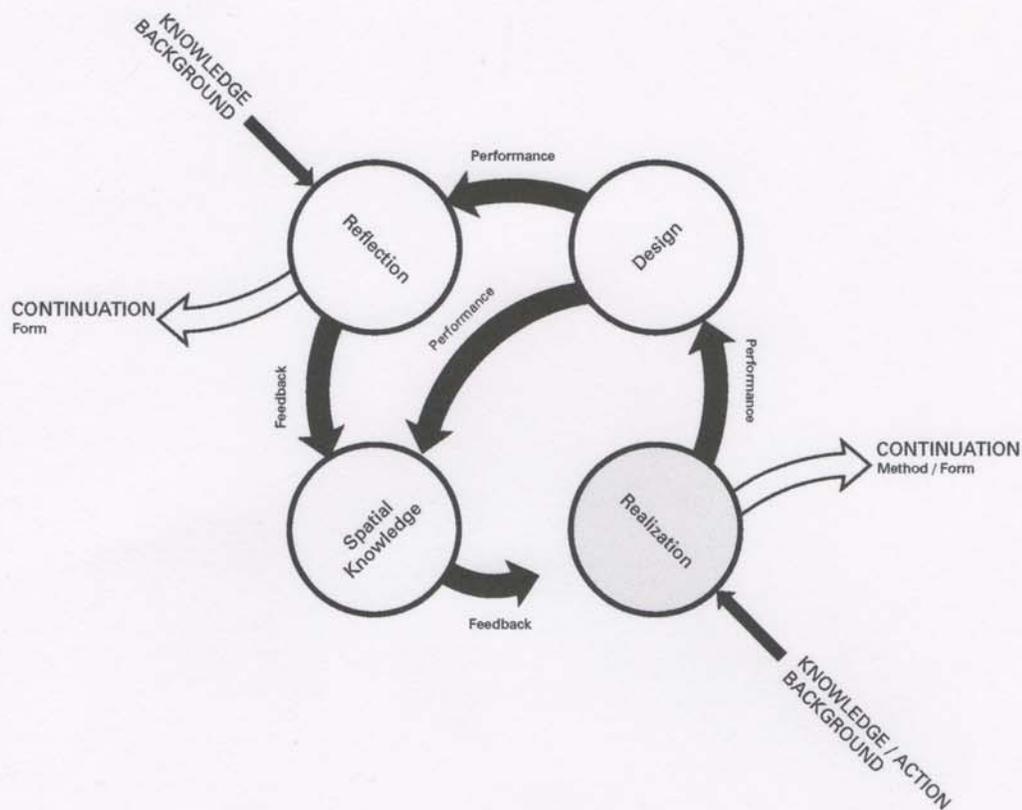
Thus we can say that the spatial knowledge of Eisenman resides in the capacity or in the attempt to transfer contents into architecture and in the development of strategies and methods to this end. His spatial competence resides in his capacity to find ways of implement certain contents into the space of his projects (and it is irrelevant whether he is successful or not in that)

The spatial knowledge is communicated through his extensive writing that even if it is not explicitly capable of explaining his work, is an indicator of how his work is structured. The continuation is in the possibility for other architect to implement the same methods and strategies to obtain similar goals (what has been done extensively).



A different take is that of Swiss Pritzker price winner Peter Zumthor, whose point of depart is design, over to realization – with a great care for construction details – and to a reflection in books and articles which is far different from the one of Eisenman, rarely taking reference to his projects and remaining quite “atmospheric” and not theoretic. Zumthors aim is to transfer qualities of what he calls “images” into his realized spaces. In order to do this, in order to anticipate these qualities already in design, he developed instruments such as oversized models in materials close to reality and his sketches, that allow him to proceed further in the process from image to space. He is not interested in theories but has a strongly phenomenological approach. He developed this method of work, which was strongly influenced by his background – education as furniture carpenter, as interior design and ten years of work in the building conservation – further and further, in order to find a way to translate these images in space. This illustrates very well how spatial knowledge is gained through the continuous running through this cycle.

Even though his approach is extremely personal and even though continuation has happened mainly on formal copies – the amount of “Vals”-project that appeared in architecture school for example – his spatial knowledge is mainly to be found in these instruments he deployed for his aims. The knowledge lies less in the texts and articles as in the case of Eisenman, as in the work methods itself.



A last example is the one by French architect and designer Jean Prouvé whose cycle starts in realization. Only what can be produced, implemented and assembled is worth being developed.<sup>8</sup> In his work, Prouvé starts with implementation and subordinates the other creative processes beneath it. This rather unusual approach can clearly be explained by his family situation and his personal background. He derived his knowledge of rationalising production from his constructive and process-oriented design. He continuously refined the processes and repeatedly gained new insight from the constant comparison between planning and implementation. For him, the primary 'judges' of the quality of the products were those who carried out the production and assembly – not the later users or even an architect. His insight consequently often flowed into patents, of which Jean Prouvé registered a countless number, acting as a form of communication of his technical and spatial knowledge.

According to Jean Prouvé, knowledge and innovation should stem from the factories, so he resisted any form of theories on his work. When he studied the work of other architects and engineers, he was far more interested in the form of design plans that in abstract, theoretical assessment. He dissected and systemised the buildings and objects of his time and thereby derived an understanding that was directly rooted in practice. Nevertheless, one can still speak of theoretical reflection in Jean Prouvé in the sense of an analysis. His spatial knowledge resides thus in his particular way of working through experiment and model and is communicated through patents.

### Conclusion

The example case studies presented here allow us to assess the personal background of each architect, the individual intentions arising from them and the use of specially developed instruments of architectural research and design for that purpose. They also provide information on the possible gain in cognition from the protagonists' individual creative architectural processes, the character of the spatial knowledge gained from it and its reception.

In an initial overview, it is apparent that personal background has a massive influence on the relevant architecture. In the diagrams, it is possible to see clear distinctions in the individual approaches. Above all, it is the starting point of each process – be it cognition, theory/reflection, implementation or the design – that reflects the different ways in which architecture is

<sup>8</sup> "Mann soll nur konstruieren, was man verwirklichen kann, (...)." Prouvé, J., Huber, B., Steinegger, J.-C., 1971, p. 11

handled. Work with the diagram shows that a hierarchy of points and processes develops within the creative cycle. Not every architect touches on every node within this process with equal intensity and not every background flows into the same influence. Creative action develops around one or two focal points that are the subject of greater concentration.

For Eisenman, theory and design methods are equally important. Zumthor starts the process directly with the design and Prouvé creates prototypes as a means of design, thereby going via implementation. So for Prouvé, the design process is reversed and his creativity takes a different course from the other examples studied here.

It also becomes apparent that the more one or two areas in the diagram are focused upon, the less influence the others have in the overall process. Eisenman is an extreme example, as he is simply not interested in the implementation of his work. By contrast, Zumthor reveals a balanced process in which the focal points lie in the design and implementation, as well as a great interest in reflection and theoretical examination.

The individual education of the architects or a personal interest in a different field apparently allows a more distanced perspective, making it easier to question architectural principles in an unbiased way. Zumthor for instance was trained as a furniture carpenter and worked in monumental preservation before founding his architectural office. Immediately after graduating in Architecture, Eisenman wrote a doctoral thesis on theoretical questions and was greatly interested in philosophy and literature. Only Prouvé has a special status among our examples, since he was exclusively trained as a craftsman, but moved in a world dominated by architecture and art. They all share a perspective on architecture that is broadened by other fields. The situation of the protagonists leads them to question dominant conventions and methods and to continuously test and further develop their own actions in the sense of architectural research.

The instruments of the creative process are developed according to their weighting in the diagram – as well as the nature of their relationships, i.e. their connections. Eisenman mainly works with diagrams he mainly draws from the context of natural sciences. Examples from art history also play a role for Eisenman – above all Colin Rowe, who formulated a new interpretation of diagrams. Very early on, Eisenman worked with computer models and was partially involved in developing the 3D software *FormZ*, which plays an appropriate role in his design work. Prouvé no longer placed craftsman's prototypes and industrial manufacturing techniques at the end of the design process, instead making them early steps in the work process, thereby giving them the role of an instrument. Zumthor developed many conventional architectural instruments further by varying the presentation of initial sketches or the scales of his models to allow atmospheric qualities to be experienced at an early stage.

All the architects presented here (actually in our investigation we treated also the cases of Aldo Rossi and Christopher Alexander) actively seek instruments and methods and test them in an experimental way to achieve their intentions in architecture. They gain cognition by experimenting, which in turn leads to knowledge of one's own working methods.<sup>9</sup> The question of the reception of the gained spatial knowledge goes hand in hand with the question of the instruments available to an architect for formulating his knowledge. Assuming that verbal communication is only possible to a limited extent, the study presents alternative solutions: Prouvé for instance uses patents as a good way of formulating his knowledge in the form of manufacturing processes.<sup>10</sup> In Eisenman's case, the knowledge is mainly presented using diagrams and theoretical texts, whereby the content of both levels, text and diagrammatic presentations, rarely overlap. Eisenman can rather be regarded as a founder of a poetic theory that is only indirectly communicated, using suggestion and theoretical constructs. His models, which sometimes distance themselves from the constructed building and represent additional project content, are further instruments for communicating knowledge. Such an example is the House X, which is now in the *Museum of Modern Art*. It was built in a way that it only appears "correct" from one position and thereby draws attention to the influence of architectural representation. With Zumthor, oversized models are the main communicators of intended atmospheric properties. At the same time, he uses suggestive books such as *Atmospheres*, in which his projects are not shown themselves, and refers to the origins of his intentions by means of reference images.

Communicating the concrete form and range of spatial knowledge apparently requires an equally large field of experimentation, as well as the development of methods of architectural creation.

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<sup>9</sup> Eisenman's work with diagrams is an example of this. In 1999 he dedicated a book to the subject, *Diagram Diaries*, which included a typological classification of diagrams and an overview of his entire work from the perspective of the relevant diagram.

<sup>10</sup> In his book *Content* (2004), Rem Koolhaas also records his urban planning strategies in the form of (fictitious) patents.

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## PRESENTATION SESSIONS | **DESIGN**

### Session Two

Moderator: Michael D. Kroelinger, PhD., AIA, FIIDA, LC



Haptic design research:

A blind sense of place

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Keywords: blind, design process, haptics,  
parameters, senses, universal design

## 1. Abstract

While architecture is experienced with all senses, the visual tends to receive most attention from designers. This paper focuses on the role of haptics, i.e. the sense of touch, in the built environment and reports on the development of haptic design parameters to support architects in paying more attention to the haptic implications of their design decisions. Haptic qualities and constraints in the built environment were identified with the help of people who are congenitally blind, as they are more attentive to non visual senses, and with professionals working with them. This paper summarizes and triangulates the results of these empirical studies and outlines the basis of the haptic design parameters derived from them. Following the classification of haptics into active, dynamic and passive touch, the built environment unfolds into surfaces that can act as “movement”, “guiding” and/or “rest” plane. Furthermore some techniques are suggested to check the haptic qualities of a design.

## 2. Introduction

Studies in architectural theory and design research have greatly multiplied in recent years. However relatively little research has been done on the multisensory experience of the architectural environment. Even if it is generally agreed that we experience the built environment with all senses (Rasmussen 1964; Pallasmaa 2005a; V; 2005b; Campbell 2007), few architects bear the haptic, olfactory, gustatory and auditory sense in mind while designing. As Nigel Cross (1982) states, architects and other designers know, think and design very visually. Moreover vision is often quoted as the spatial sense par excellence (Foulke 1983) and it is said that our Western civilization is dominated by vision (Classen 1998:2; Pallasmaa 2005; Herssens, Heylighen 2007; Ryhl 2009; Passe 2009)

Nevertheless, if architects design with more attention to non visual senses, they are able to contribute to more inclusive environments. Indeed if an environment offers a range of sensory triggers, people with different sensory capacities are able to navigate and enjoy it. Rather than implementing as many sensory triggers as possible, the intention is to make buildings and spaces accessible and enjoyable for more people, in line with the objective of Universal Design.

Within this overall objective, the aim of our study is to develop haptic design parameters to support architects during design. In this study haptic design parameters are defined as variable characteristics (quantitative or qualitative) that can be decided upon by designers during the design process, and the value of which is a determinant of the haptic characteristics of the resulting design. To this end, we call in the perspective and experience of people who are born blind, as they have learned to be more attentive to the non-visual senses (Warren 1978; Hollins 1989; Herssens, Heylighen 2008; 2010). The first section defines haptic perception in relation to space/place and sets out the theoretical framework for this link. The next section zooms in on the methodology we used to identify haptic qualities and obstacles of the built environment, followed by the analysis of the data and the resulting design parameters. We conclude with suggestions for the assessment of haptic design parameters and the discussion adds directions for future work.

### 3. Background

#### ***The research of place and space***

Ever since people have been dwelling, the meaning of space and place was one of the primary questions in life. In his book "Space and Place: The Perspective of Experience", professor of geography Yi-Fu Tuan (1977:6) explores the meaning of both terms. "Space" is more abstract than "place", but : "*space can become place if we get to know it better*". According to Tuan both ideas or words require each other for explanation. He points out that if we think of space as movement, then place is "pause" and this way each pause in movement will allow a space to become a place. Tuan's approach is interesting as it explains the meaning of space and place with regard to movement.

Haptic perception involves connections between movement and touch (Millar 2005:250). Géza Revesz (1931) first introduced the term "haptics" and the origins of the word can be traced back to the Greek words *haptikos*, meaning "able to touch," and *haptesthai*, meaning "able to lay hold of" (Revesz 1950).

Research in experimental or developmental psychology, engineering or robotics used the term 'haptics' first for defining the active exploration of objects or environments through the body. Today haptics in its broadest sense encompasses the study of touch and the human interaction with the external environment through touch (Minogue, Jones 2006: 318; Herzsens, Heylighen 2007).

In relation to the built environment, we argue, haptic perception involves active as well as dynamic and passive touch (Herzsens, Heylighen, 2007, 2008a, 2008b, 2010). Whereas active (Heller 2000) and dynamic touch (Carello and Turvey 1996) require movement from the body itself, passive touch (Heller 2000) arises from movement in the environment.

Different from other senses, haptics enables us to modify and manipulate the world around us (McLaughlin et al. 2002): we cannot change our environment through hearing, seeing, smelling or tasting but we can through haptic body movements. Vice versa the sense of touch can leave its mark on the body itself; for example, the skin may be dried by the sun and roughened by the wind (Howes 2005:33). This strong interaction reveals the importance of touch for experiencing the built environment as through movement meaning can be given to a space.

#### ***On the surface***

In developing haptic design parameters, we refer to the concepts of ecological psychology of James Jerome Gibson (1979). Although Gibson's theory focused on visual perception in the first place, some principles turn out to be usable for haptic perception as well.

For example, one of Gibson's most influential studies explored perception in relation to behavior and environment, in which the concept of affordances refers to the opportunities for action provided by an object or environment. Providing opportunities and choice in ways of use is one of the principles of Universal design, as is designing for simple and intuitive use (Connel et al. 1997).

Besides offering insights in environmental aspects, Gibson focused on human movements as an essential source of information in the ecological psychology of perception. Knowing that haptic perception requires movement, it is presumed that this theory can open up new perspectives.

A third connection refers to the representation of the world in terms of surfaces. Gibson (1979:13) points out that motion of things in the environment differs from motions of bodies in space: "*The terrestrial world is mostly made of surfaces, not of bodies in space. And these surfaces often flow or undergo stretching, squeezing, bending and breaking in ways of enormous mechanical complexity.*" As the haptic sense is a proximal sense (Millar 2006:28; Paterson 2007:128; Paterson 2009:1) and it receives information through proximal bodily experience (meaning the skin, muscles and joints), we argue that surfaces play a key role in the haptic qualities and obstacles of the environment. Haptic perception limits the acquisition of information to the immediate surrounding area that can be effectively tactually accessed. One major difference between visual and haptic discerning of space is its scale that can be accessed (Barber, Lederman 1988:99). Haptic exploration limits the vantage point, while visual access is expanded merely by turning one's head (Amedeo, Speicher 1995:117).

### 4. Methodology

#### ***Three approaches***

In order to identify haptic qualities and obstacles in the built environment, a qualitative research approach has

been adopted, following the principles of grounded theory (Glaser, Strauss 1967). Interview material is considered as key material in this study. Moreover profound contact between participants and researchers is explored in familiar settings as according to Denzin, Lincoln (1994:7) "*qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meaning people bring to them*". This approach fits in with the aim of Universal Design in which the experience and perspective of user/experts (Ostroff 2001:1.10) are applied to investigate the environment. Qualitative research is considered as an interdisciplinary field (Denzin, Lincoln 1994) in which theory and practice can interact. It opens up an interpretive way of analysing material and the more research methods are used, it is argued, the richer and higher valued the resulting material (Cohen, Manion 1986: 254). Therefore we chose to combine multiple methods: in-depth interviews, observations, photo-ethnography and focus interviews to collect data on haptic qualities and obstacles in the built environment.

First of all, in-depth interviews were conducted with 22 adults (7 women, 15 men) being born blind and living independently meaning alone or together with family but without professional support (Herssens, Heylighen 2008; 2010). The place of research was the adults' own home environment. From a theoretical point of view, "home" can be understood as a multidimensional concept (Bowlby *et al.* 1997; Wardaugh 1999; Somerville 1992; Mallett 2004). From an empirical point of view, it is for the participants the most familiar place offering safety and comfort; this was expected to encourage people to talk about the multisensory atmosphere in the built environment. On arrival participants were invited to participate in an open semi structured interview about their living environment and dwelling attitude. Afterwards, they were asked to give a guiding tour through their home environment.

Besides interviewing adults who are blind, we worked with children too, as it was hypothesized that children would react more spontaneously and are less encultured than adults. At an institute for the blind, children between the age of 3 and 13 years old living at the boarding school were observed during five months and four of them (3 girls, 1 boy) were asked to participate in a photo-ethnographic study (Herssens, Heylighen 2009). All photographers are congenitally blind and were invited to take pictures of places in and around their boarding school.

While these two methods both called in the experience and perspective of people who are congenitally blind themselves, the third method tried to learn from the experiences of people who worked for years with congenitally blind people. We conducted focus group interviews with two groups of about eleven people trained as remedial educationalist, physiotherapist, occupational therapist, socio-cultural worker or educator (18 women and 5 men). The focus interviews were designed within a semi structured format. People were interviewed in a familiar environment at their workplace. Each interview started with a brainstorm exercise. All participants were asked to write down what came up in their mind when thinking about "touch". This action resulted in a discussion triggering the first questions.

### **Analysis**

All data were cross-examined with the help of triangulation, a mixed-method strategy (Parker, Tritter 2006) used in social sciences, to answer the same key question: what are haptic qualities and constraints in the built environment? Flick (1998: 230) points out that triangulation "*is not a tool or a strategy of validation, but an alternative to validation.*" Similarly Wolcott (1999: 220) suggest that it is "*but a reminder of the need to corroborate findings*".

The in-depth interviews were transcribed and the first coding was started using a list of key words resulting from our theoretical literature review. After a following go through, citations referring to haptic qualities and haptic constraints were selected and the analysis was continued by making a division between material and spatial characteristics. The following coding procedure did use data based key words, referred to by the participants. Gradually the division between active, dynamic and passive touch became clear and could be linked to respectively orientation, direction and atmosphere. The photo-ethnographic study was giving unique insights in the role of haptics in the built environment by images, the photographers' actions, their reflections on their act of photographing, and their talk about spatial experience. The pictures referred to different multisensory experiences, as well as movements. Like haptic perception itself, their act of photographing followed a sequential approach.

The focus group interviews were contemplating the insights of educators who were representing a mixture of daily impressions and professional information. Whereas the in-depth interviews and photo-ethnographic study

reported on experiences of users themselves, the focus interviews were based on the perception of people working with congenitally blind which sometimes results in different opinions as educators give priority to orientation while users inform on passive touch as well. The haptic design parameters resulted out of key terms found throughout the different empirical research studies; the variables for the parameters are based on theoretical as well as empirical results.

## 5. Results

This triangulation analysis enabled us to identify haptic qualities and constraints in the built environment. Although all interviews revealed the lack of vocabulary to talk about haptics, most results were confirmed throughout the three different approaches. For example, it became clear that furniture is as important as architecture itself and that both are perceived as a whole in haptic perception. Material characteristics can be landmarks themselves. Furthermore the data suggested the classification of landmarks, paths, nodes, edges, boundaries, once described in a visual context by Kevin Lynch (1960), to be applicable to haptics as well. Like a tower can be a visual landmark, a difference in a floor texture on a city square can be a haptic landmark. Moreover participants often referred to environments explaining paths, nodes, edges, boundaries and landmarks. One of the educators points out that: *“The dare for movement is the start for every learning event”*. The data strongly suggest that haptic qualities and obstacles in the built environment relate to surfaces. For example, when we walk over a bridge we feel the upper surface of the floor while placing our foot on the bridge, the surface of the handrail while passing our hand over the handrail. Not the volume of the floor is felt, nor the points or dots that compose this surface as their scale is too small, but its material and spatial characteristics. A line is never felt as a line the way it is seen by a seeing person, but as a meeting between two surfaces. This understanding of haptic perception leads us to propose a specific design approach: designing by using and compiling surfaces.

### ***Environmental-Perceptual classification***

Our data indicate that the experience of the surface depends on its use. Architects can design an environment that supports orientation as well as creates an atmosphere, orchestrating both body movements and feelings. With the theory of affordances in mind, surfaces

can suggest a seat, a floor, a ceiling, a place to rest,... Different functions ask for appropriate haptic qualities which designers can determine. The more we actively touch, the more important it is that the haptic stimuli inform us on orientation, while the atmosphere is experienced more passively. Dynamic touch on the other hand forms the transition between orientation and atmosphere.

Besides the way in which we touch, it is important for designers to keep in mind which body part will touch or be touched, as body parts can differ in haptic reaction and are characterized by more or less sensitivity. For example, stimuli felt by the feet, back, arms and shoulders differ from those felt by the hand or other body parts. For touch the most sensitive regions are the lips and fingertips, whereas the back, shoulders, legs and arms yield much higher thresholds (Goldstein 2010). This way, our hands are more sensitive than our feet which means that surfaces supporting our hands ask for different texture than surfaces meant to guide our feet. Consequently we propose to divide the parameters into varying surfaces relative to the body. The classification is not strictly environmental meaning that it does not just rely on architectural characteristics; rather it reveals an environmental-perceptual classification as it is based on how people perceive touch in the built environment.

### ***Moving/ guiding / resting***

We propose to divide the surfaces architects design into three categories: “movement plane”, “guiding plane” and “rest plane”.

The more we focus on orientation, functionality and safety, the more important it is to include parameters referring to active touch, aiming at an environment that gives priority to effective, rational and efficient movement. As a result we could state that taking haptic conditions in mind, functional oriented design asks for surfaces that we could name as “movement plane”. For example, a ground floor in the underground, the steps of a staircase or a door of a public entrance.

On the other hand if atmosphere is more important, designers are asked to look at the characteristics of passive touch to create a more holistic experience. These parameters will support designers to create a “rest plane”, a surface on which people can sit, sleep, relax, lean, hang,... It is a plane as part of a design in which the focus lies on the body in rest, for example the wall of a

hallway we lean against. This way the “rest plane” can be part of a “movement plane” or a “guiding plane”.

Dynamic touch for its part depends on active as well as passive characteristics in that it involves touching the environment by means of an object. In this situation a “guiding plane” supports active and dynamic touch in the first place, a plane that literally can guide and support someone but where experience is important as well. This way the guiding plane can form a movement plane as well. The guiding plane supports and coordinates active, dynamic as well as passive touch as it aims at giving its users insight into the structure of the environment.

Guiding planes are part of the passage way and are placed parallel or perpendicular to the run or moving line. A handrail, for example, can be actively touched but gives information about the wall or construction on which it is fixed as well. It becomes clear that a movement plane can be a guiding plane as well as a rest plane.



Figure 1: sketch fountain on square (sketch by Iwert Bernakiewicz)

Figure 1 illustrates this complexity: it shows a fountain on a city square, a tourist attraction that besides its ornamental function structures the layout of the square and suggests a place for rest. Accordingly the fountain is composed out of different planes and some people sit or lean on its borders while others focus on the border planes to orientate. The floor of the square itself can be named as a movement plane, while the fountain borders are guiding planes or rest planes or can even be



Figure 2: sketch fountain on square, experiencing planes (sketch by Iwert Bernakiewicz)

movement planes when children are moving from one side to the other. It is assumed that the more a designer can create a successful movement plane that offers dynamic and passive characteristics as well, the richer the actual experience (Fig.2).

### Haptic design parameters

The haptic design parameters are described by material characteristics and spatial characteristics (Fig. 3), and the variables are differentiating between foot and hand, dependent on the regions of sensitivity mentioned before.

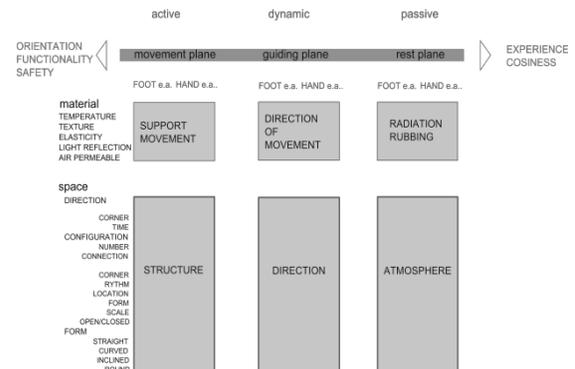


Figure 3: Framework parameters

### **Material characteristics**

Materials give an identity to the surfaces through their temperature, texture, density, permeability, light reflection and elasticity. These constitute the different material parameters.

Temperature is traced back to the coefficient of conductivity (for example, steel feels much colder than wood) and the radiation of a material.

Unlike what one might assume, light experience is very important for haptic experience. Light can be haptically experienced through temperature rise. However, light is more passively perceived by the sense of touch, consequently we refer to the temperature parameter for the variables as light is passively experienced through fluctuation in temperature. Actively or dynamically light can be perceived as an orientation point, but this happens less frequently.

Besides light, materials can also reflect or let through air. The latter is one of the most typical experiences for the sense of touch. Air that caresses our skin informs us about the structure of the environment. Materials can breathe as well. This difference can be felt on a sunny afternoon when you are nestling yourself in your garden on a garden chair made of textile. While this textile material breathes the air of your body, a rubber mat will not and makes you sweat. Besides the material itself, the configuration of the surfaces will contribute to air experience which will be discussed later.

The texture of a material gives direction, reflects light and defines the way a material is felt. To support active touch, movement will be encouraged by a rough texture for the feet, while the hands and other body parts ask for smooth surfaces. When relaxing, on the other hand, the body prefers smooth textures for hands as well as feet. For example, rough stones are excellent for staircases but can be best avoided for walls that are regularly touched like movement planes.

Elasticity of a material is the extent to which a material practices a counterforce or is transformed under external forces. A material is considered elastic if it returns to its original form when no forces are performed. If active touch is priority, like in public buildings, preference is given to materials with no elasticity. The judo mat in the boarding school was felt as a very pleasurable material on the playground. In a public building on the other hand, it is better not to use a rubber floor. Although it does feel

nice as it is soft, it is not practical at all as people risk to twist their ankle. An ideal dynamic guiding plane on the other hand is for example a grass surface next to a hard surface because it forms a guiding plane next to the run line.

### **Spatial characteristics**

Spatial characteristics consider the way in which surfaces take part in the larger built environment. We consider three spatial characteristics: the direction in which the surfaces are put, the form of the surfaces, and the configuration in which the surfaces are composed.

The direction sets out the way in which the surfaces are placed in relation to the user and his/her body and body movement. For active touch preference is given to orthogonal surfaces, whereas a walk in the park asks rather for different options; even in the absence of sight choices contribute to the experience of the environment.

Some surfaces are moving or can move. Therefore the time in relation to the body and the referring surface is important. For example, in an airport speed is important and surfaces that support speed or that can move in line with the body are therefore favored, while at some places of pilgrimage, opening a door is part of a ritual that asks time and so it gives time to reflect.



Figure 4: "backbone wall" Hazelwood School for the Blind, Glasgow (U.K.) Gordon Murray + Alan Dunlop architects (picture by Jasmien Herssens)

Every surface can be placed or built following a certain angle in relation to the user's body. This results into a corner that has influence on the experience and orientation. For movement planes, the wall surfaces are best placed at 90° or more while the floor has an angle of 0° or less than 3°. The same counts for guiding planes

as this way it is possible to orientate yourself in space. For example, in the Hazelwood School for the blind in Glasgow (U.K) (Fig.4), the architects Gordon Murray and Alan Dunlop designed a “backbone wall” in the middle of the school that has different functions: first of all, it is a cupboard for the children’s coats, canes and briefcases and the teachers working material: secondly, it creates a transit zone between the passage way and the class rooms; and finally, it helps the children with visual impairments to orientate themselves as the wall is not orthogonally structured but twists through the building by making blunt angles with its surfaces. This way the “backbone wall” kinetically draws a line through the building.

Configuration highlights the number of surfaces that contribute as well as the way in which these surfaces are connected. The connections of surfaces form corners that inform the user on orientation. It is comparable to what we described as a corner in relation to direction, but differs in this way that it focuses more on the meaning of the corner in relation to the spatial form. Surfaces can appear in a rhythm which can stimulate movement. Surfaces can create a space and consequently this space will have a form. Moreover, in architecture, configuration mostly depends on scale. Architecture can be experienced on a micro-, meso- and macro-scale but, as elaborated, the sense of touch is proximal and will focus mostly on micro-scale as we perceive sequentially, step-by-step. The more the designer wants to integrate the passive haptic experience, the more attention needs to be given to micro-details as well. The plane itself can follow a straight line, a curve or it can be inclined. Different forms support the experience and orientation.

The parameters are meant to assist designers in designing environments with better haptic qualities. Parameters related to movement planes focus on the structure and try to support orientation and balance in movement, while parameters related to guiding planes inform on the direction of the surfaces in the first place. Parameters for the rest plane on the other hand give a description on the materials concerning radiation and rubbing of the skin and spatial characteristics creating an atmosphere.

A designer has the freedom to choose which parameters s/he applies and to accept the challenge to implement these parameters towards a well-balanced environment. The parameters are defined in such a way that they can be consulted and assessed over at any time in the design process. This assessment relies on well known

spatial design practices in architecture and focuses on accentuating and clarifying the purpose of an environment. Assessing to what extent haptic orientation is fulfilled or active touch is included, designers are advised to check whether the space to move is conveniently arranged. This can be done by drawing the inverted space (Fig.5), meaning that the places where people move through are drawn instead of the designed surroundings. This way structure will become clear. Dynamic perception on the other hand can be checked by drawing the run lines (Fig.5) onto the plans. If run lines are supported by architectural elements, especially on decision points, dynamic touch is probably well supported. Passive touch is more difficult to represent as it is caused by movement in the environment. Nevertheless designers can encircle the fields (Fig.5) meant to be rest places and check whether these are not diagonally crossed by passage ways.

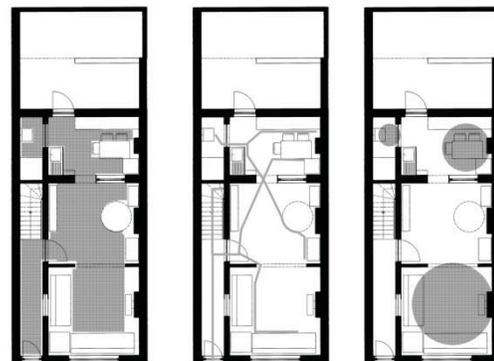


Figure 5: plan 1: inverted space| plan 2: run lines | plan 3 fields rest place

## 6. Discussion

Analysing the experience and perspective of congenitally blind revealed that we haptically perceive the environment relying on different surfaces affording and supporting different human actions. The more important active touch becomes, the more a designer needs to take into account the parameters of a movement plane while designing. If the atmosphere is most important, parameters of the rest plane can inspire the designer the most.

Interestingly, this approach gives the architect the freedom to stress what s/he finds the most important aspect of the design. Based on the characteristics of haptic perception, this study laid the foundations for haptic design parameters defined as limits in between

which architects can choose to define the appropriate experience. Architecture creates opportunities in perception, experiencing, meeting, dwelling and designers will have to realize their major role in the process of creation. As we write, the proposed haptic design parameters are being tested with professional architects. Further research may reveal more details on different parameters. Moreover a longer term evaluation of these parameters in the design process would help to refine their representation as well as their content.

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# SCALING THE TRANSFORMATION - EXTERIOR SPACES AT THE NEW HARBOR FRONTS

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## Abstract

This paper aims at introducing the notion of scale to an empirical architectural analysis: The term “scale” presently is being discussed by a broad field of researchers in geography, sociology and architecture. All of them contribute to the understanding of the term from their point of view, according to the space in which they act. This paper intends to open up for a combination of these approaches by showing, how the different understandings in combination can contribute to an empirical analysis of an architectural space. Examples are given from an ongoing Ph.D.-research on the analysis of the exterior spaces of the new housing developments, which arise on the grounds of former industrial harbour fronts, with the case of the area of Sluseholmen in Copenhagen, Denmark as example. The analysis aims at an understanding of the spatial transformation of the harbour space, the transformation of the architectural space.

## Keywords:

Scale, harbour, perception – conception, transformation, space of bodily presence

## Introduction

This paper is aiming at setting up a theoretical framework through which to look at a specific space. It is embedded in the analysis of the exterior spaces in the new housing areas at the former industrial harbor fronts. Questioning the nature of this space inevitable leads to what forms this space (and what influences the transformation of it).

A space is many things – and than again it is everything but a “thing”<sup>1</sup>. Space is the absence of materiality, while at the same time it is made up by all that, which is absent. It is made up by associations, by the way it is perceived and imagined and it is made up by relations. At one hand this makes it a very personal experience, while on the other hand there exists always a group image: Certain parameters will be perceived in the same way by a particular group of recipients<sup>2</sup>.

This search for specific characters of this particular space leads me to the notion of scale.

Interpretations of the notion of scale are as numerous and widely spread as understandings of space, both being constantly discussed by a wide variety of researchers especially in geography, sociology and architecture. All of them contribute to the understanding of the term from their point of view, according to the space in which they act.

The paper is neither an attempt to give an example on how to understand “scale” in one way or the other nor is it an attempt to combine various understandings to one overall definition. Instead it is an attempt in examining how the variety of positions in combination can make up a theoretical framework by which a space can be analysed.

The paper is embedded in the ongoing Ph.D.-project with the working title “Exterior spaces – design, organisation, significance in the transformation of harbour spaces”. The area of Sluseholmen in Copenhagen, Denmark is used as example. The Ph.D.-project aims at an understanding of the spatial transformation taking place in the area of the harbour, meaning the transformation of *the architectural space*<sup>3</sup>.

## The location:

***Exterior spaces in the new housing areas at the harbour fronts***

A growing number of closed down industry harbours became the scenery for many prominent urban

development projects during the last years, where an increasing number of closed down port facilities transforms to attractive housing developments<sup>4</sup>.

These areas provide both, special qualities, like the central location, the view to the harbour front and the possibility of public spaces towards the waterfront as well as special challenges in creating urban space for both, the public and the (new) local residents.

The high number of housing units arises at the same time with a high variety of exterior spaces, which become part of the over-all urban landscape of the particular city.

These transformed harbour areas are understood as a specific case, whose analysis conclusions can lead to a more general contemplation on the exterior spaces in urban developments.



Figure 1: exterior spaces in the transformed housing area of Sluseholmen, Copenhagen

## The notion of scale

Scale is...

*"... the relative size, extent of something.*

*... a range of values forming a system for measuring or grading something.*

*... a series of marks at regular intervals on e.g. a ruler.*

*... a relation between the actual size of something and a map, diagram, etc. which represents it."*<sup>5</sup>

By architects it is most commonly used as the latter, referred to as for example a scale of 1:2.000.

In the Diderot's and D'Alembert's Encyclopedia scale is defined as follows: *"In geography and in architecture, a scale is a line divided into equal parts and placed at the bottom of a map, a drawing or a plan, in order to serve as a common measure for all parts of a building or else for all the distances or places in a map"*.<sup>6</sup>

There are many descriptions to be found in the various dictionaries, whose summit adds up to an understanding of *scale* as some form of cartographical measurement, relating to a standardized ruler as a common reference.

And yes, scale is all that, but than again this paper asks you to put aside this understanding of scale as a measurement of the dimensions of a space to give room for an understanding of scale as an active parameter in the materializing of space.

The notion of scale is a question of relation and it is a question of relevance<sup>7</sup>. In that sense *scaling the transformation* is not a question about grading the success of a transformation, but of understanding the relevancies and relations behind the visible process.

Transforming a harbour from being an industrial harbour to a housing development is – more than anything else – a matter of relations. It is a relation of before and after, of form to structure, of interior to exterior, of a place to its surroundings, of housing to urbanity, of the private to the public - a relation of a high variety of scales in general.

## Setting up the framework

In the following I will show, how three different understandings of scale set up a framework in my approach of understanding the exterior spaces of the transformed harbour space:

Scale in the understanding of networks:

As a mapping of the parameters which the space sustains, whose scale is determined by the complexity of the relations of those parameters.

This leads to an understanding of the interaction of various actors contributing to how the exterior spaces of the *harbour*<sup>8</sup> housing developments appear in reality.

Scaling as a mode of shifting between spaces of reference<sup>9</sup> - the architecturological scales:

The notion of scale as a question of relation and as a question of relevance. From that starting point I ask to the relevancies on whose grounds these new exterior spaces came into being as well as to relevancies that determine the general perception of them.

This includes an understanding of how the architectural space consists out of conception and perception, with scaling being the mode of shifting in-between.

Scaling as a relation of my bodily presence<sup>10</sup> in the world:

How do I perceive the atmosphere of the exterior spaces of the housing developments as an individual?

***Scale in the understanding of networks:  
Placing the "architectural harbourness"  
into a network of spatial parameters***

Even so a whole area gets transformed (spatially as well as functionally) as it is the case in many harbour areas, the "has been" of the area will always be a part of experiencing it in the present – especially in its exterior spaces. Once you move into the housing units (and the same could be said about office units and, although in a less degree, about cultural spaces) the perception and the acknowledgement of their spaces will be much more dependent of their functioning. The exterior spaces, too, are defined by their various functions, but more than that they also constitute the nerves, the bloodstreams through which the private person is connected with the outer world around itself. They are not only part of the networks of landscape, urban spaces and traffic systems, but also of a network of time, of memories of the past and of expectations to the future – of both: the space itself and of the persons perceiving the space<sup>11</sup>.

In the matter of the harbour transformations the formative relations seem endless – the more you seem to understand them, the more they reveal themselves.

In the understanding of the Actor-Network-Theory (ANT) this complexity conforms to being of large scale since many actors are participating in a high variety of relations<sup>12</sup>. The ANT argues for a flat, star-like structure in which all, subjects and objects are acting on one level. The actors coalesce in networks, with each network becoming an actor in a wider network: The idea of the part and the whole, where every whole can be divided up into different parts again. In this network it is not the actors as such, which are of relevance, but the connections they coalesce: "*The only question one may ask is whether or not a connection is established between two elements.*" Bruno Latour states<sup>13</sup>.

In the case of the harbour areas a high variety of actors participates in the network we perceive as a harbour spaces as well as in the act of transforming those spaces. (Fig. 2)

A thesis to be proofed in the analysis of the PhD.-project is that the scale of a *harbourseque*<sup>14</sup> space in that understanding is much bigger than the scale of the new housing developments.

Architects play their part in this network by contributing to this process of transformation<sup>15</sup>. They did not provoke or initiate it, as that was done by developments in the general process of globalisation of economical processes and transport possibilities<sup>16</sup>, but they contribute by the presentation of it, meaning the visualisation of those global processes and changed demands of society (and thereby also contributing in changing those demands).

As an architect we can only ask what we can do as architects, where and how we can operate in the space where architecture is taking place.

In the discussions about former industrial harbour areas, which got transformed to housing areas, one critic remains reappearing: The character and the liveliness of a harbour got lost.

But what actually makes up the architectural character of the harbour? What is this atmosphere, which we miss in the transformed areas, grounded on? How much is it based on the spatial structures?

Even so there exist numerous articles and papers of what is going on in today's harbours, a scientific analysis about the architectural spatial qualities and structures of a harbour still seems to be missing. But without the knowledge of the architectural structure of the former industrial harbour, how can we use a reference to those spaces as a critic of the architecture of spaces of today?

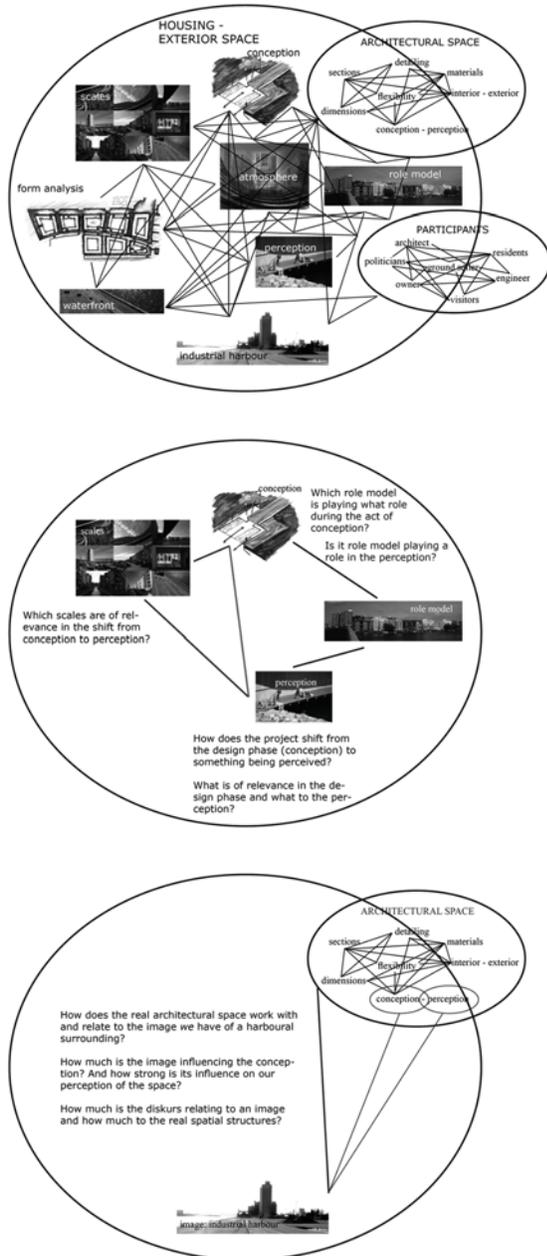


Figure 2: network of actors participating in the transformation process of the new housing area of Sluseholmen, Copenhagen/Denmark and possible questions to be asked to the connections

My interests are the intensive qualities of the harbour: A harbour can be extended or reduced, it still stays a harbour. The knowledge of its intensive qualities can contribute to a successful transformation, if it is used to scale the new design – either by preserving them or by consciously deselecting them. As an underlying idea of the architectural space of a harbour – based on an analysis of what constitutes the architectural identity of harbour space – I introduce the term of “*architectural harbourness*”.

The material used for my analysis is based on my own perception of the spaces: Without any preceding studies I registered them through my senses and with photographs on walks through the harbours of Aabenraa and Køge, functioning harbours in Denmark.<sup>17</sup> Based on my walks I will adumbrate the following themes as relevant characteristics of a *harboursque* space:<sup>18</sup>

**A fluent space as an underlying structure:**  
 constructions seem to be floating on the big platform of the harbour district according to sand piles, the spatial structure is open: the exterior is not space in-between, but the buildings are placed inside this space, the relation of the exterior to the interior is threshold free, flexibility exists in use and function as well as in the understanding of temporariness and steadiness and there is a rich variety of intermediate spaces. (Fig. 3)

**Scale jumps:**  
 The space of the harbour is open to a variety of scales. It does not only tolerate them, but actually is constituted by them. It is this variety of scales which shapes the picture of liveliness and which offers a range of flexibility concerning the functions. These scale jumps happen not only as collisions of physical dimensions but also on a mental, a functional and a temporal level.<sup>19</sup> It is especially this characteristic of scale jumps a large part of our fascination of the harbour is grounded on and which makes the space of the harbour obvious for contemplations about scale.<sup>20</sup>

**Conception of space:**  
 No overall concept for the area is legible. The area seems to be solely developed according to the demands. The concept is oriented towards a process and towards relations of functions. These functions and processes change over the course of time. As a space of movement the harbour is not only open to those changes, but it is made up by the idea of change, process and movement.

Accordingly its spatial structures are flexible, the segregation of interior and exterior spaces is fluent and there is no limitation in scale.

Connections to surrounding spaces (edges/ transitions):  
The various kinds of edges play a decisive role in the structure of the area: edges between water and land, between outside and inside, between the different harbour areas and between the city and the harbour.



*Figure 3: Harbour space in Aabenraa: buildings seem to be placed randomly on the platform of the harbour space – the same way as sand piles are*

In the understanding of the ANT these aspects function as actors in the network that complies with the overall image of the harbour. Being a complex network by themselves they contribute to the largeness of a harbour space. But although the ANT can draw a diagram to represent this architectural space in the complexity of the overall context, it does not explain the processes going on inside this architectural space. The ANT draws the attention to the connection of the actors, but I want to go further in asking what is happening in those connections.

### ***Scaling as a mode of shifting***

The French architect and theoretician Philippe Boudon is looking at the architectural space from a scientific point of view in what he calls architecturology. In his architecturology he is referring to two separate spaces: the space of conception (as the space of thought, where the design is taking place) and the space of perception (as the space of reality and usage). He is aiming at explaining the process, which transfers a project from one space to the other by the notion of scale, with scale no longer being understood as a matter of complexity, but as a frame of reference the designer is acting in. By doing so, he can draw our attention from the “real” architecture to the parameters, which influence the creative process taking place in the conceptualizing of a design object. It is in this frame of reference, where decisions are made about relevancies to the design – where it is decided about the scales of relevance<sup>21</sup>. Boudon writes: „If we suggest to define the architectural space as a unity of two spaces, of the real space and the thought space, in which one is picturing itself in the other and vice versa – than scale is the act of the transfer – in the largest terms of one space to another.“<sup>22</sup>

The act of giving scale is the central focal point in this process: through scaling the project is transferred from (the space of) thought to (the space of) reality<sup>23</sup>. The architecture to be perceived in reality thus is a representation of processes inside the space of conception – in which again the anticipation of the perception already was of relevance (as equaling to being a scale, as a relevance that influenced the design decisions). (Fig. 4a)

This idea of scaling as a transfer between spaces is a valuable tool in understanding a transformed space in relation to its origin, but also the relations that form the present space itself.

On that background an understanding of the inherent qualities of a harbour space – an understanding of the *architectural harbourness* - can contribute to a successful transformation if being used as a scale: in transferring one space to another as well as in transferring the general image of a harbour space into an actual physical surrounding. (Fig. 4b)

The characteristics of a harbour named above make up scales, which contribute in the process of design of the new housing spaces: Each actor as such works as a

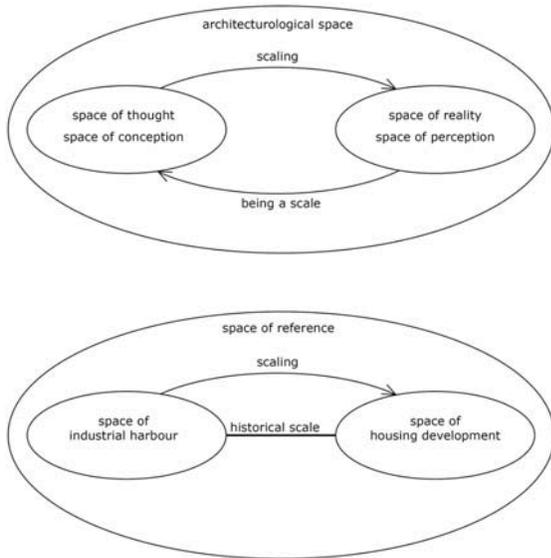


Figure 4a: scaling as the transfer from the space of thought to the space of perception inside the architectural space

Figure 4b: scaling as the act of transferring one space into another inside a space of reference

space of reference which will function as a scale in the process of transferring the architectural project from the space of conception to the space of perception.

The architect for example takes a decision about the threshold between the exterior space and his building. In doing so, he takes decisions about the relation of his design to the pre-existing situation of the industrial harbour by either taking these circumstances into consideration or by not doing so (knowingly or not knowingly).

The next questions therefore are: What are the scales of relevance in the process of harbour transformation? And: Which scales determine the space as we perceive it today?

The following gives an example of how this understanding of scale as a space of relevance is used in interpreting the exterior spaces, by referring to some of the scales Boudon is bringing forward: (Fig. 5)

#### Historical scale:

Some of the main questions are: What characterises a harbour? Which qualities are getting lost in the transformation process?

The search for the architectural character of a harbour is not a matter of counting the number of maintained harbour elements, but of analysing what constitutes the identity of harbour space. First then it is possible to go back and ask, if the new residential areas actually deal with their location on a harbour site. Is *harbourness* playing a part in the process of transformation? Meaning: Is it a conscious scale in the conception of the new spaces? And: Is there reason to talk of a loss of identity in these transformed areas?

The matter of fascination of a harbour - and to that extend the idea of the harbour each of us has in his head - is very regular and genetic: There is an understanding of harbour, which is independent of location, of nationality and in some regard also of time. When the loss of harbour character is criticized regarding the transformed areas, the comparison seldom is based on a comparison of the same site before and after, but on a comparison with the image (as the general understanding) of *the* harbour and a specific housing development.

#### Scale of the model:

The island of Java, Amsterdam/Holland is the clearly stated role model to the district of Sluseholmen, Copenhagen/Denmark. Many references are recognized easily and at first glance the import of those new ideas (water channels between the houses, water right up to the facades, vertical structuring of the housing rows with a variety of architects contributing...) seems enriching to the otherwise well known urban structures of Copenhagen. On second glance again, Sluseholmen becomes an oversimplified copy of an original idea, a mere scheme of a lively concept. Java is embedded in the local traditions, whereas Sluseholmen is an import, which neither does grow up to the spatial richness of the original nor to the richness of relations inside the district or of the district to its urban context.

By knowing the role model Sluseholmen itself is perceived in a different way, especially the interpretation of the identity of place is seen in a new differentiation.

Social scale (understood as the connection of the public to the private):

Private space, public space, public domain<sup>24</sup> and their meeting to each other are of central significance to the

functioning of a housing development, to its embodiment in the urban context and to the perception of both the residents and the public. The space of the industrial harbour is highly privatised, while its structure as well as its image speaks of openness and accessibility to the world. In the housing developments the exterior space is turned to public ground while it often lacks the fundamental attributes, which actually will turn it into public domain.



Figure 5: Scales at stake in the transformation of Sluseholmen, Copenhagen/Denmark

The concept of Sluseholmen is based on an open graduation of public spaces around eight building blocks (and along the water), half-private (or public?) spaces in the yards and private terraces. It describes itself as an area full with life and activities and a large, theatrical staircase down to the water offers a spatially attractive public space. Yet there is no public domain: the exterior spaces are all accessible, but not inviting to stay since they do not offer anything to experience, to share or to exchange on - the area seems voided for people.

Technical scale:

In the conception of a project the technical aspect, choice of materials, considerations regarding sustainability, statics etc. naturally will play a decisive role.

The materials of the industrial harbour are not only rough in surface, they are rough and big in scale - on all scales (dimensions, detailing, surface): There is not a lot of detailing about them, they consist of flats, which are built up to constitute a warehouse, silo or whatever vessel is needed to contain something inside of it.

The construction of housing units on the other hand is based on a completely different understanding of the scale of detailing. Thought is spent on every tiny detail, colour and material.

### **Scaling as a relation of my bodily presence in the world**

And yet, even so (or rather: because of) an analysis of those scales is taking a discussion about the spaces on objective grounds, it is still missing the most fundamental relation: The relation of me to the space around me. And that is both: me as a designer in the process of conception - since the process of design will always be more than decisions about relevancies, but also include an intuitive process - and me in the perception of the world outside of me.<sup>25</sup>

How that meeting is conceptualised in the design project and how it is perceived spatially in reality will play a central role in the acceptance and in the image making of the residents as well as the general users of the urban network.

My walks through the industrial harbours as well as through the housing developments were not planned ahead, but spontaneous tours, guided by the spaces themselves. My intention was to be open to the perception of the space with all of my seven senses<sup>26</sup>. Images and impressions were collected in my head and on numerous photographs to be recollected, ordered and analysed later on, after getting some distance to the immediate bodily experience.

The images I take home from those walks have to be separated into personal experiences and objective (as scientific) matters. To the latter Boudon offers a vocabulary to discuss architecture as a scientific matter.



Figure 6: placing myself in the space of the harbour

In a discussion, like the one about the harbour areas, which very much is based on pre-existing images and unspoken (or in any case not adequately formulated) expectations, this understanding offers a way of breaking a complex matter down to traceable topics. In that sense it offers a tool to analyse and discuss architectural space. But all this will never give you a feeling of the space as you will experience it while actually being in it – in the space of bodily presence as Gernot Böhme names it<sup>27</sup>. As a walker I can register the space with my senses: I see the physical elements, I hear the wind, the water, seagulls, machines and cars, I touch surfaces, feel the wind, the air, I smell the salt, the wood, sand and the petrol and I taste the air and the dust. Through movement my body experiences the space and through my body I experience scale. This experience will always be an experience of being inside and outside of me in my body and it will find a high variety of representations, which all will have a consciousness about their interpretative character in common. (Fig. 6)

This relation of me to the environment is inherent to the notion of perception. Even so it is not a transfer from one

space to another (as the character of scaling according to Boudon) it still is a form of scaling: of placing myself in the surrounding and of taking the surrounding inside of me.

## Conclusion

This paper states how various notions of scale (the Actor-Network-Theory, the architectural scales by Philippe Boudon and understanding of bodily presence by Gernot Böhme) can set up a theoretical framework for a spatial analysis, along the case study of the exterior spaces in the new housing developments in the former industrial harbour districts. It is the variety of scales being one of the inherent qualities of a harbour combined with the relevance of relations established by the process of transformation, by the location in the urban context and by the meeting of public and private in these special housing districts that suggests a spatial analysis by the notion of scale.

It has been discussed, how the various approaches of dealing with scale – the placing of the space in its surroundings, its process of realisation and the perception of the space by an individual – can be used to analyse a space from each their viewpoints and thereby contribute to the analysis of the architectural space.

Further results of this analysis will be described in detail in following papers and particularly in the final PhD project – right here they merely indicate examples to underline my intent of implying scale in an architectural analysis.

## Biography:

Meike Rehder graduated as an architect from the Technical University Braunschweig in Germany in 1999. During her studies she has received various scholarships, among others for one year studies at respectively the Kent Institute for Art and Design in Canterbury, England and at the Royal Danish Academy of Fine Arts School of Architecture in Copenhagen, Denmark. After her master she moved to Copenhagen, where she worked for KHR architects and JJW architects on various competitions and as a project architect. In 2009 Meike started her PhD-studies at the Centre for Public Space Research at the Royal Danish Academy of Fine Arts School of Architecture in Copenhagen.

<sup>1</sup> "...a gap or an area that is not filled between two or more objects or points [...] an area or a place that is not occupied and is available for use..." [Oxford Advanced Learner's Dictionary. Oxford: Oxford University Press, 1995].

For a confrontation of "place" to "space" see e.g. Creswell, Tom, *Place – a short introduction*. Oxford: Blackwell Publishing, 2004

<sup>2</sup> Kevin Lynch describes the process of building an image very precisely in his book *The Image of the City*. He, too, distinguishes between an individual and a group image and emphasizes the group image as the relevant one regarding urban planning: "Each individual creates and bears his own image, but there seems to be substantial agreement among members of the same group. It is these group images, exhibiting consensus among significant numbers, that interest city planners who aspire to model an environment that will be used by many people." [Lynch, Kevin, *The Image of the City*. Cambridge: The MIT Press, 1960. p. 7]

<sup>3</sup> Architectural space is understood as the space which is grounded on the design of the physical surroundings. [Oxford Advanced Learner's Dictionary. Oxford: Oxford University Press, 1995]

<sup>4</sup> Forecast of the report of Copenhagen's commune *Kommunaløkonomiske konsekvenser af nye boliger i København (commune economical consequences of new housing in Copenhagen)* says, that 9.000 out of the approximately completely 20.000 new housing units will be developed along the harbour front of Copenhagen in the years 2002-2015. [Kommunaløkonomiske konsekvenser af nye boliger i København. Københavns Kommunes rapport 2002, p. 35.]

<sup>5</sup> Oxford Advanced Learner's Dictionary. Oxford: Oxford University Press, 1995

<sup>6</sup> As quoted by Boudon in Boudon, Philippe: *Back to scale*. To be published.

<sup>7</sup> As brought forward in Boudon, Philippe: *Der architektonische Raum. Über das Verhältnis von Bauen und Erkennen*. Basel: Birkhäuser Verlag, 1991

<sup>8</sup> I am introducing the term *harboural* as a description for the physical placement of the new developments on the former harbour grounds.

<sup>9</sup> This space of reference is the particular frame of interest, the matter of concern to with the designer is relating during the design process. Thereby this particular theme becomes a scale in the design of the project.

<sup>10</sup> "Space of bodily presence" as experiencing space through the presence in your own body in the space as opposed to viewing it on photographs as presented by Gernot Böhme in Böhme, Gernot: *Architektur und Atmosphäre*. München: Wilhelm Fink Verlag, 2006.

<sup>11</sup> As Gadamer puts it: "In our daily life we precede constantly throughout the coexistence of past and future." free translation of: "Unser tägliches Leben ist ein beständiges Schreiten durch die Gleichzeitigkeit von Vergangenheit und Zukunft." [Gadamer, Hans-Georg: *Die Aktualität des Schönen*. Stuttgart: Reclam, 1977. p. 12]

<sup>12</sup> Albena Yaneva explains how, in the understanding of the Actor-Network-Theory, a computer rendering can be of

bigger scale as being of higher complexity as a society: "The smallest design entities are much more complex than the bigger, always richer in difference and complexity. Therefore, the smaller is always bigger. Or, as Gariel Tarde has put it: 'there is more complexity at the basis of the phenomena than at their summit'." [Yaneva, Albena. *No scales, but Ethnographic Attention to Scaling*. To be published.]

<sup>13</sup> Latour, Bruno. *Reassembling the social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press; part II How to render Associations Traceable Again, pp. 159-247

<sup>14</sup> Whereas the term *harboural* was introduced for the mere physical location and character of a place does the term *harboresque* include the being of a space on its various levels of perception.

<sup>15</sup> Architect as "a person who designs buildings and supervises the process of constructing them" [Oxford Advanced Learner's Dictionary. Oxford: Oxford University Press, 1995] Here I also include the urban planner and the landscape architect as they, too, participate in the design of the architectural space to be analysed.

<sup>16</sup> Dirk Schubert describes the background for the transformation processes taking place along the harbour fronts in his introduction chapter to *Hafen- und Uferzonen im Wandel* as a result of global restructuring processes, leading to a qualitative change of working processes combined with a physical relocation [Schubert, Dirk: *Hafen- und Uferzonen im Wandel*. Berlin: Gerald Leue Verlag Berlin, 2007/2002]

<sup>17</sup> Aabenraa is a little town in the south of Denmark, placed at the end of Aabenraa fjord. It is a deep-water port by the Baltic, close to the European motorway network. The whole of the harbour is divided into different parts: In the north you have the "old harbour" which today is the industrial harbour. Southwards this area is followed by the fishing harbour, the leisure harbour and the beach area of Aabenraa to finally close up with an industrial area which is not accessible for the public. This line of differentiating harbour facilities offers a string of changes and transfers to be studied in both: the change and the contrast from one to another.

The harbour of Køge, one of the oldest harbours of Denmark, is a functioning industrial harbour, too. As most of today's harbours, it is a harbour in change: It is going to be an extended industrial harbour in the northern part (it is getting extended for ca. 126 mill Euro with ca. 1200 wharf metres and an area 40 ha over the coming years), while its southern part will be transformed to housing developments. The first part of this development already is realised. Still showing its original character, while parts of it start to transform right along it, makes Køge an interesting harbour to study.

<sup>18</sup> These themes only get introduced here in a compromised form to illustrate what the analysis is about. They will be discussed more intensely in the actual Ph.D. project. All those themes function as actors in the network of the architectural space – and as such they can be divided into an endless number of actors again.

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<sup>19</sup> A difference of scale is much more than a difference in physical dimensions. In his article *Back to scale* Boudon shows, that the scale difference between the Manhattan skyscrapers to Danish houses is much more than just a difference in physical dimensions: "Though there certainly is a difference between the scale of Danish houses and that of skyscrapers in Manhattan, what is meant through the term that justifies speaking of scale instead of dimension or, even more simply, of size? For it is obvious, in such a matter, that we are no longer dealing with a cartographic scale."

In that sense he presents the royal chapel of Versailles with its relation to the symbolic space of reference to the royalty as a larger church than a good number of other churches even so its physical dimensions may not be so. [Boudon, Philippe: *Back to scale*. To be published.]

<sup>20</sup> For elaborations on the fascination of scale jumps in the harbour see for example Weyer, Julien, *Havnefascination – exit soveby, enter havneliv*, in ARKFOKUS, 4/2005, pp. 14-17

<sup>21</sup> With the architecturological scales Boudon is putting up an empirical list of twenty scales every project deals with as for e.g. the geometrical scale, the functional scale, technical scale, geographical scale, parcel scale, neighbouring scale, visibility scale, human scale, global scale, level of conception scale, extension scale, economic scale, cartographical scale, optical scale, semantic scale etc.

These so called scales appear for the first time in the last chapter of Boudon, Philippe: *Sur l'espace architectural*. Paris: Dunod, 1971.

<sup>22</sup> Original text: "Wenn wir vorschlagen, den architektonischen Raum als eine Einheit aus zwei Räumen zu definieren, aus dem wirklichen Raum uns aus dem gedachten Raum, wobei sich der eine im anderen abbildet und umgekehrt – dann ist der Maßstab das Gesetz der Übertragung – im weitesten Sinne von einem Raum in den anderen." [Boudon, Philippe: *Der architektonische Raum. Über das Verhältnis von Bauen und Erkennen*. Basel: Birkhäuser Verlag, 1991. p. 74]

<sup>23</sup> Original text: "... konnten wir Maßstäblichkeit als das definieren, das den Übergang von dem einen zu dem anderen architektonische Raum regelt, und konnten, von da aus, Maßstäblichkeit grundsätzlich als eine Funktion des Übergangs von einem Raum, welcher Art auch immer, in einen anderen Raum definieren..." [Boudon, Philippe: *Der architektonische Raum. Über das Verhältnis von Bauen und Erkennen*. Basel: Birkhäuser Verlag, 1991. p. 88]

The act of giving scale is scaling as deciding about relevancies: A physical dimension for example is given in accordance to a technical necessity. In the design process the necessity is of relevance, thus the architect is deciding about a dimension, which will take the project from the idea of a beam as bearing construction to a beam with certain measurements in reality.

<sup>24</sup> For a definition and precision of those terms see Hajer and Reijndorp in *In Search of New Public Domain*: "We define 'public domain' as those places where an exchange between different social groups is possible and also

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actually occurs. [...] Public space is in essence a space that is freely accessible for everyone: public is the opposite of private. That is not to say that every public space is public domain. Public domain entails additional requirements." [Hajer, Maarten and Reijndorp, Arnold: *In search of new public domain*. Rotterdam: NAI Publishers, 2001, p.11.]

<sup>25</sup> Among other Peter Bertram elaborates about the intuitive method in the design process in Bertram, Peder, *Intuitiv Metode*, Copenhagen: Kunstakademiet Arkitektsskole, 2009

<sup>26</sup> Here I refer to the seven senses described by Juhani Pallasmaa in *An architecture of the seven senses*, where the skeleton and the muscles also are described as equal senses in relation to experiencing architecture: "... every touching experience of architecture is multi-sensory; qualities of matter, space, and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle. Architecture involves seven realms of sensory experience which interact and infuse each other." [Holl, Pallasmaa, Pérez-Gómez: *The question of perception*. San Francisco: William Stout Publishers, 2006, p. 30]

<sup>27</sup> Böhme, Gernot: *Architektur und Atmosphäre*. München: Wilhelm Fink Verlag, 2006

# Blindness and multi-sensoriality in architecture: the case of Carlos Mourão Pereira

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## Abstract

The buildings architects design are multi-sensory in nature and much richer than the visual aspects that get most attention during the design process and discussions afterwards. There have been some reactions against this visual bias both from within the architectural discipline as well as from the field of disability studies. Persons who are visually impaired perceive the built environment very differently and pay more attention to tactile, haptic, auditory and olfactory aspects. A cultural model of disability can help in understanding how disability can critique this visual bias in architecture. It can even help in overcoming this bias. A dialogue between architects and people with a visual impairment can therefore contribute to a more multi-sensory design approach to architecture. In this paper we discuss the sea bathing facility designed by Carlos Mourão Pereira and especially the relation between its multi-sensory aspects and the process of becoming blind. Pereira lost his sight in 2006—after an extensive career in architecture—and develops his architecture from the new insights he gains. His blindness challenges his understanding of aesthetics in architecture, but also his sense of architectural space. Even in the way he explains this project, he searches for more-than-visual representations to shift the attention of the 'spectator' towards a more profound sensory awareness.

## 1. Towards a multi-sensory architecture

### 1.1. Architecture, the body and the senses

The term architecture and what it stands for has gone through a whole evolution. Traditionally, architecture is defined as the art of building. In this classic idea, architecture is a superior form of building as it brings about a harmonious merging of form, function and

construction (Heynen 2004a). What makes architecture more than mere building is for some the introduction of symbolic form. For instance Hans Poelzig (1931) reacts against a modern style based on mathematical and technological translations of processes in nature when he states that “the logos of art is not mathematical, it even goes against any form of arithmetic. It is mathematical, but in a more exalted sense. The logic of art goes just against nature—and against its laws.” Others, like Le Corbusier (1923), argue that it is this mathematical order, harmony and touching proportions which make architecture rise above mere demands of construction and functionality. Heynen (2004a) continues her review with the *Neue Sachlichkeit* and the left wing of the Modern Movement of which the representing architects and theoreticians argued that architecture is not limited to the more representational or monumental buildings, but encompasses the total built environment.

This tendency to consider architectural qualities in terms of abstraction can also be found in the ideas about the role of the body in Western architectural history. As Van Herck and De Cauter (2004) describe, “the classicist architecture started from a mythical corporality of the building. [...] In a building, there is harmony when all building elements are in proportion as are the parts of the human body.” They further define scale, size and proportion as aesthetic values that relate, directly or indirectly, to the body. But during the Modernist Movement, this anthropomorphism is being replaced by an organicism, exemplary of functionalist thinking. “The organicism of the modernist [architects] tries to understand the principles that are working in nature and reduces them to mathematical-physical laws, in order to surpass the mimicking of nature” (Van Herck & De Cauter 2004).

This abstraction goes even further and influenced also the perceptual experience of architecture. According to Van Herck and De Cauter (2004) the Modernist Movement proposes a new way of perceiving which is based on an immaterial principle to comprehend the underlying essence. “The intellectual comprehension of an immaterial ordering principle [e.g. mathematics] is seen as a superior form of perception, where sensory perception which cloud that perception, are by-passed” (Van Herck & De Cauter 2004). To them, this translates into the built form of Modern architecture as these buildings are designed for visual perception, since sight is traditionally the highest, less corporeal sense.

However, this over-attention for the abstract and visual qualities of architecture in architectural history, theoretical discourses, representational media and even built form does not mean that architecture was (and is) deprived of other sensory qualities. The built environment is perceived through the whole of the body. Not only how a space looks, but also the sound, the tactile aspects and the smell are of importance (Mellaerts 2006). Pallasmaa (2008) gives a further nuanced understanding of the visual bias in architecture. "It has to be emphasized that the conscious focusing on the mechanics of vision did not automatically result in the decisive and deliberate rejection of other senses before our own era of the omnipresent visual image. The eye conquers its hegemonic role in architectural practice, both consciously and unconsciously, only gradually with the emergence of the idea of a bodiless observer." Pallasmaa gives here the example of the Greek temple with its system of optical corrections but without rejection of haptic sensibility, materiality and authoritative weight. He even defends the extremely visually oriented architecture of Le Corbusier and the Modern Movement: "Le Corbusier, however, was a great artistic talent with a molding hand, and a tremendous sense of materiality, plasticity and gravity, all of which prevented his architecture from turning into sensory reductivism. [...] However, the reductive bias becomes devastating in his urbanistic projects" (Pallasmaa 2008).

Van Herck and De Cauter (2004) observed a reaction to this emphasis on the visual and the exclusion of the other senses in their analysis of the theoretical discourse starting after World War 2. By contrast, Pallasmaa (2008) argues that in architecture there is even a stronger focus on the visual. Van Herck and De Cauter interpret the upraise of ergonomic approaches as a return of attention for the body in architecture, but find these ideas still too reductionist as the body is seen as nothing more than the sum of its parts. Pallasmaa, on the other hand, argues that the visual bias in architecture only grew stronger as "architectural theory and criticism have been almost exclusively engaged with the mechanisms of vision and visual expression." Moreover, Marta Dischinger (2006) contends, "the current over-emphasis on the intellectual and conceptual dimensions of architecture contributes to the disappearance of its physical, sensual and embodied essence." She understands the traditional tools to represent architecture mostly using visual media as evidence for this.

Before Pallasmaa's extensive argument of the visual bias in architecture and his call for a truly multi-sensory

approach to designing, discussing and theorizing architecture, there were some (smaller) attempts to bring this under the attention. Van Herck and De Cauter (2004) see this in the writings of Kenneth Frampton (1983) and Hans Kollhoff (1993). Frampton calls for more attention for the tactile qualities when saying "the tactile resilience of the place-form and the capacity of the body to read the environment in terms other than those of sight alone suggest a potential strategy for resisting the domination of universal technology." Kollhoff, so state Van Herck and De Cauter, uses the cladding principle to bring the materiality of architecture in relation to the body back under attention. The reason Kollhoff gives is that "man wants an environment he understands, in which he can experience his body, because technical evolution works in a world that surpasses our comprehension."

### **1.2. Disability as critique on architecture**

There are a number of different ways to understand disability, of which the medical model is the most dominant in western society. Besides this medical model, however, there is a social model of disability coming into existence and growing in importance. These two models now co-exist, something that is recognized by the recent cultural model that further develops thinking about disability.

The medical model defines visual impairment by means of measurable criteria (see for instance the definitions of visual impairment and blindness given by the World Health Organisation (WHO 1993)). The impairment is situated in the person and the solution to the problem caused by the impairment lies in the use of prosthetics to restore the function of the body. The social model, on the other hand, situates (visual) disability in the interaction between a person and the context of his/her actions (Butler & Bowlby 1997). This context can be social as well as physical. So the solution to resolve a disabling situation can just as much come from an alteration of the environment.

Further, the cultural model does not just point to the responsibilities of architects in creating situations that are less or more potentially disabling. It looks at the meaning of disability for society and in doing so, how this can change our viewpoint on e.g. architecture. The very different experience people with a visual impairment have of the built environment compared to how it was conceived can in itself be a critique on this conception, resulting for example in the book *Blindness and the*

multi-sensorial city (Devlieger et al. 2006). McDermott and Varenne (2003) worded the critiquing abilities of disabilities in a more general way: "In cultural terms, the difficulties people in wheelchairs face with curbs and stairs tell us little about the physical conditions requiring wheelchairs or cart, but a great deal about the rigid institutionalization of particular ways of handling gravity and boundaries between street and sidewalk as different zones of social interaction."

More general, McDermott and Varenne (2003) describe how disabilities are culturally constructed concepts which can evolve into a critique on that same culture. They argue that "approaches using each term –culture and disability– differ along a continuum of assumptions about the world, its people, and the ways we learn." In this they distinguished three approaches: the deprivation approach, the difference approach and the culture as disability approach. In this first approach different groups of people develop differently but are being compared according to a stable set of tasks and possibilities. The second approach accepts that people can develop differently in their own ways and these ways are "equivalent paths to complete human development." The third approach goes even further and "takes up the possibility that every culture, as a historically evolved pattern of institutions, teaches people what to aspire to and hope for." People can be socialized into a disability.

Devlieger, Rusch and Pfeiffer (2003) further develop this thinking about disability in cultural terms and suggest a cultural model of disability. First of all, this model "recognizes and integrates the strengths that are present in each of the practiced models and recognizes that they are localized." Such a model takes into account that there already are different ways of understanding disability. Secondly, "disability is localized in the ways people could not and cannot conceptualize the phenomenon in all its complexity." This interstitial nature of disabled people can then lead to the growth of disability identity and at larger scale disability culture. "A cultural model therefore emphasizes potentiality and transformation, as it can be reached from the construction and deconstruction of information, emotionality, and spiritual growth." In other words, disability questions existing categories and this questioning may lead to new insights and inspirations.

Marta Dischinger (2006), for instance, argues how our perception of the built environment on the conscious level is mostly focused on the visual aspects, how this influences the way buildings and urban structures are

designed, and how people with a visual impairment question all this. She mainly focuses on way-finding and how urban designs rely on (distant) visual landmarks to guide visitors to their destination. But people with a visual impairment pay more attention to other aspects and qualities of the built environment, to auditory, haptic, and even olfactory cues. And by doing so they remind us of the richness in experiences we may otherwise forget exist.

"Twentieth century theory of architecture defines architecture first and foremost as a part of space: space is the most specific aspect of architecture as a discipline" (Heynen 2004b). But as much as this space can be perceived through all the senses and the whole of the body, design in and theory of architecture have focused to a great extent on the visual aspects of this space. There has been some critique both from within as from outside of the field of architecture on this visual bias, and a call for a more multi-sensory attention for the built environment. Disability studies are one direction out of which this critique has emerged. At the same time, the cultural model thinking in this area has also given a possible strategy to deal with this critique in a positive way.

## **2. The Lourinhã Sea Bathing Facility by Carlos Mourão Pereira**

Carlos Mourão Pereira is an architect who works on developing multi-sensory aspects of architecture, but from a very intriguing angle. Pereira is a Portuguese architect who became blind in 2006. He completely lost his sight in a short period of time but he decided to continue his architectural practice. He always had an interest in the senses and multi-sensory architecture and he realizes how being blind means that "now [he] can work with the senses." It is in this context and period that the idea for a project like the sea bathing facility (Fig.1) starts to take shape. Up until now, this project has not been built yet. It started as a study object and was not commissioned by a client, although Pereira is looking for sponsors and trying to convince the municipality. This however does not prohibit us from analyzing this project as fully developed architecture, because the built form is only one aspect of an architectural design. Or as Sonit Bafna (2008) words it: "Drawings in the imaginative mode are often architectural works in their own right, and they can function as works by invoking a special mode of visual attention."



Figure 1: sea bathing facility, Lourinhã: Overview and location (Sant'Ana 2008)

### 2.1. Data collection and research method

The data available to us for analysis are published materials (on Pereira's website and in magazines), materials provided by Pereira and two lectures given (one about his architecture and one about his Ph.D. research). We also interviewed him in order to know more about specific aspects of the projects and his design process. The documents found on his website are written summaries of different projects together with architectural images explaining them. Also video (moving images and sound) are used to explain a certain location. In architectural journals, two articles appeared: one in A10 (Sant'Ana 2008) about the Lourinhã sea bathing facility, and one in Mais arquitetura (nr. 31, January 2009) with an interview on his opinion and experience of architecture. A more profound description of the Lourinhã project and his ideas about architecture were given during a public lecture for architecture students in Leuven in 2009. Any further questions we had were answered in an interview which elaborated on his way of working in general and specifically in the case of the Lourinhã project. Both the lectures and the interview were recorded and transcribed word for word. For this paper we looked specifically for instances in these data that point to multi-sensory aspects of Pereira's architecture.

### 2.2. The Lourinhã Sea Bathing Facility

The sea bathing facility that Pereira designed for the Paimogo Beach in Lourinhã in Portugal is, as the name suggests, a place where the sea can be experienced, but in a safer and more controlled environment than the violent surf of the Atlantic Ocean. The main space of this project is an H-shaped basin that is implanted on the remains of an old abandoned fishery. The main basin is accessible through a slope which comes down from the

cliff towards the sea. Within this basin are a number of smaller tanks which form places where sea life can grow and develop (Fig.2). The whole is made of recycled concrete, a material that meets functional, financial and ecological demands as well as demands of resistance to the sea water.



Figure 2: sea bathing facility Lourinhã: Section(website Pereira)

As Pereira explained during the lecture for architecture students, there are three central themes to his architecture: "inclusion, sustainability and the senses" (Pereira 2009). These three themes are found to a greater or lesser degree throughout his projects, and the sea bathing facility is no exception.

When Pereira became blind, it was not safe anymore to go into the sea by himself. The surf at the Portuguese beaches can be very perilous. As a reaction to this, Pereira started developing his ideas about the sea bathing facility. He wanted to create a safe environment for all to enjoy the rich experience of the coastline. An accessible ramp leads from the parking up the cliff down to the main basin. A hand rail at two different heights offers a comforting guideline and support. The round corners and smooth concrete form a safe environment for all to enjoy the richness of this location.

As Pereira was thinking of a material that would make these rounded organic forms possible, concrete seemed appropriate. Not only does it allow these forms to be created, it can also withstand the relatively aggressive environment it is in. Sea water is highly corrosive and the movement of the surf can easily erode softer materials. For sustainability reasons, Pereira has opted for recycled concrete. There is also a sustainable aspect of water treatment. The sea bathing facility is not mechanically filtered. Because of its location, the water of the pool is naturally and regularly recycled. When the tide is high the pool is submersed in the sea and the waves wash through the basins. This creates the necessary water flow to keep the sea life in the secondary tanks alive.

But the true innovation of this project comes from Pereira's third concern: attention for the senses. The location is intentionally chosen. For Pereira, this border where water and land meet has a very rich and specific multi-sensory character. It is a unique place where wind and water interact with the land, something that we

appreciate with all our senses. After Pereira became blind he got “more conscious of certain spaces as they are more multi-sensorial and [he] discovered as most sensorial space the space between the sea and the land where we can listen to the waves and smell the sea.”

Not only the choice of location is responsible for a profound multi-sensory experience. The project in itself is conceived to further enrich this experience. The people who might use the sea bathing facility not only get in contact with the water, the wind, the sun, etc. but they can also experience touching the sea life that develops in the smaller tanks. These shelters allow for plants and fishes to live and grow. The location, the sea life and the basin itself all act together in creating an environment where people can get stimulated by their whole body. Linked back to Pereira’s principles of inclusive design, the project can be described as a botanic garden of sea life, for as many people as possible to visit and experience. The sea bathing facility mimics and gives form to an experience as enjoyed by Pereira at the sea shore (see the extract from one of his letters to Juhani Pallasmaa).

In this part of the letter (Fig.3), Pereira describes a childhood memory of a peculiar phenomenon that occurred once every year at the Portuguese coast. He tells in great detail how a few days long, the sea becomes totally silent and reveals the landscape that otherwise stays hidden beneath the waves. This landscape of little pools and shelters in the cavities of the rocks provides shelter for a person and forms the habitat for small aquatic gardens. Compared with these memories, the sea bathing facility allows for the same rich multi-sensory experience of the ocean and the life within. The small pools are recreated in the smaller touching tanks where a person can look at, feel, even smell the seaweeds growing inside them.

Letter from Carlos Mourão Pereira to Juhani Pallasmaa, August 22<sup>nd</sup>, 2007

“... made me remember an acoustic phenomenon that was happening cyclically in the summer, in a beach on the north of Lisbon, in which I used to spend some time on holidays, in my childhood.

In this point of the coast, the ocean is shown by a sound of great waves to wet the coast. The singular phenomenon was happening in two or three days, during July and August. In these

days the sound of the ocean was disappearing. The extraordinary event was consisting of the alteration of the waves resulting in a completely flat and silent sea, where the waves were coming down to the scale of the grain of the sand instead of that of the beach. This space change was noted with joy while observing of the top of the cliff such a calm sea. During most of the days, the green of the sea and the foam of the waves didn't let see the lush interior that there was. Now the water was colourless and just far away it were coming a green translucent, the one that was becoming blue when it was touching the sky. It was possible to walk along aquatic gardens. While we were walking, the sand could massage the feet. It was also possible to find some shelters on the empty spaces of the rocks. There were little seaweeds of a dark red and others of a yellowed green of the dimension of the feet, others of intensely green-emerald put a velvet touch onto the grey and dark brown rocks. There were also rocks that were pointed out of the level of the sea that appearing for some hours under the form of small islands. It was possible to go out from the interior provided by the water and to rise for the top of a rock and to be wetted by a tepid sea breeze, with the sense of a rising in a promontory. These rocks were containing brown green seaweeds with spherical empty tips in his interior that were causing resonant pops while being trodden. The mobility in this space was implicating skill and balance not to slip. In the middle of these rocks there were other interiors, some of shelter others of contemplation. Puddles with stone smooth bottom, for times with sand or almost spherical stones. There were variable dimensions and some of the puddles were allowing a uterine interior. The big brown green seaweeds were so smooth that touching it was like touching another human skin. Finally I might enter inside the ocean. ...”

Figure 3: Extract from letter to Juhani Pallasmaa, August 22<sup>nd</sup>, 2007

### **2.3. Blindness and multi-sensoriality combined in the work of Pereira**

His thinking about the senses inspires Pereira to design more than visual objects and forms. As an example he describes how the placement of nothing more than a wall on the beach can shape the wind, and change a

person's experience of that same wind: "Now the air has lost its transparency. ... With this wall you can make so many colours and details in the air." He describes how different orientations of the wall relative to the direction of the wind can change its effect from almost unnoticeable when aligned to very disruptive when transverse. Also important is the place of the body. Standing behind it, the wall can be sheltering, but when in front you are completely exposed to this strong wind. But the wall does not only shape the wind, it radiates heat and allows for a direct tactile interaction through touch. Just this simple rectangular form becomes a much more complex entity through its interaction with the environment and the body.

As he became blind, this interest in the senses only grew. He became more aware of the acoustic, tactile and olfactory components of architecture. He describes in an interview as being "in a state of great receptivity to new influences, with particular emphasis to the ones of bigger sensorial complexity" (Mais arquitetura 2009). His visual impairment allows him to pay more attention to the senses other than sight, attention that before was spent mainly on the visual world. He did not think of his blindness as a threat to his architectural practice, but he considers it as a unique opportunity to learn more about his other senses. In turn, this awareness further inspires and informs his architecture.

Although he cannot see anymore, Pereira still relates to the visual realm, both in his perception of the space, his architecture and his way of working. He describes his present experiences as a combination of sound, touch and smell, but also the mental image these experiences bring up. In this way he gets "an image of the space he touches, hears and smells" (Mais arquitetura 2009). He explains it as if you are reading a book your imagination also creates images in your mind, you 'see' what you are reading. This is the kind of visual experience he still possesses. His visual impairment has made him more aware and attuned to his other senses, but his experience of his surroundings still has a visual component.

This visual component can be understood as imagination but also memories play a part in this respect. Pereira describes in his letters to Juhani Pallasmaa how he still has strong visual memories, mostly concerning natural spaces and water. He describes then one of these memories as he talks about "the clear and transparent waters of Hilara River, shadowed by the leaves of the trees and protected by his canyon" (Pereira 2007).

These memories can be brought up by direct experiences, but also through description of the space. Further in the same letter, Pereira mentions how "the acoustic atmosphere of people talking in a bar enjoying a fantastic view, and some descriptions of this interior space, the size and position of the windows and this view angles, really [gave him] visual space memories" (Pereira 2007).

These new insights in how multi-sensory space is perceived also made Pereira question his former ideas about architecture and aesthetics. He summarises it in the interview with Mais arquitetura (2009) as follows: "Nowadays, sharp edges are not as important as a rounded one." His former ideas on aesthetics were mostly influenced by the "visual consumption of recent Portuguese architecture which favours stimulating spaces with poor details in what respects the form and the texture." This would lead him to design, for instance, handles and ironworks with deperate shapes and sharp edges. Now, he prefers those elements where a person gets in frequent and immediate contact with a building to have more ergonomic forms. His new ways of experiencing the built environment have made him question his own visually oriented beliefs on aesthetics. Visual purity became less important than tactile well-being.

This thinking about multi-sensoriality and architecture has also influenced Pereira's concept of what an architectural space is. For him, it is "more complex than a visual thing." One visual coherent space can be experienced as multiple spaces when a person inside that space focuses on tactile qualities. The part of a space that is lit by direct sunlight is for Pereira a whole different space than the part in the shadow because the heath of the sun gives a completely different tactile warmth experience. If we look at the example of the wall again we could say that the wind side is a whole different space than the back side. Although both sides 'look' identical, they are 'experienced' very differently.

To give another example, the water that fills up the basins of the sea bathing facility is as much part of the architecture and the experience as the concrete used to shape the basins. The space of the sea bathing facility would not be the same without the water. The reason Pereira gives is that the experience of the space would change to a great extent if the water were omitted. The experience that he wants to create is as much part of the architecture he strives for. As a result of this way of thinking, the water becomes as much a building material

as, say, the concrete. But water is in that sense a very special 'material'. It allows a person to be "involved in the material."

Special to this project is that one can discuss these aspects without them actually being built as they are consciously created and very well thought of. They are not just qualities of the built edifice, they are intentionally designed. They are part of the architecture made here. Experiences are as much given form as space is being formed and we can analyze them in the different forms they are represented. Sonit Bafna (2008) already mentioned how architectural drawings can invoke a special mode of visual attention. But in the work of Pereira, the architecture is also present in other forms such as texts, sound recordings, tactile models or even complete multi-sensory installations; and a purely visual attention is opened up to a tactile, auditory and olfactory attention.

One example for this is the exhibition space that Pereira designed for the International Architectural Model Festival in Budapest. There he explained this multi-sensory project in a way that appeals to all the senses, also to make a more inclusive exhibition. The main piece of this exhibition space was a wooden model filled with water and it was made to touch, not only to look at (Fig.4). Also the water was perfumed with the smell of seaweeds and arnica and the model was surrounded with the sounds of the site to represent the olfactory and acoustic space of the project. This whole multi-sensory setup was further completed with a textual description, also in Braille and audio format (Pereira 2009a).



Figure 4: sea bathing facility: Presentation model (Mais arquitetura 2009)

### 3. Conclusion

We looked for traces of a multi-sensory approach to architecture in the recent work of Carlos Mourão Pereira. This Portuguese architect always had an interest in how architecture was perceived with all our senses and the

whole body. But when he became blind this attention for the sense got a profoundly different dimension. His attention for non-visual perception grew and made him question architecture as it is today. "A wise architect works with his/her entire body and sense of self," Pallasmaa (2005) wrote, and this is what we found in Pereira's sea bathing facilities, how he talks about his architecture and explains his concepts. But to say that this is because of his becoming blind would not give him enough credit. Pereira gives the impression that he always was aware of his body, but his body changed and so did his awareness.

This altered awareness made him question his ideas about aesthetics in architecture and they evolved from appealing to the eye towards more comfortable shapes for the whole body. Shapes that cut the hand are replaced by shapes that are softer, and more pleasant to touch.

The same goes for his interpretation of architectural space. He understands it now as something much more complex and much more full than the empty void that our eyes traverse when only seeing its boundaries. The body is very much involved in the mass of the space. This became clear in the example of the water as a material that can carry an architectural shape, but also in the example of the shaping of the wind.

So disability can indeed question 'fixed' ways of working and thinking about architecture and formulate a critique on existing culturally constructed *idée-fixes*. But it goes beyond the mere critiquing and allows also to re-think these questions and inform us about alternative solutions. When Pereira became blind, he questioned the visual bias in architecture. But he also got more conscious of his other senses which in turn was for him an opportunity to develop his architecture in a very nuanced multi-sensory direction.

However, architecture is more than just the built form. It starts a long time before the opening of the building; some architectural projects do not even get past the drawing board. In future research we will therefore focus more on the design process of Pereira. There are already some hints in that direction when we described how Pereira is looking for more-than-visual ways of presenting the project of the sea bathing facility.

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# CHARACTERISTICS OF THE HOSPITAL BUILDINGS: CHANGES, PROCESSES AND QUALITY.

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## Abstract

Since the second half of the twentieth century to today, the architectural design of the hospital building has undergone great changes. These are related to the role that it plays within the city and the community, but also to the recovery of values that are different from those of quantity and function, characterizing modern hospitals in the first half of the twentieth century. These 'new values', really recovering from the past and agreeing to a humane and humanistic vision of reality, together with the recent technological discoveries and new ways of treatment and care, influence the design choices in hospitals contemporaries.

The proposed research *Architectural of hospital space: Changes and Design Methods* seeks to define the characteristics and the architectonic qualities of the contemporary hospital. It is care centre and hub of scientific and medical knowledge and it is also the important place for observations on the relationship between the man and the built environment.

The study of typological and theoretical contribution, the analysis of representative examples of recent architecture, Italian and international, give scientific basis - to the reflections that define the variant and invariants typological characters,

- to explain the meaning of the changes, specifying the architectural quality,
- to provide the guidelines for design.

## Architectural value of the hospital building

Functional aspects of a hospital building often overshadow the others that characterize its architecture.

The reason for of this "inattention" in favour of the fictional aspects concerns the difficulty to define the quality of the architecture is and how this can be assessed. Once, the

architectural quality was synonymous with safety and functional efficiency. Now, it is searched in the aesthetic and cultural values. Moreover, there isn't a scale of absolute values of quality depending on the different "users" and aims. Specifically in hospital buildings, assessment tools and related quality indicators are numerous. They are referred more to specific sanitary functions than others. These appraise the hospital only as a building system and not as architecture. As such, the hospital building has to consider the physical and psychological needs of the person (the sick in particular). The hospital plays a catalytic role within urban environment, carries out some positive correspondences for the city and the citizens. It works to promote the recovery of the values of belonging and integration with the socio-cultural context.

These values were known in the past. Filarete, for example, in the hospital of the *Ca' Granda* in Milan in 1456, created an innovative building, which meets the planning and health needs of city of Sforza, symbolizing political power and spiritual views of the time.

In 1859 Florence Nightingale in *Notes on Hospital* wrote "*It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick on harm*" (Williams, 1992) and in 1888 in the book *Notes on Nursing* specified "*The effect in sickness of beautiful objects, of a variety of objects and especially of brilliancy of colour, is hardly at all appreciated. People say that the effect is only on the mind. It is no such thing. The effect is on the body too. Little as we know about the way in which we are affected by form, colour, and light, we do know this: they have an actual physical effect*" (McKahan, 1993).

## Humanization in the hospital space

In the late fifties, within the psychology outlines a new area of study, the *Architectural Psychology*. It studies the behaviour response to physical environment and the special factors that involve a direct sensory activity of the subject, helping to specify the quality of the environment. "*Both architects and designers, like it or not, must always care the 'psychological implications' of their design decisions*" (Canter, 1972).

Another issue of the *Architectural Psychology* is the humanization of physical space. In the case of the hospital buildings the attention was focused first of all on the patient. He is considered like a completely person, with his physical and emotional needs. The hospital building is just a functional centre of knowledge and therapeutic technologies, and also the place professional and human relational aspects coexist.

Previously, the *Declaration on Primary Health Care* stated at the first point "*The Conference strongly reaffirms that*

health, which is a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity, is a fundamental human right and that the attainment of the highest possible level of health is a most important world-wide social goal whose realization requires the action of many other social and economic sectors in addition to the health sector" (Alma Ata, 1978). This sentence points out the need to produce a change about attitudes and organization of health services are developed from needs of the man in its totality. On the next the *Charter for Health Promotion* (Ottawa, 1986), in a point specifies the need to "Create Supportive Environments", recognizing the inextricable link between man and built environment. The process of humanization involves a holistic vision of people, spaces and activities. In 2001, in Italy, a Ministerial Committee chaired by the architect Renzo Piano, developing a *New Model of Hospital for acute care and high technology*, put at the first point of its theoretical principles, the humanization of hospital space. Besides "A health service, even if careful and delivered through trained personnel, is devalued where the environments, rather than reflect, contradict any attention to the man" (Spinelli, 2006).

Recognizing the interactive processes that occur between the man and the environment, building the concept of humanization means design environments and spatial distributions in which the needs of the patient (sense of acceptance and familiarity, respect for privacy, space and sensory comfort, ease of orientation) are fulfilled destroying at the same time the factors of stress.

The ways through which you can implement a project of humanization are numerous. Concern to the build space, it can be made through the distribution and composition of spaces, the shape of the exterior volume of the building, the presence of views to outside, green and worship spaces, furnishings, materials, finishes, colours, signage, light (both natural and artificial), elements of visual reference (for example, art installations). In according to *Architectural Psychology* beneficial effect of these factors, each studied by specific disciplines, derives by their combination with each other.

Comparing the hospital contemporary to the old models, it is evident that it has had many changes also for the discovery of new technologies and new ways of care and assistance. In the next time, it is thinking that the hospital model will be organized into a "network system and specialized nodes" (Del Nord, 2008). The hospital buildings, the nodes of the network, will stand out in clinics – smaller, disseminated in large numbers on the landscape and depute to provide local urgent care and health services – and fewer peripheral complexes, larger, strategically located, with specialized functions in higher technological

level. In both cases, the number of beds will be content being the shortest period of hospitalization and early transfer to residential structures. Moreover, it confirms the role of the hospital as a catalyst, social and cultural, for the city, incorporating activities such as sports, information, educational, commerce, etc.

Conversely, the issue of flexibility, on which it is contrived so much experimentation and some innovative spatial inventions, is now obsolete. It is synonymous with vagueness and instability, rather than the ability to coordinate different types of functions in a single place. So, it is replaced by the concept of *multiplicity*, through the help of modern computer technology, experiences and explores new types of spaces. Finally, the major formal innovations over the past achievements, concern the system of routes, internal and external, which is closely connected with the entrance hall and the expressive value of the wrapper. The building of the future hospital speaks a new language which we must learn the new semantics.

### **Approach to the issue**

The proposed research *Architectural of hospital space: Changes and Design Methods* defines the features and the architectonic qualities of the contemporary hospital, it is care centre and hub of scientific and medical knowledge and it is also the important place for observations on the relationship between the man and the built environment. Research defines also features about the supporting areas to health activities, because they are more representative than others about the quality of the service and especially about the quality of the building. These spaces for the absence of direct health activities are often overlooked. They are both spaces where the public role is prevailing, like entrance hall, corridors, waiting areas, common areas (especially the day rooms for the patients) and those where it is vital the use more private, like the rooms of hospitalization. In each of these areas there are specific psychological and emotional needs of the users. The humanization is more important than in others hospital spaces and the issue of architectural quality is most obvious and sensitive. In each of these areas there are specific psychological and emotional needs of the users. They must be satisfied and find answers first of all within the requirements of the acceptance and orientation.

The general objectives of research are:

- defining the typological features of contemporary hospital;
- explaining the meaning of the changes;
- specifying the architectural value;
- giving a scientific base to human dimension to the hospital space;

- providing guidelines for design of areas supporting the health activity.

These objects were pursued also through the contribution of disciplines very different: like Environmental Psychology, expressive arts, ergonomic, art of gardening, Evidence Based Design, studies on the perception of shape and colour. Several of these are related to the architecture in general, other are related to the hospital building in particular. For example, the Cognitive Psychology says that a corridor with more than two changes of direction doesn't help to create a mental maps for the orientation. Therefore, such corridor isn't good.

OUTPATIENT DEPARTMENT – WAITING AREAS	
Activity	Waiting
Architectural spaces	Waiting area
	Transit zone
	Acceptance / Front Office
Psychological needs	Visualizing access area
	Distraction elements (attractors)
	Recognize clearly the area
	Absence of unpleasant or disturbing elements
Requirement	Usability
	Pleasure/Comfort

Table 1. Waiting areas: definition of main features and requirements of the architectural spaces.

In order to the multiplicity and interdependence of all contributions, the research is divided into steps.

We look into the architecture of the hospitals in its historical evolution, the characters and the organizational and spatial relationship of functional areas. The aims of this work were: identifying the innovative of contemporary hospitals as regards to traditional ways of thinking the hospital space, the use and perception of space by users, the way putting on and integrate into the urban environment, the expression of the architectural language.

We analyze more representative example of recent hospital buildings. The case studies represent a range of different design experiences. The criteria of their selection are: hospitals building since ten years in industrialized nations of different types; the interest shown by designers to solutions steered allowing the comfort of users

### Analysis of case studies

In order to achieve the overall final results, a series of cards have been programmed. They are inherent cases of study constituting an atlas of the state of the art. In the first part of the card, there are general information about history of building, location and relationship with the place, building plan connection, layout of corridors, functional distribution, materials that characterize the external surfaces, utilization of non-traditional building technologies and presence of qualitative elements such as art installations, gardens or places for spirituality. In the second part, it was deepened knowledge of individuals 'characterizing areas', that's to say the supporting areas to the healthcare activity, object of our study. The activity and psychological needs, corresponding to classify by Jordan (Jordan, 1999), defines the requirements for recognition, accessibility, acceptability, orientation, usability, pleasure/comfort and privacy. The characteristics of requirements are detailed and 'specifications' are listed: notes related to the physical properties (size, position, shape), perceptual (colour, materials, finishes) and compositional

We report three tables, one (Table 1) about the waiting areas of the clinics, the others (Table 2) showing the example about F. Miulli Ecclesiastical Regional Hospital (Fig. 1) in Bari (2002-2005).



Figure 1: F. Miulli Ecclesiastical Regional Hospital: waiting area

The requirements and the performance, combined in a table, are the evaluation indicators of case studies.

The assessment system assigns a quantity which can vary in the range from A to D. now we attribute four values corresponding to levels of satisfying the requirements. A is the maximum value and D is the minimum value, when the requirement isn't absolutely satisfying (see Table 2).

AREA	REQUIREMENT	PERFORMANCE	SPECIFICATION	VALUE
Entrance Hall	Acceptability	Exterior / Interior continuity	Glass wall	A
			Natural lighting from above	A
			A bring sign	A
		Connection with the others areas	Barycentre	A
		Variedness of spaces and services	Hospital service (offices, booking office . box for payment, reception, banking windows, shops)	A
			No hospital services (congress centre)	B
			Harmonic composition of shapes, colours, lighting and materials	On two floors connected by sliding scale
		Natural lighting from above		A
		Three colours: white, orange and blue.		B
		Orientation	Easy identification vertical connections	No
Absence of visual barriers	Evident composition and shape		A	
Wayfinding system	No		D	
Corridors	Accessibility	Signals	Indicating the main directions and functions	B
			Generic use of colour	C
		More lighting at the access	No	C
	Orientation	Wayfinding system	Only some (Paediatric Department)	C
		Absence of visual barriers	Visibility of the whole	A
		Continuous ways without too many changes of direction	Two changes	A
		Clear identification staircases / lifts landing	No	D
Acceptability	Presence of standing areas	No	D	
Waiting areas	Pleasure / Comfort	Harmonic composition of shapes, colours, lighting, materials	Natural light from above	A
			Red armchairs, in contrast with the clear floor, apricot-coloured vertical surfaces	B
			The environment is bright, cheerful and friendly	A
	Usability	Presence of 'attractors'	A large bronze panel	B
		Distinction between the waiting areas and transit	No	D
Position of the access		Peripheral	C	
Patient rooms	Privacy	Different areas for privacy and socialization	No	D
		Seeing entrance from the station-bed	No	D
	Acceptability	Harmonic composition of shapes, colours, lighting, materials	Rectangular plan with bathroom	C
			Walls: soft yellow	B
			Bed-head: apricot and no refined	B
			Floor and ceiling: neutral colour	C
		Accessible outdoor spaces	No	D
		Furniture and furnishing accessories not 'medicalized'	Fitted wall wood	B
Acting independently on light elements	No	C		

Table 2: Features of the supporting areas in the F. Miulli Hospital in Bari and valuation of their requirements in according to the assigned levels (A=High, B=Medium, C=Low, D=Null).

In the example, the waiting room of the outpatient department of the F. Miulli Hospital in Bari is enough comfortable, although some *soft*<sup>2</sup> actions could improve the perception of comfort. Regard the usability<sup>3</sup>, is low satisfied.

The analysis of case studies has allowed the rafting of an abacus of types expressing the different organizational and morphological state of the structure. This method for evaluating the quality of supporting areas of health activity, together a typological abacus, are the basis for defining guidelines to guide the choice of designers.

Furthermore, the comparative assessment of the case studies can be derived the strengths and problems of these 'characterizing areas' in contemporary hospitals.

Regarding the entrance hall, which is configured as a 'Main Street' or as a 'Square', is the site of the initial impact with the hospital, the interface between the healthcare facility and the user, the communications centre and junction of crossing flows. Entrance hall, like a 'Street' or a 'Square', presents hospital services (reception, offices, outpatients, etc.) and not hospital services (shops, bank, post office, cafes, restaurants, charities, classrooms, auditoriums, etc.), waiting areas, break areas and vertical connections. For example, into the foyer of the Ascau Pediatric Clinic (Germany), there is a wall for climbing having therapeutic and also recreational purposes (Fig. 2).



Figure 2: Ascau Pediatric Clinic: the entrance hall.

The entrance hall is often the extension of the outside space, like the lobby of the Hôpital Mutualiste Mountsouris (Paris), with its glass walls and the variety of items inside.

In some projects, such as Assuta Hospital in Tel Aviv, the entrance hall is a hybrid combination between the 'Main Street' and the 'Square'. To respond appropriately to natural and urban site, bounded by a road and a park, two transverse cuts cross the block and the building, jointing up in a glazed multilevel 'Street'. This is the main axis of vertical and horizontal connecting the building, beautiful views of the park. The entrance hall is unitary, divided in many very different areas. Inside there are a square, a winter garden and a panoramic promenade.

In many recent examples, especially German, the entrance halls are more austere and minimal. They are essentially places to stay and relax. In these relaxing places you can talk with friends sitting in comfortable sofas, read near a fountain, watch other people.

However, the presence of numerous and diverse activities and services, hospital and not, can cause a 'sensory overload'. For this the morphology of the environment is particularly important. It should facilitate the identification of main directions. The unitary language of the architectural elements and furnishings is important too. In Italy, one of the most successful examples is the entrance hall, the 'bioclimatic greenhouse', of the Meyer Paediatric Hospital of Florence. The structure of greenhouse of wood laminated is like as a fairy forest (Fig. 3).

Within very bright environment the "kiosks" for information and for the acceptance are located with the waiting areas, whose colourful character are part of a larger artistic project. In this art project, coordinated by the designer Andrea Rauch, every single interior are designed as parts of an imaginary tale: the *artistic glass*, separating the giant waiting room from the service corridors, gives stylized natural forms; the *zodiac* is made up of a group of metallic installations suspended; the *clouds in the sky* are a group of painted placed along the walkways connecting and under a large skylight; the *light cones* are two great spinners coated ceramic glazed in bright colours; the *fantastic fishes*, the *multimedia installation*, the *sails as curtains*, the *care toys*.

In Italy, the most magnificent example of entrance hall is the large covered one, enriched with luxuriant vegetation, in the new Mestre Hospital (Fig.4). This is thought to be a large garden square with reception, bar, restaurant, shopping areas, offices for the public, religious services and offices for the associations. On its face, on the upper floors: the outpatient department, the day hospital, medical offices and wards.

Although the hospital is a building complex, also for the distribution, the user should be able to perceive it as simple

and cross instinctively, without being confused. So the presence of a system of wayfinding assumes a fundamental role, contributing to the construction of mental maps.

For example, the Circolo and Macchi Foundation Hospital in Varese, a sequence of colour was adopted for different floors. It is based on the balance principle about the 'harmony of the four colours' by Jorrit Tornquist, international artist. Four different pastel colours alternate, with a modulation exponential of brightness, by lower floors (dark) to the highest (unclear). Where the transition is fast, colours are more saturated, as in the living areas, the colours are de-saturated. In a *wayfinding* system are important: the visual, acoustic and tactile signs and also the lighting and the shape and distribution of the ways. Communicative elements (signals, flooring, lighting, finalized use of colour, presence of 'attractors', etc.) are also designed.

In fact, these are often sewing up between different parts, instead of an organic and contextual operation of whole building. Sensitive points in the design of the routes are: landings of stairs and lifts, which must be clearly identifiable, and the waiting areas, presence and location, which need not be an obstacle for either visual or walk.



Figure 3: Meyer Pediatric Hospital (Florence): the entrance hall.

Color is not just a tool for orientation is also an integral part of the hospital's aesthetics and a form of therapy with beneficial effects. Thanks to the work of the American

'color specialist' Gary Glaser, in the Pôle Santé Sarthe et Loir, the alternation of colors set spatial layout like signposting. Besides, "the colors emphasized the structure, add depth to the rooms, raise the heights, draw us towards the landscape and help instill a sense of overall peace and quiet" (Pargade, 2008).



Figure 4: New Mestre Hospital: internal 'Square'.

The corridors, although are clear and linear<sup>4</sup>, are the simple connections between parts of the building and they haven't standing areas. Moreover, they are not particularly characterized: the artificial lighting is zenith, which would avoid the problems of glare, but confuses the orientation.

The colours of floors, walls and rubber buffers are harmonized with each other but they aren't enough to guide the users. However, in many cases, such as the Gubbio and Gualdo Tadino District Hospital, the corridors have a strong relationship with the windows opening to the countryside or into the inner courtyards.

Even the waiting areas, such as the corridors, are not always designed together functional articulation of building. They are often made out of residual space. They are peripheral to the area to which you have to access and show no element (a view out, art object, the composition of plants, etc.) drawing attention to the user, detaching his from stressful waiting. Outlining the requirements and performances of waiting areas, it is necessary to distinguish different types of 'waiting', because for each of them corresponds different ways of using and different psychological needs. Waiting areas of the outpatient hospitals are characterized by a high state of anxiety and emotional tension and a perception of dilated time. Waiting areas in the atrium, support to other functions, have a considerable degree of representativeness and there is a greater tendency to socialization, between users and between users / operators. The waiting areas in the corridors, punctiform through the building, have the force of disruption and characterization of pathways and they are an extension of functional areas more defined.

The waiting areas are in direct visual contact with the area in which the user must come in, decreasing the stress factors. These areas are lighted in different ways, depending on the composition of the various groups of chairs for waiting. At the end there are 'attractors' often views to the outside that distract the waiting user.

Together with the entrance hall another area that is subject of special attention is the patient room. There are more avant-gardes examples in profit health system. These rooms, using the studies of Evidence Based Design, have hotel-like characteristics. They improve the quality of life of patients. Inside the room a semi-private area is foresaw. This is a living that allows more and better interaction between the patient and family members who assist him, ensuring a greater sense of 'territoriality', too. From the room the patient can see out. In temperate zones, the rooms are also equipped with a solarium, to enjoy the therapeutic effects, including psychological, of the sun. The furniture, taking care to the tactile and visual characteristic, allows customizing the environment by patients. However, medical instruments and equipment technology tend to be camouflaged, almost hidden. Patients may act independently on the systems of lighting / dimming and on those for the temperature control in the room.

The day rooms are not designed like the others supporting areas. If they are present, are unadorned rooms with chairs and tables. But, these rooms are very important for the socialization: they may be used as a dining area, or to meet relatives and friends. They should be equipped with comfortable furnishings, they should be directly connected with the outside, a garden or a courtyard, and if is not possible to have pleasant views. They should also have a space for media and internet access.

An area that has assumed considerable importance is the so-called "Room of Peace". Previously it was an anonymous room inside the morgue, now it is designed appropriately. It is a place where the light plays an important role and in which religious symbols aren't present necessarily.

## Conclusions

Previous considerations about trends of contemporary hospital buildings and about humanization of spaces supporting the health activity are the basis defining design guidelines.

The next step of the research is to specify a system of criteria that the designer can take into account to humanize important spaces, like those supporting the health activity. These criteria will be written for each aspect analyzed and derive directly from the evaluation of its architectural quality according to the optimal parameters introduced.

In fact from the analysis carried out and observing actual trends, we have saw that in those areas optimal levels of architectural quality in terms of humanization have not been achieved.

Obviously taking into account emerging criteria will be easier for new hospitals. More complex is to act within existing hospitals, where however is always essential to solve the problem of humanization. In existing buildings humanization doesn't follow the same logics of new buildings. Sometimes it is better to change their use making them housing or dormitories.

One of many problems is to create a strong system of relationship with external spaces that sometimes it is impossible to achieve because of the easy conditions of the urban context. Specifically the Italian hospitals have features that are different from other countries. Italian designers give great importance to the relationship between building and place, and use forms and languages that don't contradict local history and identity.

## Notes

1. "The Centre for Health Design is a leading research and advocacy organization fo forward-thinking healthcare and design professionals who are leading the quest to improve the quality of healthcare through building architecture and design" ([www.healthdesign.org](http://www.healthdesign.org)).

"The International Academy for Design & Health was founded in 1997 by scientists at the Karolinska Institute in Stockholm as a non-profit organisation dedicated to the stimulation and application of research concerning the interaction between design, health, science and culture. It is is a global, interdisciplinary knowledge community dedicated to the stimulation and application of research concerning the interaction between design, health, science & culture" ([www.designandhealth.com](http://www.designandhealth.com)).

2. The *soft* actions are those in wich materials, colours, finisches, lighting acting complementary, qualify the space. For example, floors and walls must be color-matched. Their 'draw' helps to measure the space and, at the same time, highlights the configuration.

3. ISO 9241-11, "Ergonomics of human-system interaction - Guidance on usability": "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use".

4. According Cognitive Psychology the corridors should not have more than two changes of direction, because these prevent the construction of a mental map that guides the users inside the costructed space.

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## PRESENTATION SESSIONS | **DESIGN**

Session Three

Moderator: Michel A. Mounayar, RA



## Photography Matters: Balthazar Korab's Legacy in the Saarinen Office

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### John Comazzi, University of Minnesota

#### ABSTRACT

This paper begins with the premise that architecture is (re)created through photography, as photographers play a crucial role in the public dissemination and critical reception of architecture. While designers, educators, historians and consumers of architecture often ascribe a calculated *objectivity* to the photographic images thereof, it is undeniable that any representations of original sources (buildings, landscapes, cities) are *inflected* by the approaches, sensibilities and practices that photographers bring to bear on their subjects. As such, this paper will examine the unique contributions made to the disciplines of architecture and photography by Balthazar Korab (b. 1926) by examining two specific projects from the Saarinen office (TWA Terminal and Miller House) with which Korab had direct and sustained involvement during the processes of design, construction and documentation. Korab's portfolios of these projects offer a unique opportunity to reexamine distinctive representations of canonical architecture produced by a photographer with unique insights into the design and constructions thereof.

#### INTRO: DRAWING WITH LIGHT<sup>1</sup>

It's right there in the name, *Photography*. Scrutinize its etymology and one discovers the word is based on a combination of the Greek *phos*, meaning "light" and *graphê*, meaning "representation by means of lines" or "drawing."<sup>2</sup> In combination, this roughly translates to "drawing with light."<sup>3</sup> There, yoked together in the very name given to the discipline (photography) and the thing itself (photograph) are the dual authorities of *representation* (drawing and painting) and *natural sciences* (physics and chemistry) and the assertion of their necessary alliance.

To an extent, the inevitability of this alliance was forecast by the lives and careers of the men most widely credited for the *inventions* and earliest developments of what became photography. Louis-Jacques-Mandé Daguerre was a Frenchman for whom one of the earliest and most successful processes of direct or "positive" plate images bears his name, the *daguerreotype*.<sup>4</sup> Joseph Nicéphore Niépce (Daguerre's partner prior to Niépce's death in 1833) is credited with the earliest known surviving *photograph*, an image that vaguely depicts silhouettes of rooftops taken

from his attic window in 1827. Niépce was a French-born physicist who devoted much of his life to the invention and design of various mechanical devices and research experiments in chemistry and lithography.<sup>5</sup>

At the same time that Daguerre and Niépce were developing their efforts to fix illuminated images, in England there were parallel experiments in early photographic techniques undertaken by, among others, William Henry Fox Talbot, who is credited with one of the earliest and most-successful developments of a "paper negative." This technique had the distinct advantage, over the daguerreotype, of producing multiple "positive-print" reproductions using the "paper negative" image. Talbot was trained as a mathematician and physicist with a "kaleidoscopic play" of interests ranging from the science of light, phosphorescence, flame-colors, and, of course, photographic imagery.<sup>6</sup> In the case of Talbot, much of the motivation for his experiments in "fixing" the illuminated images produced within his camera obscura and camera lucida came from a frustration with his own inability to actually *draw* the images projected within those devices. So, in 1844, when Talbot published a detailed description of his photographic developments he titled the book, of all things, *The Pencil of Nature*. Talbot's emphasis given to a drawing tool in the title of a book on photography was completely understandable when considering that "by the early nineteenth century most well-educated individuals were schooled in perspective and figure drawing, which was considered a skill as important for personal development as handwriting."<sup>7</sup> Equally significant is the fact that in 1877, when later reminiscing of his earliest exploits in photography, Talbot wrote that his country house, Lacock Abbey, was "the first that was ever yet known to have drawn its own picture."<sup>8</sup>

However, while it is arguable that these earliest forays into architecture photography were consistently produced according to the prevailing language and conventions of drawing and painting, emerging innovations in the *technology* of photography, along with a flourishing publishing industry, began to create independence among photographers to gain greater control over their individual approaches and interpretive practices when photographically presenting their subjects.<sup>9</sup> Through travelogues and expeditions to *foreign* lands (mainly to survey colonial settlements and military outposts, archaeological sites of excavation, and 'grand tours' to the most widely acclaimed sites of classical antiquity), there was no shortage of architectural styles widely available to practicing architects to incorporate into the new and increasingly eclectic forms of architecture. Thus a stylistic eclecticism grew in popularity in no small measure to the increased diffusion of original sources through photographic publications.<sup>10</sup> In short, the technological, mechanical and chemical advances in photography began

to drive the design sensibilities of practicing architects through the ubiquity of architecture represented ever increasingly through *light* rather than *drawing*. Consequently, this “served to broaden the debate on architectural photography from the constricted nineteenth-century preoccupation with its role *vis-à-vis* sketching to a more critical examination of the way buildings were photographed and the influence of photographs on architectural taste and production.”<sup>11</sup>

It is, however, in the experimental photography and pictorial manipulations of light-sensitive materials pursued in the 1920s and 1930s by Surrealist artists (i.e. Man Ray, Maurice Tabard and Hans Bellmer), the artists, architects and designers of the Russian Avant-Garde (i.e. Alexander Rodchenko and El Lissitzky), and those practicing and teaching at the influential Bauhaus school in Dessau, Germany (i.e. László Moholy-Nagy and Walter Peterhans) where one sees a near complete visual and rhetorical liberation of photography (*light*) from the traditional conventions of architecture representation (*drawing*).<sup>12</sup> With the advent of such transformative techniques, photographers, it would seem, were not only liberated from a previous adherence to the conventions of drawing when approaching architectural subjects, they were also empowered to explore more active and *reflective* uses of photography as a productive tool within the very processes and practices of design.

## THE REFLECTIVE PRACTICES OF PHOTOGRAPHY

Architecture and Photography, together they pose a curious set of predicaments and opportunities. They always have, really. Initially yoked together by a range of mutually-beneficial technical, commercial and disciplinary practices, the coupling of architecture and photography has ever since engendered numerous quandaries regarding their inevitable and, at times, intractable entanglements. At their most productive, these entanglements result in a reciprocal give-and-take wherein photography is extended beyond mere representation and participates in the actual processes of design and the production of architecture. As such, it would seem reasonable to imagine among the multiple histories of architecture photography one would encounter the occasional examination of reflective and productive exchanges between these two disciplines. And yet, while the stylistic, formal and critical assessment of *architecture-photographically-considered* is consistently presented through most surveys of architectural photography, it is striking that the vast majority of these accounts give little, if any, attention to the uses of photography as an active and instrumental part of the actual design process.

Certainly, there are a number of independent and discrete accounts of photography employed as part of the design

and production of architecture. For example, Mies van der Rohe’s use of collage and montage as tools for design development has been examined in the recent exhibition *Mies in Berlin* and the accompanying catalog by the same name.<sup>13</sup> Antoni Gaudí’s innovative use of photography to analyze and interpret complex structural models and his photography of live human, animal and vegetal subjects for the accurate modeling of ornamentation has too been widely and thoroughly covered in accounts of his life and work.<sup>14</sup> And the pioneering use of models and photography employed by Frei Otto and his partners at the Institute for Lightweight Structures in Stuttgart, Germany have been the subject of thorough study to wide acclaim in countless publications on his career’s work.<sup>15</sup>

However, while these and other studies offer important and detailed accounts of photography actively utilized in the design of architecture, such *reflective practices* tend to remain disconnected and noticeably absent from major historical surveys of architectural photography.<sup>16</sup> Furthermore, in the exceptional cases when photography is demonstrated to be an active agent within the design process, the results of those practices are rarely discussed as having any influence upon the subsequent photographic representations of the architecture once completed. In other words, the photography of architecture is most typically presented as that which *follows* the completion of *the thing itself* (in this case buildings), and rarely, if ever, as that which is actively pursued during the processes of design from conception, to construction, through completion, and beyond.

## BALTHAZAR KORAB: ARCHITECT OF PHOTOGRAPHY<sup>17</sup>

It is important to note that Balthazar Korab has always considered himself to be “an architect who produces photographs rather than a photographer who is knowledgeable about architecture.” In short, he was trained as an architect first and became a photographer through the very practices of architecture and design, a fact that is not insignificant to a broader understanding of his work and the unique contributions he has made to the production, representation and critical assessment of Modern architecture.

Balthazar Korab was born in Budapest, Hungary in 1926. He was given a strong education and developed an early interest in the arts, languages, music and poetry, and was particularly drawn to painting, sculpture and figure drawing. By early childhood he had developed a refined set of artistic sensibilities and was determined to pursue a career as a painter but was “encouraged” by his parents to instead parlay those talents into a more “respectable” career in architecture, as his uncle had done before him.<sup>18</sup>

In the Fall of 1945, shortly after the end of the Second World War, he enlisted in university classes to study architecture at the Budapest Polytechnic, and though the general conditions of the city were still “miserable and overwhelming,” he found some solace and distraction in his studies and quickly gained a reputation in the school for his strong design abilities.<sup>19</sup> His time in the University coincided with the Soviet occupation of Hungary and major political upheavals which led to the unjust imprisonment of his father in 1948. Shortly after his father’s release from prison, Korab made a decision to flee the country with his younger brother Antoni and his architecture schoolmate László Kollár.<sup>20</sup> With assistance from a network of Hungarian expatriates in France, Korab ultimately moved to Paris in 1950 and Balthazar completed his studies at the *École des Beaux-Arts* in 1955. His time and work in Paris at that time marks a critical transition in Korab’s training and would prove instrumental for his future collaborations as both a designer and photographer of architecture.

Based on his successes in schooling and his experiences periodically working for renowned architects such as the Swedish firm Backström & Renius and the Swiss-born, Parisian architect Le Corbusier (Charles-Édouard Jeanneret-Gris), it is not without reason to contend that Korab’s academic and professional training as an architect provided him with a heightened sensitivity to the material, spatial, technical and conceptual maneuvers by which architects infuse architecture with rhetorical and symbolic value. In fact, Korab himself has said of his approach “what affected my photography most is the fact that I knew about architecture because I had designed and drawn it,” and that “architects know how to interpret space, because they understand how a building works.”<sup>21</sup>

### **EERO SAARINEN AND ASSOCIATES**

Upon the completion of his studies in Paris, Balthazar Korab had been planning to make his next move to Brazil and work for the renowned Brazilian architect Oscar Niemeyer who had gained an international reputation for his sculptural formalism, innovative structural solutions, and his design “collaboration” with Le Corbusier on the United Nations Headquarters in New York City (1947). In the meanwhile, however, Korab’s new bride Sally Dow, originally from Royal Oak, Michigan, convinced Korab to spend a month in Michigan before making a more permanent move to Brazil.

Shortly after their arrival to southeast Michigan, Korab became restless, but relieved to discover that the office of Eero Saarinen and Associates was only a few miles away, in the town of Bloomfield Hills. He cold-called the office and was granted an interview with Eero Saarinen to whom he presented a series of photographic reproductions of his *Beaux-Arts* drawings from Paris. Eero conferred with his junior partner Kevin Roche and they immediately offered

Balthazar a cigar and a job with a starting wage of \$2.75 an hour. He was asked to return after lunch to begin working and was immediately given design responsibilities on several projects in the office, including the Miller House in Columbus, Indiana and the TWA Flight Center at Idlewild Airport in New York City (later John F. Kennedy International Airport), among others.

Because the Saarinen office designed through the use of large-scale models, full-scale mock-ups and iterative prototyping, Korab was asked to begin using photography to document the design development process. At the time he joined the office, he did not yet consider himself to be a “photographer,” per se, but he willingly accepted the responsibilities to photograph the models and prototypes used to explore various alternatives for each project. Throughout his tenure in the office (1955-58) Korab’s photography became an indispensable tool for design which also gave him a tacit knowledge of the design intentions underlying the projects he was eventually assigned to photograph upon completion.

What is most crucial to this particular study is the extent to which both Saarinen’s and Korab’s training, sensibilities, and approach to architecture were aligned to create a fortuitous and exceptional collaboration. In addition to his side-by-side practice of architecture with his father Eliel, Eero had a wealth of training in graphic and plastic arts, so it is of little surprise that Eero would go on to manage his own architecture office in the model of a collaborative studio or atelier. Those in the office were engrossed in a constant flurry of design activities exploring multiple iterations for every possible design solution. “But,” in the words of Gunnar Birkerts, “through this process, we arrived at a refined result because there were so many people involved in the solution,” a sentiment corroborated by Cesar Pelli, who worked in the office for eight years (1954-61). “Research,” according to Pelli, “was integral to almost everything we did. There was always an investigation of another way of doing something, a way that had not been used before.”<sup>22</sup> And Richard Knight, who succeeded Korab as in-house photographer in the office, wrote of the work environment, “it was more an atelier, an informal studio-workshop, than a professional corporation. Most everyone worked at a drawing board, freely exchanged information, and helped out on whichever project needed attention.”<sup>23</sup> Therefore, it is of little surprise that Korab’s introduction into this studio would require him to draw upon all of his artistic and visual skills to negotiate multiple forms of production to work through projects of vastly differing scales and programs.

### **Miller House: Columbus, IN, 1953-57**

One of the first projects to which Korab was assigned was the house for J. Irwin Miller and his family in Columbus,

Indiana (1953-57). Saarinen had already designed (with interior designer, Alexander Girard) a lake front house in Ontario Canada for the Millers (1950-52), but their house in Columbus was to be their primary residence in their home town.<sup>24</sup> Korab was tasked with designing and modeling multiple proposals for the sculptural fireplace that – along with a vertical screen, sunken seating area, a circular dining table and a built-in storage unit made of rosewood – was to punctuate the main living area in the center of the house. (Fig. 1) While designing and photographing numerous interior models for the development of this space, Korab cultivated a keen awareness of Saarinen’s intentions to create an interior, artificial landscape comprised of sculptural furniture, free-standing elements, a rich tapestry of upholstery and fabrics (designed by Girard), and the Miller’s extraordinary art collection. (Fig. 2)



*Figure 1: Miller House model, c. 1955, photograph by Balthazar Korab.*

Korab, involved throughout much of the design process for the building, was also knowledgeable of the important (if not central) role played by the landscape architecture for the house that was designed by long-time Saarinen collaborator, Dan Kiley. Selective views of the exterior were framed by floor-to-ceiling windows that created a visually-seamless connection between the ever-changing landscape outside, with the highly choreographed interior architecture that also received seasonal variations in the upholstery, carpets and drapery designed by Girard.



*Figure 2: Miller House interior, c. 1957, photograph by Balthazar Korab.*

As a result his sustained involvement with the design development of the house, Korab’s transition from photographing modeled interiors, to ultimately documenting completed house (1957), was, highly influenced by his understanding of the intimate connection and inseparability between the house, its interior and the landscape within which it was situated. (Fig. 3) Furthermore, it is not surprising to note that since the completion of the design, Balthazar Korab has maintained a career-long relationship with the Miller’s producing what is likely to be the most comprehensive and diverse collection of images of the house and property, assembled over a forty-year period. Within this extensive portfolio, Korab has produced a collection of images that depict the house at nearly every time of day, amongst various climatic conditions, through every season of the year. On one occasion, he even hired a pilot to fly high above the house to afford an aerial perspective that delivers an even greater understanding of the project within the larger context of Columbus, Indiana and the broad Midwest landscape.



*Figure 3: Miller House view of exterior wall and landscape, c. 1957, photo by Balthazar Korab.*

### **TWA Flight Center, New York Idlewild Airport (Now JFK International), 1956-62**

Charged by the president of Trans World Airline in 1956 to capture “the spirit of flight,” and to design “a building in which the architecture itself expresses the drama and specialness and excitement of travel,”<sup>25</sup> Eero Saarinen and Associates began a long process of design and production that quite arguably established new expectations for a modern form of monumental architecture. And, “like all poetic visions, it was timeless, drawing upon the past, anticipating the future, although it was firmly grounded in the present, and at all times dependent on the machine technology of our industrial civilization.”<sup>26</sup>

Through an incremental, and at times painstaking, process of working form into monumental expressivity, spatial continuity and structural stability, large-scale models proved to be the method of working best suited for the terminal’s design. (Fig. 4) With an initial team of designers that included Kevin Roche, Cesar Pelli, Edward Saad,

Leon Yulkowski and Norman Pettula, countless models were constructed, deconstructed, and reconstructed in effort to attend to all of the complex spatial, structural, programmatic and functional challenges. Nearly impossible to draw on paper, the project progressed almost entirely through models of varying scales, materials and degrees of complexity, and throughout the process, Balthazar Korab was charged with photographing all of the evolutionary phases from beginning to end. Of his own involvement, Korab has said:

*I myself experimented with a new instrument; the camera, often splitting my time, day and night, between my pencil and my Leica... we developed a way where the camera and its handler became an integral part of the design process... We were intrigued by the extent to which Eero grew dependent on the images, particularly during the TWA studies. Both form and space could be conveyed conveniently with my small Leica.<sup>27</sup>*



Figure 4: TWA Terminal model, c. 1957, photograph by Balthazar Korab.

While instrumental to the very processes of design, Korab's photography was also an indispensable tool for conveying to the clients a sense of how the architecture would appear, if not feel, upon completion. Because the models were often times roughly built and pieced together from various iterations, the clients were typically shown only slide presentations of models that had been augmented through literal "smoke and mirrors." Again, Korab:

*I was quite skillful with photography, and for our models we used smoke-and-mirror effects – and I mean that literally. For the TWA project, we had a model where you could almost stick your head into half the shell. So out of that half model, we added the mirrors and cutouts of people; then blew smoke to create depth, and took the photograph. It gave an impression of being in the space... The clients were shown a slide show of the photographs, and the effect was so successful that they bought the whole project without even seeing the model.<sup>28</sup>*

As the building entered the complex construction phase of the project, Korab was also tasked with the enormous efforts to document the translations from models to drawings to building. Unlike most photographers of architecture, however, Korab was already quite familiar with the project's formal and spatial qualities, its interior configurations, and the potential lighting conditions that he could reasonably anticipate. Through his work with the TWA models, he had been rehearsing the photography of this project for years prior to any contractors ever breaking ground. And now, during the phase of construction, he was essentially photographing what amounted to a representation in reverse, a full scale model. (Fig. 5)



Figure 5: TWA Terminal construction, c. 1960, photograph by Balthazar Korab.

By the time of its completion in 1962 Balthazar Korab had essentially *photographed* the TWA Terminal hundreds, if not thousands of times. Through his camera, he had *moved* among its interiors, *experienced* the flow of its spatial continuity, and had captured the complex dynamism directed by Saarinen's vision long before the project's official opening. In a very real sense he had been preparing for this assignment for decades and was perhaps the most ideal photographer for the job. His early pursuits of painting and sculpture along with his own designs produced as a student of architecture had together prepared him for the theatrical qualities of light, color, form and material that were sympathetic to, if not synonymous with, Saarinen's sensibilities as exemplified in the TWA Terminal. Furthermore, his self-taught skills as a photographer allowed him to utilize the camera in a rather improvisational manner without being encumbered by the disciplinary rules of photography or the traditional conventions of architectural representations. It is perhaps not surprising then that one of Korab's most celebrated and widely-published photographs is a striking image of the Terminal interior produced shortly after its opening in 1962. (Fig. 6) Unfortunately, due to his untimely death in 1961,

Eero Saarinen did not live to see the completion of TWA Terminal; however, thanks to the photographic exploits of Balthazar Korab, Saarinen had, no doubt, passed on having *experienced* one of his most masterful works of architecture.

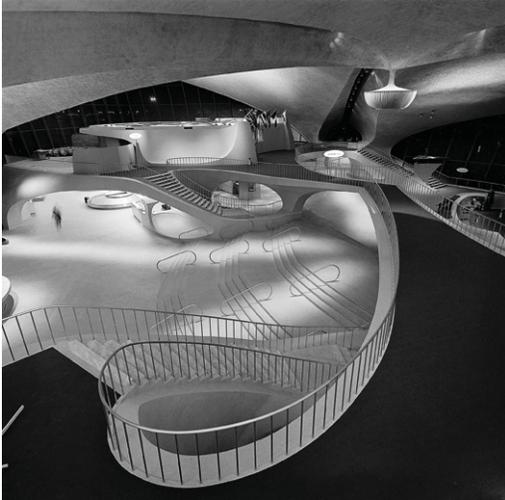


Figure 6: TWA Terminal interior, c. 1962, photograph by Balthazar Korab.

## ENDNOTES

<sup>1</sup> The following texts have been instrumental for the introduction to this paper: James Ackerman, "On the Origins of Architectural Photography," in *Origins, Imitation, Conventions: Representation in the Visual Arts* (Cambridge, MA and London: The MIT Press, 2002), 95-124; Rudolf Arnheim, "A Study in Spatial Counterpoint," in Steve Yates ed., *Poetics of Space: A Critical Photographic Anthology* (Albuquerque: The University of New Mexico Press, 1995), 7-22; Martin Caiger-Smith and David Chandler, eds., *Site Work* (London: The Photographer's Gallery, 1991); Robert Elwall, *Building With Light: The International History of Architectural Photography*, (London and New York: Merrell, 2004); Robert Harbison, "Decoding the Cipher of Reality: Fox Talbot in His Time," *Aperture*, No. 125 (Fall 2001): 2-8; Cervin Robinson and Joel Hershman, *Architecture Transformed: A History of Photography of Buildings from 1839-Present* (Cambridge, MA and New York: The MIT Press, 1987); Eve Blau and Edward Kaufman, eds., *Architecture and Its Image*, exh. cat. (Montreal: Canadian Center for Architecture, 1989); Weston Naef, "Daguerre, Talbot, and the Crucible of Drawing," *Aperture*, No. 125 (Fall 2001): 10-15; Richard Pare, *Photography and Architecture 1839-1939* (Montreal: Canadian Center for Architecture, 1989); John Szarkowski, *The Photographer's Eye* (New York: Museum of Modern Art, 1966); Mary Woods, *Beyond the Architect's Eye: Photographs and the American Built Environment*, (Philadelphia: University of Pennsylvania Press, 2009)

<sup>2</sup> Oxford English Dictionary, online edition accessed through <http://dictionary.oed.com.floyd.lib.umn.edu/entrance.dtl>

<sup>3</sup> Though the word *photograph* was not the first or only used to describe the nascent techniques of "fixing" a light-produced image (William Henry Fox Talbot originally preferred "photogenic drawings" for example), its ultimate adoption and persistence is telling as to the appropriateness and effectiveness of its usage. See, Weston Naef, "Daguerre, Talbot, and the Crucible of Drawing," *Aperture*, No. 125, Fall 2001, pg. 10. For early photographic processes in general, see Beaumont Newhall, *The History of Photography* (New York, 1982).

<sup>4</sup> Daguerre was trained as an architect, practiced as a designer and painter of stage-sets and large-scale panorama, and the *inventor* of dioramas. See Elwall (2004), 12-13; Naef, "Daguerre, Talbot, and the Crucible of Drawing," *Aperture*, No. 125, (Fall 2001): 10-15; Walter Benjamin, "Paris, Capital of The Nineteenth Century," in Peter Demetz, ed., *Reflections: Walter Benjamin, Essays, Aphorisms, Autobiographical Writings*, (New York, NY: Schocken Books, 1986), 149-151; some information on Louis-Jacques-Mandé Daguerre sourced from the Encyclopædia Britannica, Eleventh Edition, 1911, (vol. 7, pg. 730), online in the public domain at <http://www.archive.org/details/EncyclopaediaBritannica1911HQDJVU>;

<sup>5</sup> see Pare (1989), 13; entry on Joseph Nicéphore Niépce sourced from the Encyclopædia Britannica, Eleventh Edition, 1911, (vol. 19, pg. 672) online in the public domain. <http://www.archive.org/details/EncyclopaediaBritannica1911HQDJVU>

<sup>6</sup> see Harbison, "Decoding the Cipher of Reality: Fox Talbot in His Time," *Aperture*, No. 125 (Fall 2001): 2; Ackerman (2002), 96-97; Elwall (2004), 13; Pare (1989), 13-15; some information on William Henry Fox Talbot sourced from the Encyclopædia Britannica, Eleventh Edition, 1911, (vol. 26, pg. 368), online in the public domain. <http://www.archive.org/details/EncyclopaediaBritannica1911HQDJVU>

<sup>7</sup> Weston Naef, "Daguerre, Talbot, and the Crucible of Drawing," *Aperture*, No. 125 (Fall 2001): 12-14.

<sup>8</sup> as quoted in Ackerman (2002), 97; originally published in Gaston Tissandier, *A History and Handbook of Photography* (London, 1878).

<sup>9</sup> In fact, within the first century of photography's existence as a commercially and artistically-viable practice, advances in film speed, cameras technology, half-tone printing and an emerging print media culture all coalesced to give photographers of architecture increasing authority over the design sensibilities of professional architects. For discussion architecture and the development of print media industry see Robert Elwall, "The Specialist Eye," in Caiger-Smith & Chandler, eds., *Site Work* (London: The Photographer's Gallery, 1991), 63-76; Elwall (2004), 50-51 and 86-90

<sup>10</sup> see Ackerman (2002), 115; Elwall (2004), 50-51; Pare (1989), 21.

<sup>11</sup> Elwall (2002), 89.

<sup>12</sup> Physical manipulations to photographic materials such as collage and montage, the transformation of light-sensitive materials such as photograms and double exposure, along with the use of dynamic perspectives, extreme oblique

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angles and abstract framing devices dramatically established new sensibilities and radical approaches for the photography of architecture. As demonstrated by the various techniques and curricula developed by such Bauhaus leaders as Moholy-Nagy and Peterhans, photography and light-based arts were employed to express new concepts of space, time, motion and speed through their constructivist teachings dedicated to the mutually-beneficial development of art, design and industry. See for example, Magdalena Dabrowski, Leah Dickerman, Peter Galassi, eds., *Aleksandr Rodchenko* (New York: Museum of Modern Art, 1998); Jeannine Fiedler, ed., *Photography at the Bauhaus* (Cambridge, MA: The MIT Press, 1990); Alexander Lavrentiev, *Alexander Rodchenko: Photography 1924-1954* (Edison, NJ: Knickerbocker Press, 1996); El Lissitzky, "A. and Pangeometry," in *Poetics of Space: A Critical Photographic Anthology*, ed. Steve Yates (Albuquerque: University of New Mexico Press, 1995), 67-75; László Moholy-Nagy, "Space-Time and the Photographer," in *Poetics of Space: A Critical Photographic Anthology*, ed. Steve Yates (Albuquerque: University of New Mexico Press, 1995), 150-56; Man Ray, "The Age of Light," in *Classic Essays on Photography*, ed. Alan Trachtenberg (New Haven: Leete's Island Books, 1980), 167-68.

<sup>13</sup> see in particular Detlef Mertins, "Architecture of Becoming: Mies van der Rohe and the Avant-Garde," in *Mies in Berlin*, eds., Terence Riley and Barry Bergdoll (New York: Museum of Modern Art, 2001), 106-133; and Adres Lepik, "Mies and Photomontage, 1910-38," in *Mies in Berlin*, eds., Terence Riley and Barry Bergdoll (New York: Museum of Modern Art, 2001), 324-329.

<sup>14</sup> see Ignasi de Solà-Morales, *Antoni Gaudí* (New York: Abrams, 2003); Robert Descharnes and Clovis Prévost, *Gaudí: The Visionary* (New York: The Viking Press, 1971).

<sup>15</sup> Winfried Nerdinger, ed., *Frei Otto: Complete Works Lightweight Construction, Natural Design* (Basel, Boston and Berlin: Birkhäuser, 2005); Sabine Schanz, ed., *Frei Otto, Bodo Rasch: Finding Form Towards an Architecture of the Minimal* (Axel Menges, 1995)

<sup>16</sup> for example Robert Elwall, *Building With Light: The International History of Architectural Photography*, (London and New York: Merrell, 2004); Cervin Robinson and Joel Hershman, *Architecture Transformed: A History of Photography of Buildings from 1839-Present* (Cambridge, MA and New York: The MIT Press, 1987); Eve Blau and Edward Kaufman, eds., *Architecture and Its Image*, exh. cat. (Montreal: Canadian Center for Architecture, 1989) make no mention of photography utilized as a tool for design or the production of architecture.

<sup>17</sup> This biography is written from interviews between Balthazar Korab and the author unless otherwise indicated. Some details have been gleaned from an unpublished interview between Balthazar Korab and Marlayna Schoen.

<sup>18</sup> Interviews 06/16/2006 and 11/11/2006

<sup>19</sup> For example, due to his advanced skills in drawing and painting he was the first student at the Polytechnic to be offered a position as a teaching assistant for a course on drawing, painting and sculpture.

<sup>20</sup> Interview 06/16/2006

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<sup>21</sup> Interview, November 13, 1997

<sup>22</sup> Pelli as told to Belinda Lanks in "Team Eero," *Metropolis*, November, 2008, 74.

<sup>23</sup> Richard Night, *Saarinen's Quest: A Memoir* (San Francisco: William Stout, 2008), 23.

<sup>24</sup> see Christopher Monkhouse, "The Miller House," in *Eero Saarinen: Shaping the Future*, eds., Eeva-Liisa Pelkonen and Donald Albrecht (New Haven and London: Yale University Press, 2006), 236-241.

<sup>25</sup> as quoted in Jayne Merkel, *Eero Saarinen* (London and New York: Phaidon, 2005), 205.

<sup>26</sup> Allan Temko, *Eero Saarinen* (New York: Brazillier, 1962), 35; see also Eeva-Liisa Pelkonen and Donald Albrecht, eds., *Eero Saarinen: Shaping the Future*, (New Haven and London: Yale University Press, 2006), 75-79, 83-90, 301-303; David DeLong and C. Ford Peatross, eds., *Eero Saarinen: Buildings from the Balthazar Korab Archive* (London and New York: Norton Press, 2008), 294-317; Merkel (2005), 205-216; Temko, (1962), 33-48.

<sup>27</sup> as quoted in David DeLong and C. Ford Peatross, eds., *Eero Saarinen: Buildings from the Balthazar Korab Archive* (London and New York: Norton Press, 2008), 20, 410-11; and reiterated during numerous interviews with the author.

<sup>28</sup> as quoted by Paul Makovsky in "Team Eero," *Metropolis*, November, 2008, 76; and reiterated in numerous interviews with the author.

# Nuns and Architecture in Renaissance Reggio Emilia

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## Abstract

A convent plan dating from approximately 1519 raises a series of questions concerning architectural production and the role of women in Renaissance Italy. This paper examines the plan in question, its authorship, the history of the convent depicted, and the relationship of the plan to the convent as built. The paper then addresses the role of women in architectural design in Renaissance Italy, and challenges the long-standing assumption that women did not design buildings then because they were not permitted to do so.

The discovery during the summer of 2009 of a convent plan dating from approximately 1519-1524 opened up a series of methodological and research questions concerning architectural production in Renaissance Italy.<sup>1</sup> The large document illustrates, partly in plan and partly in elevation, a project for the convent of Santa Maria della Misericordia in Reggio Emilia. While the plan had been inventoried and cited in a few publications regarding sixteenth century Reggio Emilia, scholars paid little attention to the provenance of the document. The assumption appears to have been that because it is a plan, it must therefore have been produced by a man.<sup>2</sup> Our examination of the document, in particular the captions and room descriptions, have led us to the inescapable conclusion that the author of the plan was one of the eleven nuns then living in the convent. The methodological and research questions therefore concern on the one hand, the document and its production, and on the other, the more general question of the participation of women in architectural design. Did a woman draft this plan, and if so, can we draw any conclusions, even provisional ones, about the participation of women in architectural design and construction? Before turning to the methodological issues, a brief description of the project is in order.

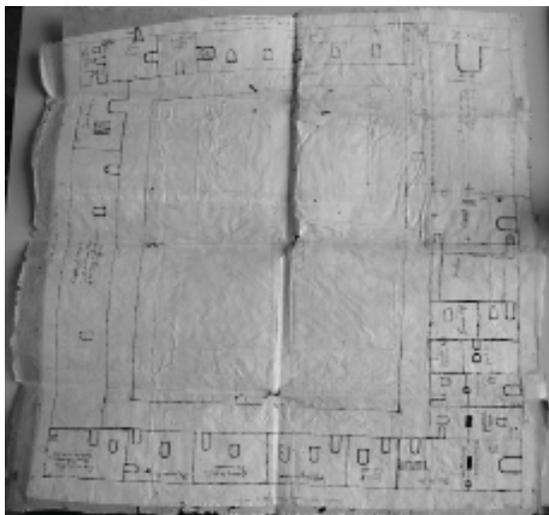


Fig. 1. Anonymous, *Plan of Convent of Santa Maria della Misericordia, Reggio Emilia, ca. 1519.*

The document was produced at a large scale by gluing together at least three large pieces of paper, which was subsequently glued to a blue backing during the eighteenth century, possibly in a misguided effort to preserve it. This backing makes it difficult to identify a watermark on the papers, although there is an illegible one partly visible, and it also makes it impossible to determine exactly how many pieces of paper were glued together. Nonetheless, using several pieces of paper made it possible to work out the details more carefully.

The plan illustrates a two-story convent whose outline was drawn with a ruler, but only the ground floor is illustrated; however reference is made at several points to the use of several rooms for the dormitories and other living spaces on the absent second floor. Measurements in units of *cavezzi* and then *pertiche* are included for nearly every room. The ground floor consists of a church dedicated to St. John the Baptist, a smaller one to St. Joseph, kitchen, parlor, refectory and storage spaces. Most extant convent plans date from the eighteenth or nineteenth centuries, so this project affords a rare look at the activities that were to take place in each room on the ground floor. While none of the columns that would form a loggia around the courtyard appear on the plan, at several points the document indicates the presence of such a loggia. Entrance to all of the ground floor rooms was from the loggia, with the exception of the kitchen and hearth room, the church, the storerooms for wood, and the area where visitors could be received on the west wing.

Because the political and cultural norms of the era resolutely barred women from direct participation in architectural design, the woman who drafted the plan was unaware of the conventions by which to indicate doors and windows. She therefore developed her own, indicating both in elevation, and presumably the location of the doors in a wall indicated in which direction she meant the door to open. Notable too, is the fact that the windows are symmetrically placed within their respective walls and are also in alignment with one another and in relation to the doors. Other features, such as the fireplace chimney and the iron grates used to separate the cloistered nuns from the sight of visitors, are also rendered in elevation. The designer took especial care with the organization and representation of spaces in the zone of the parlor, or *parlatorio*, the several rooms in which nuns could receive visitors. Here both the iron grates, which would be woven through with fabric to block the view from both sides, and the wheels, or *rode*, with their triple panels for passing objects back and forth without being seen, are represented in detail. This set of

rooms is not linked by interior doors, so that most must be entered individually from the loggia or for visitors, from the street. Finally, although the stairs are not drawn, the designer noted where they should go, and indeed, they are placed precisely where one would expect, diagonally across from one another near the church and the refectory. This arrangement rendered access to the upstairs rooms equally convenient, and also facilitated movement of the nuns to their two major group rooms – dining room and church, which they would arise during the night to visit and pray.

Any attempt at an analysis of this plan gives rise to a range of methodological issues. Dating from nearly five hundred years ago, the plan is accompanied only by the most limited documentation for its subsequent history, a matter further complicated by the general disinterest at the time (not to mention in subsequent centuries) in matters having to do with women. In general this has led to the archiving of fewer records associated with them, whether patrician women or others, and this includes materials related to convents. Likewise, relatively few female monasteries survived the Napoleonic invasions and sales of ecclesiastical properties, and the subsequent speculative boom of the nineteenth century. Such is the case with this convent, which no longer exists.<sup>III</sup> How then does the scholar undertake to understand the history of such a building, in the absence of reasonably complete documentation? Our approach has been three fold: a close study of the existing documents related to the convent; an analysis of additional documentation where the convent is mentioned by subsequent commentators; and a comparison of this convent with others known to us from elsewhere.

We begin with the issues raised by the plan:

- evidence for female authorship
- relationship between the plan and a second one dating from around the same time period and conserved in the same file
- the unique features of the plan
- relationship between the plan and the building eventually erected on the site
- the relationship between this convent and other sixteenth century convents.

The evidence for female authorship begins with the caption by which the author presented it to the city fathers of Reggio: “This is the design according to the idea of the mothers when [in response to] the prayers of this magnificent community the Observant [Clarissans] were brought here.”<sup>IV</sup> The ideas behind the plan, then, are emphatically attributed to the nuns themselves. By itself, this is not conclusive evidence that the hand that drafted the plan was that of a woman. Our further argument that a woman drew up the project hinges in part upon the caption by which the church is designated: “our church.”<sup>V</sup> Had a man drafted the project, whether a monk or a builder, he would certainly not have referred to the church as “our.” The hand that drafted the plan also drafted a small brochure of the convent’s book of memories, where the same

terminology about “our” church and “our” convent is evident.<sup>VI</sup>

As noted above, the unit of measurement adopted in the plan initially was that of a *cavezzi*, a unit of measurement common in the region of Lombardy and the town of Cremona, but not in Reggio Emilia.<sup>VII</sup> The nuns destined to inhabit the convent were transferred from a convent in the city of Cremona, where the *cavezzi* was a standard unit of measurement. As the plan indicates, at some point the *cavezzi* were translated into the standard unit of measurement in Reggio and elsewhere in the duchy of Ferrara, the *pertica*.<sup>VIII</sup> This too suggests that a nun from Cremona drafted the plan according to the units familiar to her, but then transferred them into those of Reggio at some later point, probably to facilitate communication with local builders.

If the first plan provides an elaborate and detailed description of the organization of a convent, complete with loggia, church, storage, kitchens, refectory and parlors, the second is a puzzling, partial documentation of what appears to amount to little more than a small house. When the city fathers summoned the nuns from Cremona, there was already a much smaller convent inhabited by eight nuns on the site. It is possible that this plan refers precisely to that smaller convent, because it illustrates a church, a chapel or smaller church dedicated to the Madonna, two courtyards, three chambers and two loggia, with an indication of stairs to otherwise unspecified rooms on the second floor. The problem is that there are no evident relationships between the two plans. If the first plan was meant to be a remodel of an existing convent, this second plan could not fill that role, since there is absolutely no overlap between the two. Although we puzzled at length over this, we ultimately could find no relationship between the two, so we concluded either that this represented a temporary abode for the nuns while the new convent was being constructed, or, that it had nothing at all to do with either the early convent or the one being erected after 1519.

There are a number of unique features to this plan. First, it looks toward the future by anticipating a room where silk will be produced. Silk production had only been introduced to Reggio in 1502, but the master silk maker had already abandoned the city by the end of the second decade.<sup>X</sup> That the nuns already anticipated taking up this activity indicates an astute sense of the fashion tastes of the time, and an awareness of the economic advantages of producing silk with the aid of unpaid labor. In fact, the Observant Clarissans were distinguished by their strict vows of poverty.<sup>X</sup> Unlike many other religious orders, these nuns refused to hold property in the name of the convent, and stressed that the women cloistered within their walls were meant to earn their livelihood through the labor of their hands, not from rents collected from tenants. The nuns who transferred from Cremona included several from extremely prominent families, including the Aymi of Cremona, the Albizzi of Florence, the Anguissoli of Piacenza, and the Pallavicini of Cortemaggiore and

Monticelli. It is no surprise that the women were knowledgeable about trends in luxury fabrics and fashion.

Second, the perimeter walls on the interior of the church of St. John the Baptist is scored by a series of hatch marks, marking out forty spaces. Because the convent planned to house no more than forty nuns, it seems obvious that the forty spaces indicate forty seats for the women. However, St. John the Baptist was also meant to be a public church, meaning that the neighborhood, including men, would sit inside during services. Cloistered nuns would not have sat around the perimeter of such a space in the presence of men – so if the signs do not indicate seats, what do they illustrate? We have proposed everything from flooring to beams, but for a variety of reasons, none of these hypotheses work. Moreover, the church of St. John the Baptist entirely lacks access from within the convent; the public could enter from the main doors to the south, while the priest could enter from the sacristy and a his courtyard. But where would the nuns have entered were they meant to sit in the chairs? Perhaps the chairs were only utilized on certain private occasions, when the nuns would have entered from the priest's quarters and sacristy. But in any case, the nuns had no private access from their convent from which to enter the church and prepare hangings, linens, or other objects for services, let alone from the upstairs dormitory. Unless, perhaps, they enjoyed access to a choir above the altar on the second floor, from where they might have moved down the staircase. We cannot know the answer to this puzzle, because the second floor is absent, so it could even be as simple a matter as the nun having forgotten to mark that particular door.

From the organization of the plan, and in particular, the wall between the two churches, it appears that the nuns would have stayed inside St. Joseph's church during services in St. John the Baptist, because here a window for communion, another for passing linens back into the convent, and a grate above the altar are depicted.



Fig. 2. Veduta Camuncoli, 1591, detail. Santa Maria della Misericordia is at n. 14.

What was the relationship between the structure envisioned on the plan, and the convent as built? Here all of the problems associated with ferreting out information about female spaces in Renaissance Italy come to the foreground. The city elders designated the original convent dating from the fourteenth century as the site of the new one planned in 1519, situated in the southeast corner of the city, adjacent to the old city walls on via Ponte Levone.<sup>xI</sup> Although the nuns from Cremona arrived in 1519, the evidence suggests that major parts, including the church, had not been completed five years later. The representative of the Duke of Ferrara in Reggio, Hector Sacrato, notified the Duke about the conflict between the convent and the city, and the convent's neighbors.<sup>xII</sup> The city Elders had accepted the nuns' request to close off the small street, via Ponte Levone, so as to enlarge the building and make room for the church, because the site was an exceptionally cramped one. Those with properties backing up on the street objected, and they also objected to the proposed transfer of an outdoor shrine to the Madonna inside the convent's church. The Duke supported the street closure.

Nothing further emerges about the status of the convent until more than two decades later. A book of construction expenses and payments maintained by the nuns has survived for the years 1542-43.<sup>xIII</sup> We thought this would be a boon. Instead, the booklet includes details on purchases of such materials as sand, stucco and tiles, as well as payments to masons and occasionally, a reference to the construction of a wall – and that is it. In other words, the booklet is more an accounting of materials and labor payments than a construction record. Huge amounts of money were spent during this two year period, however, so we believe that work on the convent and church may have been concluded precisely in those years. The absence of other records leaves open the question of whether similar construction may have been ongoing throughout the twenty-three years since the first nuns arrived, or indeed, whether it continued afterwards.

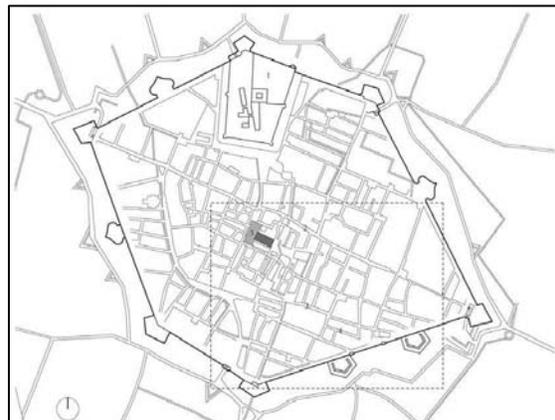


Fig. 3a. Plan of Reggio, 1660, [drawing by Joseph Flynn]



Fig. 3b. Plan of Reggio, 1660, detail [drawing by Joseph Flynn]

We reviewed visual materials on historic Reggio to determine how, and whether, the plan drawn by the nuns might have related to the convent as built. We assembled city views beginning with the late sixteenth century, and maps of the city from the seventeenth century forward. Try as we might, we could not manage to make the plan as drawn correspond to the fragmentary visual materials illustrating the convent. Initially, we concluded that the convent was not built in line with the plan as drawn correspond to the fragmentary visual materials illustrating the convent. We were able to fix its location in 1555 as occupying the block bordered by via Fontenelli, via San Filippo, via San Girolamo, and via Monte Grappa, but we could not relate the church envisioned in the plan and the disposition of the convent in 1555 – or so we thought. We subsequently uncovered evidence that because the city walls were being worked on, the city required the nuns to demolish the existing convent and reconstruct the entire complex on the other side of the street – as it would appear in subsequent city views and maps.<sup>XIV</sup> Originally, the church had faced via Monte Grappa with via Fontanelli on the left – much as was envisioned in the plan drafted by the nuns. Such fragmentary evidence means that we can not state with confidence that the convent was erected as the nuns envisioned it, but we can say that at least the location and orientation of the church respected their vision.

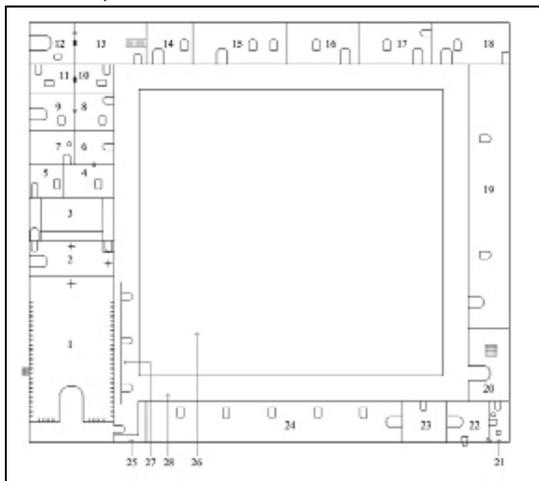


Fig. 4. Santa Maria della Misericordia, Reggio, ca. 1519 [drawing by Joseph Flynn]

As noted at the outset, our third resource includes comparisons with the other convents, specifically regarding construction and design issues. While there appears to be no other documented case of nuns drawing up a plan for a new convent, there is instead a growing body of evidence that demonstrates heavy involvement in remodeling, rebuilding, and adding to their convents. In her study of three convent chronicles, K. J. T. Lowe demonstrates how Sister Orsola Formicini, once elected abbess of the Clarissan convent of San Cosimato in Rome in 1598, initiated a massive and ongoing building campaign.<sup>XV</sup> Refashioning the refectory was the first of a long series of building interventions Sister Orsola undertook during her various terms as abbess, including building a fountain in the courtyard, lifting ceilings, building cellars under the refectory, redoing the ovens in the kitchen, inserting new windows, rebuilding staircases, and whitewashing the entire complex at least twice. Her activities spurred other nuns in the convent to similar undertakings, including decorations in the church and other embellishments. Closer to home, the Benedictine convent of San Silvestro in Ferrara underwent several phases of expansion between the sixteenth and eighteenth centuries. Other than repairs and complete reconstructions after an earthquake in 1570 and a massive fire in the seventeenth century, the nuns also extended and enhanced an ornamental garden with benches, pergolas and other amenities, and added a second dormitory at a second dormitory at an unspecified time.<sup>XVI</sup> In both cases, the documentation makes it clear that the building activity was done at the behest of the nuns, not their male supervisors. At the very end of the sixteenth century, the Benedictine nuns at Le Murate in Florence decided to erect a new bell tower with two bells, and between 1594 and 1595 they raised the funds to do just that. Here too the convent records demonstrate that the nuns were the active agents in choosing to undertake the construction project, in determining its configuration, and in seeing to the construction.<sup>XVII</sup>

Secular patronage as documented by McIver for the Pallavicini women and Ghirardo for Lucrezia Borgia also occurred on a significant scale, even if the historical memory of the participation of women in the design of spaces has been lost. While no plans drawn by women survive in either case to document these women's active roles in their architectural enterprises, considerable evidence illustrates their direct engagement, including decision-making, at all phases of the building enterprise.

What do we have to say about research strategies? It will come as no surprise to researchers to hear that we believe the first and most important step is to abandon presuppositions and assumptions based upon historical generalities. Just because women were not permitted to do things does not mean that they obeyed such dictates, and just because we assume that until the nineteenth century only men designed buildings does not mean that this is true. Faced with a plan, a design or a drawing, researchers must question all

assumptions, not just those that are convenient. Secondly, do not dismiss unsophisticated or visually uninteresting documents or plans. Often these are precisely the ones that hold such interesting secrets as having been produced by a woman – not because a woman would not have been capable of producing a sophisticated design, but because she was not given the tools to do so, and therefore had to invent her own, often rudimentary tools, as in the case of our anonymous nun.

To return to our original questions, then, what can we now say about the participation of women in architectural design and construction in Renaissance Italy? We can assert with great confidence that the plan for a new convent in Reggio was certainly drafted by a woman, but we cannot express equal confidence about whether the subsequent construction followed the document as they had designed it. We believe that this was probably the case, based upon the references to the fate of the original building in 1555, particularly with respect to the location of the church. Nonetheless, we are on less sure ground here. As to the larger questions about women and architecture in Renaissance, Italy, we believe that the discovery of this plan, along with a growing body of evidence from later in the sixteenth and seventeenth centuries, allows us to assert that women were far more active in shaping their surroundings, including the architecture itself, than has been previously thought. We also believe that there are probably other unlabeled drawings in archives throughout Italy that could reasonably be attributed to women, and that the willingness to consider such possibilities is only now opening up.

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#### End Notes

I The plan in question is located at the Archivio di Stato Reggio [ASRe], Raccolte Mappe, Archivio dei Monasteri Soppressi, Dallari 120/10.10, Plan of the Convent of Santa Maria della Misericordia.

II The general view of women in the scholarship on Renaissance Italy is that women were barred from activities such as medicine, scholarship, law and architecture, a fact about which there is little dispute. However, the question of whether, and how much, women actually did in fact encroach on the prerogatives of males by engaging in various forms of activity regarding architectural production remains open. The best recent accounts of women and architecture are K.J.P. Lowe, *Nuns' Chronicles and Convent Culture in Renaissance and Counter-Reformation Italy* (Cambridge 2003), and Katherine McIver, *Women, Art and Architecture in Northern Italy, 1520-1580* (Burlington VT 2006).

III The convent was closed during the eighteenth century in a move to consolidate women's monastic communities.

IV ASRe, Raccolte Mappe, Archivio dei Monasteri Soppressi, Dallari 120/10.10, Plan of the Convent of Santa Maria della Misericordia, caption: "Questo sie el design secundo la mente dele madre che furono a pregi di questa magnifica comunita que cundunte dala santa observantia."

V Two of the references to the church mention "our church," the description of number 1 [To St. John the Baptist this our church is dedicated] and to the loggia in front of it, number 26 [This is the loggia in front of our church] on the redrawn plan.

VI ASRe, Archivio del Comune di Reggio (ACR), Corpo-razioni Soppressi (CS), Santa Maria della Misericordia (Misericordia), b. 120, 1, "1519-1555. Libro delle memo-rie della fondazione del monastero di Sta. Maria Mise-ricordia, con la memoria della chiesa del Pontevovone," henceforth *Libro*.

VII "Cavezzi" in the eighteenth and nineteenth centuries was the length of the piece of rope used to draw the oxen into a harness; they appear always to have been of a specific length. The term is still used in the southern Veneto region and in the parts of the province of Emilia

Romagna, the region where Reggio is located, but it was not an official unit of measurement in the sixteenth century or later; in the duchy of Ferrara, it simply meant a length of fabric.

VIII A pertica is a unit for measuring length; in Ferrara it was a bit more than four meters, 4.03, while in Modena it equaled 3.13 meters. Giuseppe Trenti, *Voci di terre estensi. Glossario del Volgare d'uso comune (Ferrara-Modena) da documenti e cronache del tempo secoli XIVXVI* (Vignola 2008).

IX Duchess Lucrezia Borgia Estense of Ferrara recommended that the city fathers permit Antonio da Genova to develop the art of silk production in a letter of 2 August 1502. ASRe, Archivio Comunale, Registro dei decreti e delle lettere, 1477-1516, b. 641, cc. 41v/42r, Lucrezia Borgia to the Elders of Reggio, 2 August 1502. Antonio and his wife taught women and girls the art of silk making until 1518, when he left the city after not having received the promised salary from the city fathers for several years. Odoardo Rombaldi, "L'arte della seta a Reggio Emilia nel secolo XVI," in *L'arte e l'industria della seta a Reggio Emilia, dal sec. XVI al sec. XIX. Atti e memorie del convegno di studi* (Modena: Aedes Muratoriana 1968), 42-73; for Antonio's departure, 47.

X The literature on the vows of poverty adopted by Observant Clarissans is extensive; most recently, see Alessandra Bartolomei Romagnoli, "Il francescanesimo femminile dalle origini al concilio di Trento," in Aleksander Horowski, *All'ombra della chiara luce* (Rome 2005), 11-85.

XI Guido Agosti, "Monasteri femminili pre-Napoleonici a Reggio Emilia," *Bollettino Storico Reggiano* XL, fascicolo n. 133 (April 2007), 17.

XII ASRe, ACR, Misericordia, b. 120. F. 1, letter from Hector Sacrato to Duke Alfonso I d'Este, 24 July 1524.

XIII ASRe, ACR, Misericordia, Spesa di fabbrica.

XIV Vittorio Nironi, "La riforma cinquecentesca delle mura di Reggio," *Bollettino Storico Reggiano*, 11 (April 1971), 1-24.

XV Lowe, *Nuns' Chronicles*, 68-70.

XVI Two chronicles drafted by nuns from San Silvestro report the reconstructions: Biblioteca Comunale Ariostea, Manuscript Collection Antonelli, n. 528, "Memorie del Monastero di San Silvestro di Ferrara," and Archivio Storico Diocesano di Ferrara, Corporazioni Soppressi, San Silvestro, 11, "Libro de Memorie delle Monache di San Silvestro, 1662." For more details, see Andrea Faoro, "L'Abbazia di San Silvestro e il suburbio orientale di Ferrara. Ricerche di topografia e urbanistica medievale." *Deputazione Provinciale Ferrarese di Storia Patria, Atti e Memorie*, 4, vol. 15 (1999), 29-86. San Silvestro was transferred in 1520 into a palace commissioned by Lucrezia Borgia; see Diane Yvonne Ghirardo, "Lucrezia Borgia's Palace in Renaissance Ferrara," *Journal of the Society of Architectural Historians*, 64, 4 (2005), 474-497.

XVII Lowe, *Nuns' Chronicles*, 131.

Appendix: Captions for Fig. 4

On the reverse

With the consent of the first overseers.

This is the design according to the mind of the mothers who were conducted here in holy obedience by the prayers of this magnificent community.

In that design, are understood two dormitories, one by the church, with the refectory, kitchen, chapter room, and with all other necessary rooms as you can see and the loggias around [the courtyard] below, as pleases God, that it pleases your lordships to whose prudence and best judgment about everything about the building I place my judgment in all.

It is well that I advise that other than the rooms contained in this design [and] wanting this monastery to be outfitted with all the offices necessary noted below they can be accommodated here, that is, by the infirmary and the places necessary to it, the room for medicinal herbs and spices, the laundry, the dressing room, the room for looms, the room for making silk, the oven, the buttery, the pantry and the chicken coop.

1. To St. John the Baptist this our church is dedicated. It measures 4 cavezi and 4 arms long, 18 arms wide.
2. St. Joseph
  - a. little wheel for the linens
  - b. little window for communion
  - c. sacraments
3. little cloister
- 4 & 5. rooms for the fathers
6. Room of the abachucha [?]
7. Well for the fathers
8. [no caption]
9. Outsiders
10. [no caption]
11. Private parlor
12. Parlor for seculars
13. House of the neighbors, wheel for the nuns
14. The mother's room
15. Dispensary for charity
16. Room for the community's infirmary
17. Wood room
18. Here is a staircase that goes to the dormitory when the nuns are warm
19. Chapter room 6 cavezi with the dormitory above that will be organized like the one above the refectory.
20. Room measuring 3 cavezi
21. Kitchen courtyard measuring 2 pertiche cavezzo
22. Kitchen [with] fireplace [and] storage box.
23. Site for the closet for meals, 1 cavezo. Storage box.
24. Door of the refectory. Refectory of 6 pertiche. Above is a dormitory [measuring] 10 pertiche.
25. Here will be the staircase for the dormitory. Exit of the piazza.
26. This is the loggia in front of our church.
27. Loggia adjacent to the church, 1 cavezo.
28. Loggia above and below
29. Cloister

# Ruins in Sir Walter Scott's Historical Novel: A Case of Diachronic Interpretation of Architecture

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## Abstract

In cultural studies of architecture the terms "place" and "performance" suggest a need to consider its particular scope that is not often discussed in architectural history and criticism. As David Leatherbarrow observed in his recent book, *Architecture Oriented Otherwise*, "So much writing about architecture tends to evaluate it on the basis of its intentions: how closely it corresponds to the artistic will of the designer, the technical skills of the builder, or whether it reflects the spirit of the place and time in which it was built." We do not require a reminder from a Poststructuralist like Michel Foucault to realize an architectural "place" often outlives its designer and supporting *zeitgeist*. This postulates a way of thinking on the basis of "performance," that is, how architecture participates in the meaning of life for subsequent inhabitants and observers.

Architectural ruins present exemplary cases with which to consider questions concerning the diachronic interpretations. While the 1970s' application of semiotics discussed the architectural multivalence, this paper is not concerned with the change of meaning through time. Nor does it build a Deconstructionist argument for deferral. Instead it will focus on a specific nature of architecture, that which assists in realizing the life's infinitesimal occupation within the time's continuum. Architecture then participates in the meaning of life, diminutizing human existence but at the same associating it to a larger entity of which it partakes.

Each year all over the world tourists flock around ruins from Acropolis to Jerusalem and from Angkor Wat to Machu Picchu, fascinated by the lives of the people who are long gone, displaced for political, cultural, or

unknown reasons. The state of ruins clearly presents the distance from the past, while by appreciating ruins one feels close to the bygone era. Architectural ruins then present diametrical relationships between the past and the present: identification and distancing, to use Paul Ricoeur's terminology. This paper will trace this function of architecture and identifying its pedigree in the nineteenth century, in which literary authors, artists, and stage managers incorporated buildings' depictions to feed the historical imagination. In particular, it will discuss the role architectural ruins played in Sir Walter Scott's historical novel, referring to his *Kenilworth: A Romance*.

Firstly, Scott used actual buildings as the setting, restoring them to the time of the events. The specific names of the building and their parts and their spatial relationships substantiated the story. Secondly, Scott narrated the building's history, referring to the associated individuals and events, or creating his own nomenclature to give a genealogical meaning. He also described the building's ornamentations, both actual and imagined, referring to the past. Thirdly, Scott described the architectural styles, in order to give specificity of the time to the story. Architectural descriptions helped Scott bring the story vividly to life. The details of the buildings in which the story's events take place and the states of the buildings with which to remind the passage of time earned Scott the popularity, and enticed many readers to visit these buildings.

## Architectural Ruins

In cultural studies of architecture the terms "place" and "performance" suggest a need to consider a particular scope that is not often discussed in architectural history and criticism. As David Leatherbarrow observed in his recent book *Architecture Oriented Otherwise*, "Forces beyond the architect's control affect architecture's concrete reality, regardless of what was intended in design. What is more, unforeseen influences also bring about the end of the building's freestanding individuality."<sup>1</sup> It is important then to develop the architect's awareness and interests in the building's "unscripted performances" beyond what is intended. We do not require a reminder from a poststructuralist like Michel Foucault

to realize an architectural “place” often outlives its designer and supporting *zeitgeist*. This postulates a way of thinking on the basis of “performance,” that is, how architecture participates in the meaning of life for subsequent inhabitants and observers.

Architectural ruins present exemplary cases with which to consider the performative nature of architecture. While the 1970s’ application of semiotics discussed the architectural multi-valence, this study is not concerned with the change of meaning through time. Nor does it build a Deconstructionist argument for conflicts of meanings. Instead it will focus on a specific nature of architecture which promotes the observers’ and inhabitants’ interpretation, in which the interpreters understanding the piece of architecture, reflecting on their world and self. Such interpretations are to be distinguished from the type that aims to arrive at the original meaning by the designer and the culture to which the designer belonged.

Each year all over the world tourists flock around ruins from Acropolis to Jerusalem and from Angkor Wat to Machu Picchu. They are fascinated by the lives of the people who are long gone, displaced for political, cultural, or unknown reasons. Ruins entice the visitors’ imaginations because of their physical and metaphysical incompleteness – missing roofs, decayed stones, or the lost way of living that once kept the buildings alive. While some historically significant ruins are designated for preservation by law, some are turned into hotels or other tourist facilities. New buildings also are constructed that mimic the ruins’ appearance but use newly available materials and technology, arguably corrupting the significance of the original building. The physical state of ruins entices the observers to contemplate on the lives of the people who are long gone, displaced for political, cultural, or unknown reasons of the bygone era. The state of ruins clearly presents the distance from the past, while by appreciating ruins one feels close to the bygone era. Architectural ruins then present diametrical relationships between the past and the present: identification and distanciation, to use Paul Ricoeur’s terminology. It ultimately draws the observers’ attention to their own world and the self, to their infinitesimal occupation within the time’s

continuum. Architectural ruins then, diminish human existence but at the same associate it to a larger and greater entity of which it partakes, associating the observer’s present to the past and the future.

By examining the ways in which architectural ruins contributed to the understanding of the world and the self, this paper will introduce a theoretical stance rarely taken in architectural history and criticism, namely that of diachronic interpretation. The discipline of architectural history always has been comfortable with studying synchronic interpretations, in which the meaning in discussion is of the time of the object’s fabrication. The diachronic interpretation in case of architectural ruins involves meta-history; that is, there are at least two and often three layers of the past – those of fabrication, destruction, and appropriation. As a consequence, a study such as this does not intend to yield further knowledge of the past. The ultimate goal is, however, to understand, first and foremost, the type of architectural interpretation that is a manifestation of cultural creativity.

The performative nature of architectural ruins which connects the observer to his/her past and future is not exclusive to modern times. Throughout history people have made use of the remains of buildings from a distant past, giving a new purpose to what had become obsolete. The reasons for doing so vary from political, religious, and philosophical, to economic and pragmatic, and even to hedonistic. Buildings in ruinous states allow viewers to distance themselves from the political or religious implications of history and at the same time entice them to identify with an imagined and often idealized past. This paper, however, will focus on a case of the nineteenth-century Romanticism, identifying it as the pedigree, in which literary authors, artists, and stage managers incorporated buildings’ depictions to feed the historical imagination. In particular, it will discuss the role architectural ruins played in Sir Walter Scott’s historical novel, referring to his *Kenilworth: A Romance*.

In order to understand the performative nature of architectural ruins, it is helpful to refer to the French philosopher Paul Ricoeur (1913-2005) and his discussions on “The Hermeneutical Function of

Distanciation.”<sup>2</sup> Ricoeur began the article by rejecting what motivated Hans-Georg Gadamer (1900-2002), that is, the opposition between “alienating” distanciation and participatory belonging. For Ricoeur, distanciation is “positive and productive,” and as such not an obstacle but an essential condition of communication. In order to demonstrate this, Ricoeur discusses the nature of the text. He characterized the discourse as an event, as compared to the language as a system. When a discourse turns from speech to a written text, it gains autonomy, away from reference or context that may otherwise give primacy to the original meaning either by the author or the society. What must be interpreted of the autonomous text then is not the original meaning hidden behind it but is “the world of the text” in front of it. Ricoeur goes on to say that such a world of the text is something that “I [the interpreter] could inhabit and wherein I could project one of my ownmost possibilities.” As such, the text is self-reflective of the interpreter. A third kind of distanciation, while the first being Gadamer’s distanciation to be overcome between the interpreter and the author, and the second being Ricoeur’s own notion of productive distanciation between the author and the text, then is that between the text and the reality, in the sense that through the interpretation of the text, the everyday reality is “metamorphized by what could be called the imaginative variations which literature carries out on the real.”

Architectural ruins promote “positive and productive” distanciation in at least three ways. Firstly, just as the text fixed by writing, architectural ruins like any other built objects have textual autonomy, which separates them from the original meaning. Secondly, architectural ruins carry in their physical properties what Austrian art historian Alois Riegl (1858-1905) called “the age value.” To compare with his “historical value,” “age value” is based first and foremost on the signs of age by way of natural, or intrinsic representation. It does not rely on the significance of its original purpose or context, on which the “historical value” is based, nor does it require such knowledge from the viewer. Age-value therefore is accessible regardless of the viewer’s education or taste. Ruins’ features including missing parts of the buildings, decayed stones, and growing vegetations indicate the

time passed. This is a special quality of architectural ruins, although there can be other non-ruinous buildings that have the similar value by way of patina or weathering on the building. Thirdly, the obvious lack of any use or purpose of architectural ruins further emphasizes the distance. These three aspects promote distanciation between the original context that necessitated the building on the one hand and the interpreter on the other.

### **Sir Walter Scott: Historical Fiction**

Sir Walter Scott (1771-1832), a Scottish poet and novelist, was the most successful writer of his day, both in popularity and critical acclaim. A prolific writer, he invented the literary genre of historical novel, riding on the great wave of the nineteenth-century historical consciousness and demonstrating the understanding of one’s nation through its genealogy. Scott’s novels are different from the earlier, “so-called historical novels of the seventeenth century” including Horace Walpole’s *Castle of Otranto*, for which the past was an unfamiliar setting to entice the reader’s curiosities.<sup>3</sup> To compare, Scott’s works provided a “new sense of history and a new experience of historicity,” by incorporating the actual historical events and characters with those imagined for the purpose of exuding the essence of a historical epoch being portrayed. If anything, Scott’s works brought the past closer to the reader.<sup>4</sup>

Familiar from the childhood with stories of the region, Scott published in 1802-1803 *Minstrelsy of the Scottish Border*, a collection of ballads. His original works were first in the form of poetry, beginning with *The Lay of the Last Minstrel* (1805). Scott then moved onto the prose romance. Scott produced more than two dozens of works drawing from Scottish history, now called the Waverly novels, which include *Old Mortality* (1816), *Rob Roy* (1817), and *The Heart of Midlothian* (1818). Some of his later works deal with English history, of which *Ivanhoe* (1819) portrays the enmity of Saxons and Normans during the reign of Richard I, and *Woodstock* (1826) is set in the year 1651 during the English Civil Wars and revolves around Charles II’s escape from the country. Scott was the most successful and greatly admired author of his day, and his works were also great sources of

inspiration in other artistic forms – operas, plays, and paintings – up to 1890s.

In 1821 Scott published *Kenilworth: A Romance*. It took only four months since he began writing the first words. The story evolves around three historical individuals: Queen Elizabeth, Robert Dudley, Earl of Leicester and Queen's favorite, and Amy Robsart, Dudley's wife. The first half tells about Amy Robsart staying at Cumnor Place. As Amy decides to visit Dudley at Kenilworth Castle, the story also shifts its place in the second half. Shortly after Amy's arrival, Queen Elizabeth makes her royal visit to the Castle. Amy encounters the Queen but cannot tell her what she really is because the marriage between her and Dudley is kept secret from Elizabeth in order to advance Dudley's position in the court. Amy eventually is taken back to Cumnor Place, and there she is murdered by the order of Dudley, who suspects her disloyalty to him. Contemporary reviews, both Scottish and English, praised the work for the "brilliant and seducing" (*Edinburgh Review*) or "vivid and magnificent" (*Quarterly Review*, London) characterization of Elizabeth. The book had a great appeal among general readers, popularized the Elizabethan age, and ushered in nationalism.

*Kenilworth* belongs to the literary genre of historical fiction because it incorporates historical figures and events with imaginary ones. Scott cited a number of antiquarian and historical documents. For example, he identified in the novel Sir John Harrington (1560-1612)'s *Nugae Antiquae* (London, 1719) as a source of Elizabeth's character.<sup>5</sup> For the entertainment at Kenilworth Scott followed fairly faithfully two sources included in *The Progresses, and Public Processions of Queen Elizabeth ...* (London, 1788) compiled by John Nichols: Laneham's "A Letter ..." and Gascoigne's "Princely Pleasures ...".<sup>6</sup> Whether Scott was a discriminating historian is, however, beside the point. For Scott's intention was not to accurately depict the past. Instead, Scott allowed his imagination work freely to tell an intriguing and alluring portrayal of the past.

Kenilworth Castle in Warwickshire is "one of England's most spectacular castle ruins," and has been

managed since 1984 by English Heritage.<sup>7</sup> The Castle was first constructed in early twelfth century by Geoffrey de Clinton, the royal chamberlain to King Henry I, and major additional works were done by King Henry II, King John, John of Gaunt, son of King Edward III and duke of Lancaster, and Robert Dudley, Earl of Leicester. The Castle is famous for the nineteen-day royal entertainment of 1575 for Queen Elizabeth, in which Scott's story takes place. It would be necessary to understand the Castle's states in Elizabethan time as Scott knew them and those Scott found in his visit to the site. The two states were totally different because parts of the building were dismantled in 1650 after the Civil Wars and the slighting.

### **Kenilworth Castle**

The information of the building which Scott used for the novel came both from his first-hand experience at the site and from the past documents. Scott visited Kenilworth Castle in 1815, not for the first time, five years before Scott began writing the novel. At the site Scott asked searching questions and spent a couple of hours in contemplation.<sup>8</sup> The Castle of 1815, however, appeared differently from that of 1575. The Castle lay in a ruinous state after the slighting of the mid-seventeenth century.

Scott cited for sources concerning the building in the text *Kenilworth Illustrated* (1821), and a "curious ground-plan" shown to Scott by Richard Badnall.<sup>9</sup> Although *Kenilworth Illustrated* was published in 1821, Scott would have had an opportunity to see the plates – there were "fine plates individually dated from 1 February 1820 to 1 December 1821" – prior to the publication, since he is listed among the subscribers of the publication.<sup>10</sup> As to the "curious ground-plan," the first appearance of the reference to the ground plan is in the 1837, posthumous, edition.

In addition, there are common sources, although not cited by Scott, for the descriptions of the building as it stood in 1575. William Dugdale's *Antiquities of Warwickshire* (1656) has three distant views of the castle and a ground plan. Dugdale visited Kenilworth Castle in September 1649, knowing that the slighting is eminent, and there made sketches of Kenilworth.

Wenceslaus Hollar engraved the illustrations in the publication based on Dugdale's own sketches (figure 1). Dugdale's ground plan (figure 2) is the oldest known plan of the building. The second source is *Concise History and Description of Kenilworth Castle* (first edition 1777; second 1781; third 1790, and fourth edition, 1798), whose second and subsequent editions have a ground plan slightly different from that in Dugdale.<sup>11</sup> The "Magnum Opus" edition (1831) of *Kenilworth* also included a similar ground floor plan (figure 3). In fact, the naming and numbering of the buildings that make up the castle complex are identical to those of Dugdale's.

There is a drawing "Kenilworth Castle as it stood in the reign of Queen Elizabeth to illustrate the romance of Kenilworth, 1575," now in Walter Scott Archive at the University of Edinburgh (figure 4), to which Scott could have had an access. The drawing is extracted from an anonymous work, *Account of Kenilworth Castle: With A Key to the Novel of Kenilworth* (Warwick: H. Sharpe, [182-?]).<sup>12</sup> The drawing is a reproduction of a fresco, which existed in Newnham Paddox, which now is lost. Henry Beighton made a copy of the fresco in 1716, titled "Kenilworth Castle as It Appeared in 1620," which is now at Aylesford Collection of views of Warwickshire seats, Birmingham Reference Library Archive.

In the eighteenth century, the Castle descended through Hyde successors to Thomas Villiers, who became the first Earl of Clarendon of the second creation in 1776. The Castle remained with the Earls of Clarendon till 1937, at which time it was transferred to the state. By the later part of the eighteenth century tourists began to take an interest, and the first guidebook, *A Concise Guide and Description of Kenilworth Castle* (1777) was published, which was issued in twenty-five editions by the 1840s. In August 1817, just after Scott's first visit (the second one is in 1823) and before *Kenilworth* publication, 30 tons of stone crashed down from the northwest turret of the keep.

The ruinous state of the Castle at the time of Scott's visit can be seen in other documents. A number of drawings show the state of the ruin of the late

eighteenth and early nineteenth centuries. "Caesar's Tower Kenilworth Castle" included in John Nichols's *The Progresses and Public Processions ...* (1788 edition; figure 5) shows the view from the east, including Leicester's building to the left, the keep to the right, and the Great Hall in the center far ground. *Kenilworth Illustrated* (1821) and *A Guide to Kenilworth* (1825).<sup>13</sup> Additionally, a ground plan figure 6) of the ruin is included in John Britton's *The Antiquities of Great Britain*, vol. 4, 1814, as well as a textual explanation of the state of the building.<sup>14</sup>

### Three Traits of Architectural Ruins

Architectural ruins played a great role in Scott's construction of historical novel, providing means to mark a clear distance between the past and the present and at the same time to give a clear sense of the real to that distant past allowing readers to identify themselves with the past. Scott used two modes in the narrative: one, of the "tale-teller" who portrayed the events, and the other, of the antiquarian who historicized the past.<sup>15</sup> As Scott oscillated between these two modes, architectural ruins supplied a stark difference and the long passage of time between the now observed by Scott the antiquarian and the then portrayed by Scott the storyteller.

Firstly, just as protagonists in his stories were actual historical figures, actual buildings provided Scott with the setting of the novel. The ruinous buildings prompted Scott to restore them the time of the events, which Scott responded by referring to historical documents and his own imagination. The names of the parts of the building are specific, and the spatial relationships between them are concrete, which give substance to the story's events. He referred to the specific names of the parts of the building and the spatial relationships between them, sometimes restoring them to the time of the events and other times describing the state of ruin. For example,

We cannot but add, that of this lordly palace, where princes feasted and heroes fought, now in the bloody earnest of storm and siege, and now in the games of chivalry, where beauty dealt the prize which valour won, all is now desolate. The bed of the lake is but a rushy swamp; and the massive ruins of the Castle

only serve to show what their splendour once was, and to impress on the musing visitor the transitory value of human possessions, and the happiness of those who enjoy a humble lot in virtuous contentment.<sup>16</sup>

Secondly, like that of the monarch and the nation in the narrative, the genealogy to the building helped Scott to imagine the past, by way of the names of historical individuals and events associated to the parts of the building. Scott came up with his own nomenclature to a certain parts of the building, treating the building as a trace of past events. The building's ornamentations also motivated Scott to relate the building and its past occupants and events, and even to come up with his own to support his imagined story. An example is Saint Lowe Tower, referring to the historical Saintlowes who once tenanted the Castle. Another is Mervyn's Tower, referring to a figure of Scott's own creation, whose murder in the Castle foreshadowed Amy's. Scott also described the building's ornamentations, whether actual or imagined, that referred to the building's past occupants and events.

Thirdly, just as manners and costumes of the story's personalities, the architectural styles of the buildings gave Scott the specificity of the particular time of the story. For example his description of the Castle's Great Hall reflected the typical style and furnishings of the day:

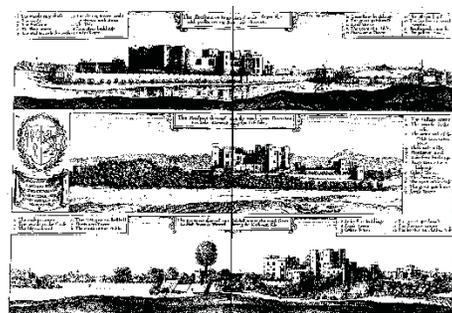
... the Queen ... found her way to the Great Hall of the Castle, gorgeously hung for her reception with the richest silken tapestry, misty wit perfumes, and sounding to strains of soft and delicious music. From the highly-carved oaken roof hung a superb chandelier of gilt bronze, formed like a spread eagle, whose outstretched wings supported three male and three female figures, grasping a pair of branches in each hand. The Hall was thus illuminated by twenty-four torches of wax. At the upper end of the splendid apartment was a state canopy, overshadowing a royal throne, and beside it was a door, which opened to a long suite of apartments, decorated with the utmost magnificence for the Queen and her ladies, whenever it should be her pleasure to be private.<sup>17</sup>

In all these instances, both what was present in the architectural ruins and what was missing from them helped Scott imagine and portray the vivid story, lending his work the power to allow the reader identify with the past. The concrete details of the buildings in which the story's events take place, and the concrete states of the buildings with which to remind the passage of time – these two modes in combination earned Scott the popularity, and enticed many readers to visit these buildings. The weaving of the building's glorious past and its forgotten present must have been highly effective in enticing the imagination of the nineteenth-century readers.

## Conclusion

The discussion on architectural ruins has a wider application to that on architectural design in general. While architectural ruins drew the nineteenth-century literary authors and their contemporary readers, there are other types of architectural designs that encourage participatory interpretation in different ways. With Tadao Ando and Peter Zumthor, for example, the observer's attention is drawn to the few carefully selected and superbly constructed forms and materials. Either through distancing or minimalism, architecture's physical properties engage the observers and inhabitants in the participatory interpretation. Thus architecture has a way of contributing to the contemplation on the meaning of life.

## Illustrations



*Fig. 1: three distant views of Kenilworth Castle, William Dugdale, Antiquities of Warwickshire, 1656.*

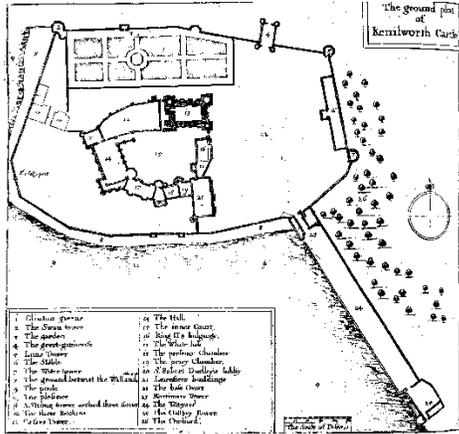


Fig. 2: site plan of Kenilworth Castle, Dugdale, Antiquities, 1656.

Fig. 4: "Kenilworth Castle as it stood in the reign of Queen Elizabeth to illustrate the romance of Kenilworth, 1575," Sir Walter Scott Archive, University of Edinburgh



Fig. 5. John Nichols, The progresses, and public processions, of Queen Elizabeth ..., 1788.

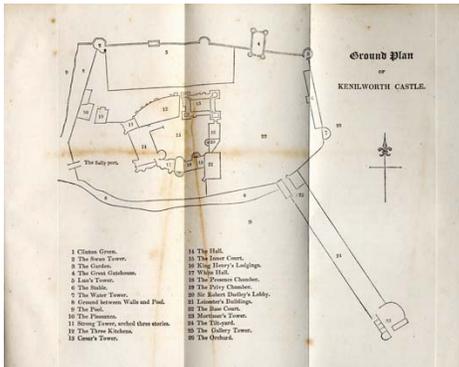


Fig. 3: ground plan, Scott, Kenilworth, "Magnum Opus" edition, 1831.

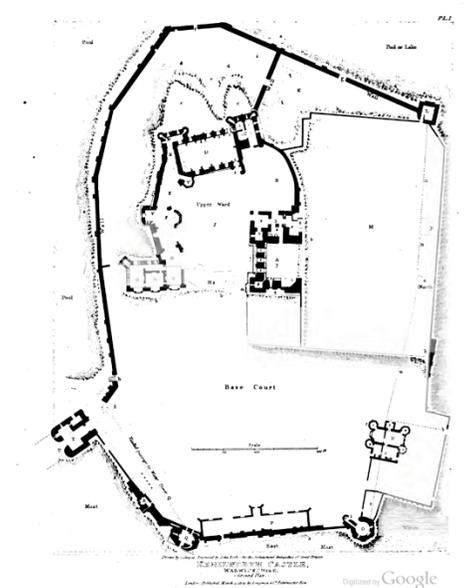
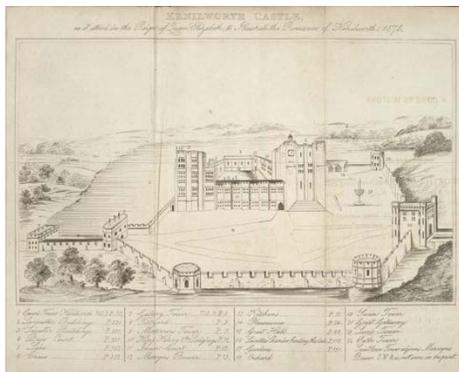


Fig. 6. John Britton, Antiquities of Great Britain, 1814.



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<sup>1</sup> David Leatherbarrow, *Architecture Oriented Otherwise* (New York: Princeton Architectural Press, 2009), 7.

<sup>2</sup> Paul Ricoeur, "The Hermeneutical Function of Distanciation," *Hermeneutics and the Human Sciences: Essays on Language, Action and Interpretation*, ed. trans. and intro. By John B. Thompson (Cambridge: Cambridge University Press), 131-144. Originally published in French "La Fonction Herméneutique de la Distanciation," *Exegesis: Problèmes de Méthode et Exercices de Lecture*, ed. by François Bovon and Grégoire Rouiller (Neuchâtel: Delachaux et Niestlé, 1975), 201-14, which is a modified version of an earlier essay that had appeared in English in *Philosophy Today*, 17 (1973), 129-143.

<sup>3</sup> Georg Lukács, *The Historical Novel* (London and Lincoln: University of Nebraska Press, 1983; reprint of the original, Boston: Beacon Press, 1963).

<sup>4</sup> Frederic Jameson, "Introduction," Georg Lukács, *The Historical Novel*, trans. from the German by Hannah and Stanley Mitchell (Lincoln and London: University of Nebraska Press, 1983): 1. The English translation originally published: Boston: Beacon Press, 1963.

<sup>5</sup> Sir John Harington, *Nugæ antiquæ: being a miscellaneous collection of original papers in prose and verse. Written in the reigns of Henry VIII, Edward VI, Mary, Elizabeth, James I, &c.*, 2 vols. (London: printed for W. Frederick, at Bath: and sold by J. Robinson and Roberts, and J. Dodsley, 1769 and 1775). *Nugæ antiquæ* is cited in Chap. XXI in both the first and the Magnus Opus editions.

<sup>6</sup> Ashmole, Elias. *The Antiquities of Berkshire.... With a large appendix ... and a particular account of the castle, college, and town of Windsor*. In three volumes. Vol. 1. London, 1719: pp. 149-154. Eighteenth Century Collections Online. Gale. University of Nebraska-Lincoln. 11 July 2009. Ashmole's *Antiquities of Berkshire* is cited at the end of the last chapter (Chap. XLI) in the first edition and "Introduction" in the Magnum Opus edition. John Nichols's volume includes Robert Laneham (Langham), "A Letter: Wherein part of the entertainment unto the Queenz Majest ... is signified," and George Gascoigne, "Princely Pleasures [cited as "Progress" by Scott] at Kenilworth Castle." Nichols's volume and Laneham's Letter are cited in a note at the end of Chap. XXX in both the first and the Magnum Opus editions.

<sup>7</sup> Kenilworth, English Heritage website, <http://www.english-heritage.org.uk/server.php?show=nav.16873>, accessed July 27, 2009.

<sup>8</sup> Edinburgh edition, p. 473.

<sup>9</sup> Robert Laneham, "A Letter: whearin, part of the entertainment, unto the Queenz Majesty, at Killingwoorth Castl, in Warwik Sheer, in this soomerz progress, 575, iz signified," (vol. 1, pp. B1-56) and George Gascoigne, "The Princely Pleasures at Kenilworth Castle" (vol. pp. B56-89) in John Nichols,

*The progresses, and public processions, of Queen Elizabeth. ... Now first printed from original MSS. of the times; or collected from scarce pamphlets, &c. Illustrated with historical notes...*, 2 vols. (London: Printed by and for the editor, 1788). Eighteenth Century Collections Online. Gale. University of Nebraska-Lincoln. 29 July 2009

<<http://0-find.galegroup.com.library.unl.edu/ecco/infomark.do?&contentSet=ECCOArticles&type=multipage&tabID=T001&prodId=ECCO&docId=CW100450051&source=gale&userGroupName=linc74325&version=1.0&docLevel=FA SCIMILE>>. *Kenilworth Illustrated: or, the history of the castle, priory, and church of Kenilworth, with a description of their present state* (Chiswick, printed by C. Whittingham for Merridew and Son, 1821.

<sup>10</sup> Edinburgh edition, p. 473.

<sup>11</sup> William Dugdale, *The Antiquities of Warwickshire illustrated from records, leiger-books, manuscripts, charters, evidences, tombes, and armes: beautified with maps, prospects and portraictures* (London: Printed by Thomas Warren, 1656), Wing/D2479, Early English Books Online [http://0-eebo.chadwyck.com.library.unl.edu/search/full\\_rec?SO URCE=var\\_spell.cfg&ACTION=ByID&ID=12269225&E CCO=undefined&FILE=../session/1248885128\\_3433&S EARCHSCREEN=CITATIONS&DISPLAY=AUTHOR&H IGHLIGHT\\_KEYWORD=param\(HIGHLIGHT\\_KEYWOR D\)](http://0-eebo.chadwyck.com.library.unl.edu/search/full_rec?SO URCE=var_spell.cfg&ACTION=ByID&ID=12269225&E CCO=undefined&FILE=../session/1248885128_3433&S EARCHSCREEN=CITATIONS&DISPLAY=AUTHOR&H IGHLIGHT_KEYWORD=param(HIGHLIGHT_KEYWOR D)) accessed July 29, 2009. 1730 (second edition): *The antiquities of Warwickshire illustrated; ... with maps, prospects, and portraictures. ... 2 vols.* (London: printed for John Osborn and Thomas Longman, and are sold also by Robert Gosling; and William Ratten, in Coventry, 1730). Eighteenth Century Collections Online. Gale. University of Nebraska-Lincoln. 29 July 2009

<<http://0-find.galegroup.com.library.unl.edu/ecco/infomark.do?&contentSet=ECCOArticles&type=multipage&tabID=T001&prodId=ECCO&docId=CW125429304&source=gale&userGroupName=linc74325&version=1.0&docLevel=FA SCIMILE>>. The second edition has only the ground plan, and does not have three views of Kenilworth Castle. *A concise history and description, of Kenilworth Castle: from its foundation, to the present time.* (Kenilworth: printed by S. Thornton, MDCCLXXVII. And sold by the booksellers in Coventry and Warwick, and at Thornton's printing office, and the principal inns in Kenilworth, 1777). Eighteenth Century Collections Online. Gale. University of Nebraska-Lincoln. 29 July 2009

<<http://0-find.galegroup.com.library.unl.edu/ecco/infomark.do?&contentSet=ECCOArticles&type=multipage&tabID=T001&prodId=ECCO&docId=CW100065639&source=gale&userGroupName=linc74325&version=1.0&docLevel=FA SCIMILE>>. The first edition does not have a ground plan, but the second and subsequent editions do.

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<sup>12</sup> Correspondence from Dr Paul Barnaby, Project Officer, Walter Scott Digital Archive, Edinburgh University Library, George Square, Edinburgh EH8 9LJ, Tel. 0131 650 2881, <http://www.walterscott.lib.ed.ac.uk>, dated July 14, 2009.

<sup>13</sup> *Kenilworth Illustrated, or, the history of the castle, priory, and church of Kenilworth, with a description of their present state* (Chiswick, printed by C. Whittingham for Merridew and Son, 1821) – CCA, Huntington Library, Newberry Library, Folger Shakespeare Library, Yale University, etc. This book is cited in Scott's *Kenilworth*, Magnum Opus edition. *A Guide to Kenilworth, containing a brief historical account of the castle, priory, and church; with a particular description of the present state of the castle, and notices of the priory ruins, and the church.* Illustrated with a plan and six other engravings. Coventry: Printed and sold by Merridew & Son, Longham, Hurst, and Co. London; at the Castle and Principal Inns at Kenilworth; and by the Booksellers at Leamington and Birmingham. UNL Special Collection. J.M.W. Turner's painting of Kenilworth Castle is at Fine Arts Museum of San Francisco.

<sup>14</sup> John Britton, *The Architectural Antiquities of Great Britain represented and illustrated in a series of views, elevations, plans, sections, and details of various ancient English edifices with historical and descriptive account of each.* Vol. IV. London: Printed for Longman, Hurst, Rees, Orme, and Brown, Paternoster Row; J. Taylor, Architectural Library, 59 High Holborn; and the Author, 1814.

<sup>15</sup> Chap. I.

<sup>16</sup> Scott, *Kenilworth: A Romance*, Chap. XXV.

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## PRESENTATION SESSIONS | ORGANIZATION

### Session One

Moderator: Madlen Simon, AIA



# **A Study of Process in Design: Curatorship, cloud intelligence and applied research**

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James Stevens, Lawrence Technological University, synchRG  
Dr. Anirban Adhya, Lawrence Technological University, synchRG

## **Abstract**

The architectural design community is faced with a shift in focus from an object-centric model of design creating discrete aesthetic objects in the landscape to addressing valid and relevant process-oriented solutions involving complex problems within complex systems. In this evolution, traditional boundaries of ownership, ego and control of knowledge or product become insignificant and flow and accessibility issues of the design process become critical for examination. The issue is how to adjust an old model of project methodology which is not structured to support a systems-based approach. The investigation addresses the idea of systems, curatorship, invited experts, open source standards and focused crowd-sourcing as a core operational structure for knowledge creation and dissemination, research, and practice.

This paper presents the organizational aspect of a research and design structure developed through analysis of open source processes. In addressing a tradition research/design framework, the role of primary investigator was interpreted as a role of curatorship rather than ownership. The proposed organizational structure focuses on catch-and-release data framework, point-of-release timings, problem-set organization and co-existing top-down/bottom-up authority structures. Inherent in the structure, the curator defined the catch-and-release strategies for informational feedback loops and point-of-release of defined segments of research (problem-sets) to the interested community. The two functions then engaged the larger project by tying problem-set knowledge and solutions into larger lines of enquiry. In addition, by linking open source contribution to curatorship, the project addresses the possibility of a parallel top-down/bottom-up authority structure. A result is a potential asset for maintaining a position as

a dedicated generalist within a culture of increasing specialization while addressing the benefits of systems process which supports a culture of innovation.

## **Introduction**

We are at a point of a societal event horizon with the intersection of social media, increased specialization, deep disciplinary knowledge, proprietary research and computer processing power (Stevens et al 2009). This point is an opportunity to address what is increasingly becoming an introverted design culture within architecture (Till 2009), and to address the integration of research, both internal and external to the discipline of architecture, into that design process as an examination of methodology. Previously, the open source model of project methodology was highlighted as a possible adaption to the architectural design process in order to address the solution finding in a creative problem-solving process. In addition, the potential to use a lateral and self-organizing system may address a design process in architecture has been reduced to being self-referential and mainly internally focused. Architecture has been accused of often ignoring everyday problems and disregarding the importance of non-formal functions, events and interactions within complex real-world systems (Hillier 1996) .

This paper first identifies some existing issues in the use of research, process and design within architecture. The concept of openness and the connection to innovation are then explored. Next, the potential of alternative processes by examining organizational systems based on social media and open source (permeable barrier) systems are identified. Extracting potentials from both existing case studies and from original experiments in design

process, an alternative organization structure for an architectural design (formal/technical/social) is detailed.

## 1.0 Design, Research and Process

Traditionally, design has achieved “success” through a process of trial and error which creates an iterative but undefinable methodology, labelled 'intuition' and 'practice'. However, this position is uncritical, difficult to transfer in an educational setting due to its esoteric and defensive posture, and limiting in vision. Architectural design has maintained a narrow focus in terms of detailing both interest and success (Till 2009), a focus which often ignores relevant extra-disciplinary knowledge and even internal research (social, technical, environmental) from being applied. The iterative process in architecture has been reduced to self-referential process. What is needed instead is iterative processes that takes *any* relevant knowledge from *any* discipline and applies it to a solution focused model (i.e. It has to do this, I don't care how we get there). This is fundamentally the core of a creative problem solving process, the heart of any design ecology.

The traditional design process is generally a top-down and compartmentalized process, due to both business organizational models and the complexity of the product to be delivered. This division can be internal or external, dividing tasks such as the design of a curtain wall to a department of experts or contracted to a specialist. The general rule is to divide into categories based on disciplinary knowledge, generating discrete teams for schematic design team, HVAC, electrical, construction documentation, construction administration, site integration, and landscape, to detail a few. Failures often occur when there is a conflict between the components and overall aesthetic or formal composition, or significant lack of organization between the siloed specialist teams. However, the architect does not often think of this failure in terms of a conflict between the intentions of the parts as discretely considered and the total system, of which they are an element. In an article examining notions of architectural innovation of product technologies, where architecture is used not in the disciplinary way to mean all that is held in the discourse of the design of buildings, but as it is used in Organizational Science to mean the distribution and

composition of the whole, Rebecca Henderson and Kim Clark note;

*“This distinction between the product as a whole—the system—and the product in its parts—the components—has a long history in the design literature (Marples, 1961; Alexander, 1964). [ ... ] A component is defined here as a physically distinct portion of the product that embodies a core design concept (Clark, 1985) and performs a well-defined function. When the two distinct portions are separated (components/architecture) there lies an opening in the process of architecture and design, one that allows for components to be distributed in a designed system for maximum productivity. Furthermore, the distinction between the product as a system and the product as a set of components underscores the idea that successful product development requires two types of knowledge. First, it requires component knowledge, or knowledge about each of the core design concepts and the way in which they are implemented in a particular component. Second, it requires architectural knowledge or knowledge about the ways in which the components are integrated and linked together into a coherent whole.” (Henderson, Clark, 1990).*

Taking knowledge from Organizational Science, organization and communication channels have been shown to be critical to both task completion and effectiveness in design (Galbraith, 1973; Arrow, 1974). As researched and described by Henderson and Clark (1990), the communication channels of an organization embodies its architectural knowledge as a relationship of the parts (structure) to the whole (limits of content). This means the communication structure *pre-determines possibilities of design solutions based on component knowledge*. Communication channels create a set of filters, so that each link focuses on only key relationships and masks any adjacent or minor element, locations were solutions to the whole might be found but are unintentionally suppressed as they don't solve the local. Most structured organizations are, by definition, not able to be fully innovative as their own rigid structural shortcomings limit the range of possible answers before the question is even asked. This includes proprietary knowledge bases as closed systems which again limit the potential of an innovative solution and the use of tangential research

or access to extra-disciplinary knowledge.

## 2.0 Openness and Innovation

Traditional disciplinary barriers often inhibit the acquisition of knowledge from beyond the boundaries of that discipline by defining territorial control however openness is important. A study completed by Karim Lakhani, Lars Bo Jeppesen, Peter A. Lohse, and Jill A. Panetta titled *The value of openness in scientific problem solving* (2007) present the case using existing literature and studies from Mulkey, Stephan, Hagstrom, Campbell and Grushcow that there is often even difficult transfer of knowledge within the boundaries due to issues of “career, publication priority, intellectual property, and financial concerns often trump openness to the potential detriment of overall scientific advancement”. The study recognizes a problem solving approach called “broadcast search” based on the premise that “knowledge is unequally and widely distributed in society” (Lakhani et al 2007, 4).

Another key finding in the Lakhani et al study addresses predictors for innovation. The study found a 29.5% resolution for previously unsolved scientific problems which had remained within the industrial proprietary centers, such as R&D labs, by broadcasting for a solution *outside* of its disciplinary boundaries. That is innovation has been proven to occur at a higher ratio when a closed group which speaks the same specialized language (a discipline) must translate the problem they are attempting to solve into a general language to discuss in an interdisciplinary manner. Another way of saying this is a broadcast search is performed which introduces knowledge provided by 'outsiders' into a closed system (Lakhani et al 2007). For example, one solution provided through an inter-disciplinary knowledge transfer website ([www.innovate.com](http://www.innovate.com)) provided a solution to a previously unsolved problem within the boundaries of toxicology by applying standard processes in protein crystallography, processes that were unknown for toxicology. It was the transfer of knowledge from one discipline to another which was the key to innovation and problem solution. The type of knowledge was particular as well, it was *deep knowledge well encoded in disciplinary syntax*.

What is important for architecture to realize is the core of innovation is found in knowledge transfer, not product, material or manufacturing. This knowledge transfer is essentially one of the central elements in the creative problem solving process which is the essence of design. Instead of defending disciplinary boundaries, the critical activity is to make those boundaries permeable so to allow external deep knowledge to filter into architectural design through an organizational structure. It is the potential of broadcast social media which opens up the ability to present information and request solutions from outside the discipline.

## 3.0 Permeable Barrier Organizational Systems

Looking outside of the discipline of architecture, the Open Source Software (OSS) industry provides a relevant example for the organization of communication, tasks and evaluation of success and failure. In terms of broadcast social media and cross-disciplinary knowledge transfer, the OSS community has shown how a large pool of eyes and contributors, often not from within the core of the process or discipline, can significantly improve quality and innovation (Raymond 2001).

There are strong parallels between software development and architectural design processes. In both disciplines, varied and numerous design variables must be synthesized into a cohesive whole. Open Source Software philosophy uses a completely different model than the proprietary system of commercial firms. The style that was pioneered by Linus Torvalds, the founder of Linux, was “release early and often, delegate everything you can, be open to the point of promiscuity” (Raymond 2001, 3). The organizational system is further described:

*“In traditional, commercial software projects, the response to the Brookian critique of large teams is to divide and conquer, by fiat. The system is deliberately divided into smaller components, and the developer pool grouped into manageable teams which are then assigned to those components . By contrast, Open Source Software (OSS) projects are not formally organized, and have*

*no pre-assigned command and control structure. Not one is forced to work on a particular portion of the project. Team members contribute as they wish in any number of ways.*" [Bird et al 2008, 1].

As the project forms, interested parties participate based on their interest and abilities based on project vision and not on a rigid management structure focused on a predetermined outcome. This doesn't mean the project is anarchistic, it instead relies on knowledge content holders to rise into positions rather than to be placed there. It is self-regulating, efficient and organized on competencies rather than political structures. Anyone can contribute *if* they make their contribution relevant to the process. If it is not, the system will eliminate that contributor and/or contribution by a process of natural selection.

Open Source Software is predicated under the assumption that when a program is developed, the source code will be openly distributed and redistributed. Open exchange of ideas and knowledge and an accessible public development process is required. For the open source organizational alignment to work, participants must commit to a common set of rules.

- All software is created with the foundation called source code. This code is made available for free distribution.
- When using the source code developers are then expected to make the new software available to the originator and future developers. This is a critical step to maintain the circular process of development.
- If programmers modify the source code then the new software will be renamed or given a version number. A small modification or a "patch" is often an exception.
- New software that embeds the source code can not place further licensing restrictions that would prohibit future development.
- Distribution of the source code can not be restricted to exclude specific professions, person or groups.
- Software innovations are not proprietary but mutually beneficial.

The Open Source Software community identified early that not one individual could solve all of the problems facing the profession and that it was inefficient for programmers to replicate existing efforts, and even considered unethical for anyone to 'hoard' code. This understanding has streamlined the development process and has allowed the community of programmers to respond to a rapidly changing market (Stevens et al, 2009). The process of open decision making can appear foreign to the academic and professional architect. However, the fluidity in the OSS allows efficient management and organization of large amount of data along with quick modification of software components to adjust to the evolving outcomes and needs. At the core of an open source philosophy, and one that should also be considered as the foundation architectural design, is an iterative process. However, unlike strong hierarchical structures, the iterative process uses broadcast media and a fluid, open structure to be innovative and solution finding rather than self-definitive. More to the point for architecture, the Open Source community identifies its core competency to be a design-focused process, not a code-focused industry (Raymond 2001, 19).

### **3.1 Curatorship**

In terms of open source processes (management organization), one of the important factors is not that projects are designed by committee or emerge as part of a general anarchistic crowd effort, but that they are guided by an individual or small team in a process that is *open* to external influences. This is a very important distinction. Eric Raymond, one of the originators of the open source label, uses the terms *coordinator* and *leader* to describe this position. Due to the requirements of selecting, editing and merging elements during the design process, we use the terms *curator* and *curatorship*.

### **4.0 Alternative Organizational Flow**

Using knowledge gained from the analysis of existing processes which encourage openness and innovation, possible alternatives to the existing organizational structure in architecture design were examined by running a series of test processes through social networking applications. The intent of the systems

tests was to established points of alignment with current research in other fields regarding organizational structure and the potential for a open systems which will allow diverse input while still maintaining curator overview. The goal is to allow for an environment of innovation by transferring research and knowledge from the periphery, where knowledge traditionally is housed in architecture, in a non-rigid structure. Curatorship is a key term in developing a successful open source system for architectural research.

#### 4.1 System Tests

The system tests were developed using existing media, and analysis for potential based on factors listed above. The tests were executed and analyzed with the intention to extract potential elements to be reintegrated into a proposed model for architectural thought production. Currently, general categories within emerging social media are blogs (share personal views and experiences with others in a formal setting), wikis (group contribution building knowledge with collective intelligence), micro-blogging (quick bursts of information which are informal & asynchronous, for example Twitter), RSS feeds (constant connection to relevant sources of news/information), social bookmarking (extension of social network, the sharing of discovered information), instant messaging (quick and direct synchronous communication with others), and social networks (used to find and connect with people like common interests or pasts, for example Facebook and LinkedIn). This list can be further organized by 1) connections and context (social networks, IM, social bookmarking), 2) personal broadcasting (blogs, micro-blogging) and 3) Collective Intelligence (wikis).

The first test involved connections and context, using Facebook as a broadcast media. It was thought that due to the high visibility and high population of this social network site, the potential to reach a large audience was possible. A contact database of possible professional and academic contributors were identified and provided with a group invitation. A curator originated the problem and requested a solution. The sourced interested parties where encouraged to pass the problem set to others they thought might be interested in a viral process. Respondents were asked to return possible solutions with the promise of a

reward (notoriety in this case). Once the information was returned, it was distributed back out to the social network for critique and modification. This system is a *catch-and-release* information loop; challenges released and solutions caught and then released again. The systems theory approach lead to the isolation of various operational factors into lines of enquiry to be solved individually and at various scales.

A second test involved the ability to transfer hard information in both upload and download directions. This is not supported by most social networking sites. A open digital repository was set up in another location and linked into the broadcast media for visibility. Due to the attempt to maintain openness, the repository was not secured in any way, in order to allow for maximum access.

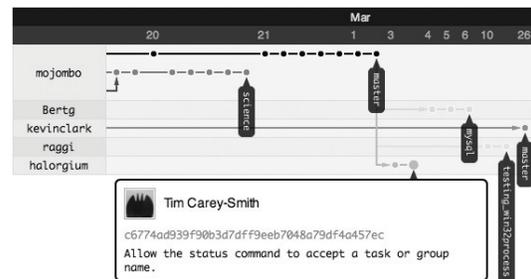


Figure 1: Versioning notation in Github

A third test was performed with an alternative social networking site based in the computer software industry. Part of early analysis illustrated that one of the major components necessary to realize an open source research project was version control and the tracking of the catch and release process. Version control has the ability to track changes, catalogue differences and most importantly allow for parallel development with the functionality to merge information (see Figure 1). This third test was hosted by the social coding site Github (github.com) Git has multiple important attributes not available on the standard web 2.0 social networking site. First, it provides a secure public repository that is open to all other git members. Furthermore the site manages your data through file versioning located on your local machine. Each contributor works independently and tracks changes through versioning. At key points (decided by the contributor) the files are "committed" to the repository with notations. The commit is a

researchers way of providing their data to the community. If the resource was developed by modifying or improving an existing asset in the repository (as is normal) then the contributor will conduct a “pull request”, this request notifies the original author that modifications have been submitted. The original author then has the ability to “pull” the changes into the original or leave them parallel.

## **4.2 Analysis**

The system tests illustrated several issues and opportunities. The intention was to develop an understanding on how to operationalize weak connections in the design process and to pull adjacent or extra-disciplinary knowledge into a core process by using a catch-and-release data framework, point-of-release timings, and examining problem-set organization. It was hypothesized that a hybrid culture of co-existing top-down/bottom-up authority structures could develop.

### *Transparency of information*

Problem-set organization needs to address the degree of transparency of information. As part of the tests, the problem was assigned and critical information was masked by the curator. It was believed that through masking background information, the widest possible set of solutions would occur. However, this bias became a possible issue in pre-determining outcomes. As well, in a lateral design process, the lack of parameters was shown to inhibit design options rather than encourage them. The balance between transparency and masking has to be well considered.

### *Version control*

One of the key elements in an open source project is the ability to document changes and 'versions' of the current project. The tests revealed that most existing broadcast media does provide any tools for versioning, with the exception of Github. Openness of information is also necessary in versioning in order to allow the potential of peer-to-peer curatorship. Version control also allows for branching to occur, points of potential of a project when it chooses to go in one direction of development but there is an alternative and valid second course of action. Current social media, and organizational structures do not lend

themselves well to versioning, where a line of enquiry can be shared across proprietary boundaries.

### *Iterations*

One of the key factors in an innovative design process is an aggressive iterative process which is *fully connected* to outside influences. The issue that was raised by the system tests was the degree of control the curator should and does have in the process. This relates to the issue of transparency, wherein the curator would have the option of closing the challenge loop or re-issuing a new challenge focused on synthesizing each suggestion. There is a large degree of pressure of judgement, akin to a top-down proprietary system, if 1) the curator alone is responsible for determining the most viable solution, 2) whether it was reissued in an iterative process, 3) whether it would be used internally only, 4) how the information provided is evaluated and 5) when/how the process is continued.

### *Role of curator*

The need for curator participation exposed a flaw in the adaptation of the open source process as it relates to architecture research. As noted above, in order to effectively produce multiple iterations, the curator must stay fully engaged. The problem exists when the sourced community overwhelms the curator, or the curator is too dominant in the process, thus losing the power of open-system dynamics. This can cause confusion, lack of direction and loss of interest on part of the community, project and curator.

## **4.3 Proposed Elements of Organizational Flow**

These tests revealed potentials and shortcomings in developing an alternative model of communication and development focused on maximizing innovation. Extracted from the systems tests and analysis, four primary elements were identified in order to be reintegrated into an organizational structure. These are 1) the release, 2) the catch, 3) the pull request and 4) the fork. It is proposed that these primary components form the basis for an open source and circular architectural design research methodology.

*The release* (Figure 2) leverages the open source value of publishing early and often. The initial broadcast of research intention should be an

investment into vision of the project. The researcher is motivated by the prospect of further development by others and developing knowledge that can be later incorporated back into the original proposal (or not). The release also does not prohibit the initial researcher from developing the project as long as each subsequent version is committed to community knowledge. This is done by versioning, logging and distributing relevant intellectual knowledge. The point of release, particularly the initial commit is a significant shift in the standard mode of research by making the findings available for all and providing the potential for cross-disciplinary contributions. Releasing findings from the “academic silo” will provide feedback and development ordinarily not received.



Figure 2: The Release

The catch (Figure 3) is the process of searching, finding and obtaining research findings. The catcher is not only the beneficiary of transferable and repeatable knowledge but also a contributor to the original findings. The catch is the first step in community benefit and contribution. Exclusion of participants does not occur at this step in the process, anyone can catch and contribute. The idea of full and open participation is critical to insure cross-disciplinary contributions and it also allows for multiple interpretations and vectors of enquiry. The catch represents a shift in point-of-release timing, that is to say, the point in time that academia limits participation of others – curatorship. The action of curatorship is moved to the end point of the contribution, allowing for the participation to occur freely with the significance of the findings being judged only occurring when requested by the catcher.

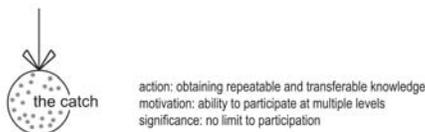


Figure 3: The Catch

The pull request (Diagram 3) is the point of curatorship. When a researcher has caught findings

and developed them further, new findings only run in parallel lines. It takes a pull request to merge the new findings into the original release. When a pull request is sent the catch researcher is asking the researcher that initially committed the findings to consider the pull to be incorporated into the original, thus furthering the project as a whole. At this point the initial commit researcher becomes a curator and decides relevance. If the pull is accepted, the findings have completed the circular open-source process and have benefited from contributors ordinarily excluded. If the pull is rejected or ignored, the findings remain parallel. It is important to recognize that by rejecting or ignoring a pull request does not remove the content to others but only prevents incorporation. The rejected project then forks and becomes a new version (1.1, 1.2, 1.3) and is available to be caught by others, improved and developed independently.

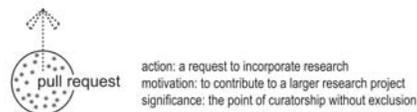


Figure 4: The Pull Request

The fork (Diagram 4) occurs when findings are either rejected or ignored by the initial commit researcher but also when the catch researcher intends to fork the project from the onset with the intent of using the findings as foundational information. The forked research re-enters the reiterative cycle of research and will proceed forward in the same way as initial commit research. The pull request is an action of contribution and curatorship, the fork is a mechanism of inclusion, insuring that all research is given the opportunity to be found, used and developed.

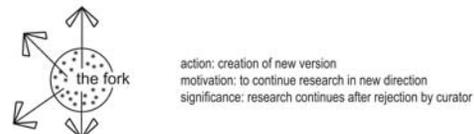


Figure 5: The Fork

#### 4.4 Interdependency of Elements

The four proposed elements of the organizational flow only serve to define specific points in an iterative process. It is their relationships, connections and requests that create a natural process of curatorship.

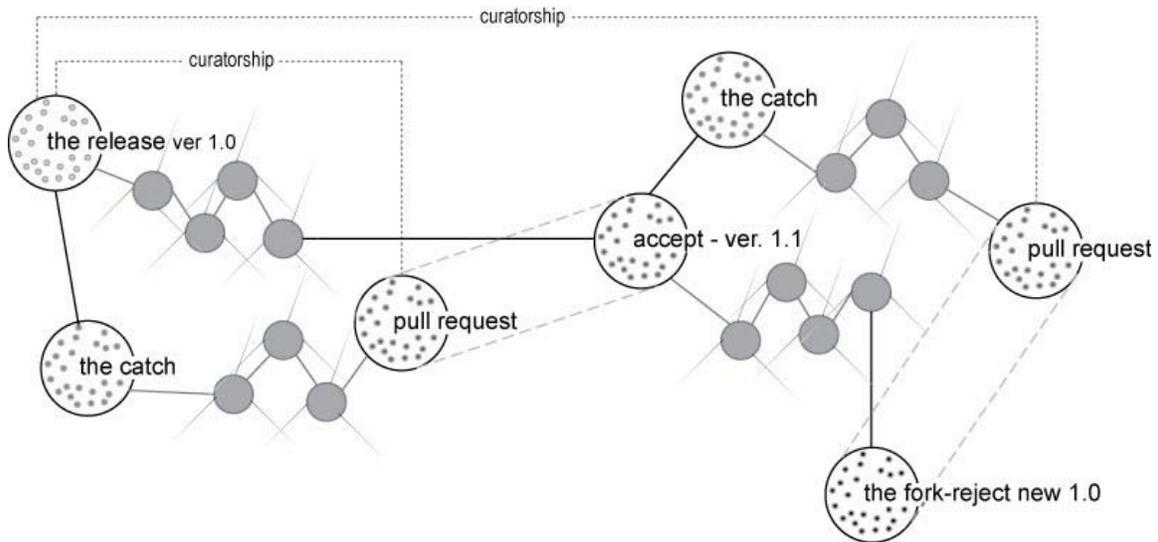


Figure 6: System Interdependency (variation)

Natural curatorship is a process whereby peer-review, or curatorship, occurs only as needed and is conducted by the beneficial nature of new research within the organization flow (i.e. does this new or developed research help me?). It is the need for new sets of data (the catch) or with the decision to, or not to, incorporate new findings (the pull request and the fork) which triggers curatorship. Although there are a multitude of possible relationships, there are only a few key relationships that define the organizations flow.

*The release* and *the catch* have a symbiotic relationship. The catch researcher needs new research and the release researcher needs further development. Since the flow is structured to be controlled from the bottom-up the Release researcher does not have the ability to request specific development (so not to limit scope), this is decided by the catch researcher in a self-guided exploration. At this stage of the relationship, the research can respond in one of three ways; 1) the research can be developed in parallel (indicated by the filled circles in Diagram 5), 2) it can be returned for incorporation of the whole (*pull request*) or 3) it can fork (by choice or denial by originator). Prior to the pull request, there is natural curatorship. The catch is driven by demand, if the research is not relevant, it will not be caught nor developed.

*The pull request* and *the release* are defined as a question rather than as a relationship.. The pull request is simply a request, or an offer, to incorporate new findings into the original release of research. This is a critical point of curation when the originator decides relevance of the new findings based on the original intent of the release. Denial of incorporation is not necessarily a negative response to new work but an assertion on the part of the curator to maintain an appropriate roadmap for the project. In fact, the denial of a pull request can be seen as a complement, the curator may feel that the new findings have contributed significant new knowledge that should remain separated (or fork) allowing for further development by others (a new *catch*).

*The fork* is a new starting point, and it is related to previous releases through a parent-child relationship. It is the benefactor of transferable knowledge but is a contributor for potential new catches. The fork, in many ways, exemplifies the organizational flow. It is the child of the release, the catch and the pull request, as well as a product of curatorship. This does not mean the fork's research is immediately relevant and significant. Since natural curatorship on the original line of research continues with a new catch, the point of the fork is a *project stub*. A project stub is one that shows potential but needs developing. Every fork will produce a main line of enquiry and a stub line left for

later expansion. If both lines of the fork are developed, it may be that parts of the development line of the second is considered for reintegration into the first if there is relevance.

It is these four elements and their connections where relevance is decided. What can not be described in this proposal is the results of such a system when fully aggregated. Each of the four elements can branch to create new vectors of research growing the knowledge base exponentially. The aggregation of curated research will take on its own significance, one that will only be apparent in retrospect.

## **5.0 Conclusion**

The systems tests and proposed system elements examine how to integrate scientific research, product innovation and deep knowledge within associated, allied and external disciplines into a design process which tends to ignore, eliminate or discount this knowledge as a relevant design factor. The analysis and subsequent proposals also speculate the start of a culture of transferable and repeatable knowledge in the architectural design community. So often, design is treated with the Hegelian legacy of genius and intuition, with each architectural designer seeking inspiration from personal sources, rather than drawing from a deep database of social, cultural and technical predictability premised on integrated technical components within an aesthetic and formal system. Now the cultural and technological conditions have allied for architectural research to become less introverted. The opportunity exists for a new design culture, one rooted in research, openness, innovation and transferable knowledge, which places the advancement of the profession over oneself.

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# A Research Protocol for a Field Study of Behavior, Comfort, and Energy Consumption in Student Residence Halls

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## Abstract:

A research protocol was developed for a field study of occupant behavior, thermal comfort, and energy consumption in two residence halls, one old and one new, at the University of Oregon in Eugene, Oregon. Three methodologies were used in the investigation: an online occupant survey, data logging of thermal conditions within the buildings, and the collection of electrical utility data. In response to university concerns, the study protocol was carefully devised to prevent intrusive contact between the investigator and the student residents as well as to limit the number of times that housing staff would need to provide access to the buildings. Data collection over a three-week period, beginning in late October 2009, indicates that the procedure outlined can be effectively utilized to investigate residence hall living environments with little disruption to student and staff routines.

## Keywords:

Residence Halls, thermal comfort, energy consumption, behavior

## Introduction

Student housing on college campuses began as early as the 12<sup>th</sup> century in France, England, and Germany.<sup>i</sup> Over the centuries various terms have been used to describe these living environments: hostel, hall, college, halls of residence, and dormitory are, perhaps, the most common.<sup>ii</sup> More recently the term “residence hall” has come to symbolize institutional housing that satisfies student needs for affordable, comfortable, and safe accommodation, and contributes in a positive way to academic and personal development.<sup>iii</sup> Consequently, the term “dormitory” has fallen out of favor because it has come to symbolize an

antiquated idea of institutional housing in which students merely sleep and store their belongings.

Student housing has been an integral component of American higher education since the founding of the first colonial colleges.<sup>iv</sup> However, it was in the years after World War II that colleges dramatically increased their student housing stock in response to increased enrollments and the availability of federally subsidized construction loan programs.<sup>v</sup>

Indeed, the majority of student housing at colleges and universities dates from the 1950s and 1960s. At that time, the priority was to economically house as many students as possible. These buildings have functioned as the workhorses of student housing ever since. Within the past decade, however, a new breed of residence hall has emerged that directly responds to increased student expectations and institutional commitments to student needs and environment concerns.

New residence halls differ substantially from their predecessors due, in part, to their advanced environmental systems, energy efficiency, and greater opportunities for occupant control. However, studies of other building types, such as offices, have found that occupants appear less willing to take action to adjust their comfort in the presence of sophisticated systems that regulate environmental conditions.<sup>vi</sup> Furthermore, many institutions have been unable to build or renovate residence halls at a pace that satisfies the student demand for newer housing. As a result, students attending the same institution are often housed in vastly different living environments.

## Objective

A large number of residence hall studies were completed in the 1960s and 1970s. Much of this research focused on social interaction, academic achievement, room layouts (suites vs. doubles), and building types (towers vs. low-rise). Robert Sommer, the noted psychology researcher, speculated that the widespread use of college dormitories for research studies is due to the large number of study subjects in close proximity to academic researchers.<sup>vii</sup> However, institutions now appear determined to dispel the notion that college students living in residence halls should be “easy targets” for research samples. This may help to explain why fewer studies have focused on residence hall environments in recent years.

Nevertheless, there is a lack of residence hall research related to occupant comfort, energy consumption, and the role of building age on occupant behavior. Therefore, the primary objective of this research project is to address these gaps in the existing body of residence hall research.

Despite the procedural challenges inherent in conducting research in residence halls, information related to behavior, comfort, and energy usage in these buildings could assist institutions in providing superior campus housing that improves student satisfaction, productivity, achievement, and health in addition to reducing energy costs, waste, and environmental impact.

### Approach

The field study focused on two residence halls at the University of Oregon in Eugene, Oregon: Riley Hall was built in 1963 and the Living and Learning Center (LLC) South was built in 2006. The intent was to investigate occupant behavior and physical conditions related to comfort and energy consumption in two residence halls of different vintages. The buildings were specifically chosen for their similar size, number of occupants, and numbers of double and single bedrooms (Table 1).

	Riley Hall	LLC South
Age (year built)	47 (1963)	4 (2006)
Gross Sq. Ft.	42,719	48,748
Net Assignable Sq. Ft.	22,355	26,280
Bldg. Efficiency	0.52	0.54
Occupancy	143 (56 male, 44 female)	165 (41 male, 59 female)
Number Double Rooms	70	77
Number Single Rooms	10	11

Table 1: Building Comparison.

Riley Hall is located five blocks from the campus and was originally built by a local hospital to house nursing students (Fig. 1). The university purchased the building in 1987 and it is scheduled to be demolished in 2013 in accordance with the Housing Strategic Plan.<sup>viii</sup> The three-story building is located on a corner lot along a busy arterial road. The hall is rectangular in plan with student rooms predominantly oriented north and south. Student rooms are small: 163 square feet for doubles and 88 square feet for singles. Bedrooms have operable windows and simple, numbered thermostat controls. The building is not air-conditioned. Corridors are long and narrow (approximately four feet wide). An open courtyard provides natural light and ventilation to parts of the upper floor corridors. Student rooms occupy the 2<sup>nd</sup> and 3<sup>rd</sup> floors. The ground floor is predominantly lounge space. The entire building is card-access only.



Figure 1: Riley Hall Residence Hall.

LLC South is located on campus near other existing residence halls (Fig. 2). It comprises one half of a larger complex. The LLC Complex was the first new residence hall built on the campus in 43 years. The four-story building is “C” shaped in plan with student rooms predominantly facing north and south. Student rooms are large: 215 square feet for doubles and 139 square feet for singles. Bedrooms have operable windows and electronic thermostats. The building is not air-conditioned. Corridors are broad and well lit. The ground floor includes lounge spaces, a performance space, a small number of student rooms, and an apartment for housing staff. Several ground-floor public spaces are open and accessible to the entire university population, but the student room areas are card-access only.



Figure 2: LLC South Residence Hall.

## Methodology

Three research methods were utilized in this field study investigation: occupant surveying, thermal data logging, and electrical utility data collection. A *dominant-less dominant design*, as described by Groat and Wang,<sup>ix</sup> was developed in which the survey data assumes a *dominant* role and the thermal and utility data assume *less-dominant, or supporting*, roles. Using a combination of research methods is common in field studies and helps to balance the strengths and weaknesses inherent in individual data collection strategies.

## Occupant Survey

Surveys have been widely used as research instruments in studies of thermal comfort, energy consumption, and residence halls. Several recent studies by Petersen et al.<sup>x</sup> and Devlin et al.<sup>xi</sup> have successfully utilized web-based survey methods in combination with incentives to encourage student participation. When compared to traditional paper surveys, online surveys offer researchers investigating residence halls several key advantages. First, they are less costly because no printing or mailing is necessary. Second, they do not have to be manually distributed to individual student rooms, which is time consuming. Third, they can be accessed and submitted at any time via the web, which eliminates the risk that students will misplace or forget to return their paper survey. Finally, they enable investigators to administer the survey without having to interact directly with the survey participants, which was a significant concern at the University of Oregon. For these reasons, a web-based survey was created and administered using SurveyMonkey.com. Basic surveys created using the

SurveyMonkey website are free of charge, however a monthly subscription service was purchased for this study, which provided an expanded range of options (Fig. 3).

The survey was comprised of an introduction and consent page, an instructions page, 29 questions on 12 separate pages, an opportunity to be entered in an incentive prize drawing, and a concluding thank you page with contact information. The survey questions were divided into five sections, which asked students: their perceptions about their room; their routines and actions in their room; their perceptions and actions in common spaces such as lounges; their overall residence hall experience; and demographic information. The divisions helped to organize the question types and to give participants the sense that they were making progress toward finishing the survey.

Figure 3: Page from Online Survey.

Survey questions were predominantly multiple-choice. 5-point Likert scales (for instance: never, rarely, sometimes, often always) were heavily used in sections 1-4 and enabled ordinal-level measurements. An "other" option was often included so that respondents could type-in additional information. Few entirely open-ended questions were given. Respondents were typically asked to comment on the one-month period that they had lived in the buildings since the beginning of the academic school year. This was important because accurately recalling experiences beyond recent memory can be challenging for survey takers and can produce inaccurate data for investigators.

Random sampling methods were not possible given the limitations imposed on this study by the university. Therefore, purposive sampling methods were used in the selection of survey subjects. All residents in each of the two buildings investigated were given an opportunity to complete the survey.

A survey pretest was conducted using 10 students who did not live in either of the two buildings being studied. Pretest respondents were given an opportunity at the end of the survey to provide suggestions for improvements to the survey organization and question wording. This feedback was used to modify the final version of the survey.

Printed fliers were the primary respondent recruitment method. Housing staff agreed to hang color fliers on bulletin boards, to distribute black and white fliers beneath student room doors, and to send one e-mail to the hall residents at the very beginning of the survey period.

The online survey ran for two weeks. A customized online URL weblink was created to enable respondents to easily access the survey page.

### **Thermal Data Logging**

Six factors, or parameters, affect thermal comfort conditions in buildings: air temperature, relative humidity, air movement, radiant temperature, metabolic rate, and clothing insulation.<sup>xii</sup> Typically, thermal comfort field studies measure the first three factors with instruments and calculate the later three factors from measurements and questionnaire data. The six parameters are then compared with occupant responses to questions related to thermal comfort at the time the measurements were made. This procedure is effective when large numbers of occupants can be surveyed in a single space, for example in offices or school classrooms.

Because residence halls are compartmentalized into large numbers of bedrooms, they present unique challenges for thermal comfort research. Measuring separate student rooms would be prohibitively time consuming and intrusive to students' personal privacy. In addition, arranging separate meeting times with all building occupants given the access limitations was not logistically possible. Therefore, small HOBO U12 data logging devices were used to measure temperature and relative humidity conditions every two minutes over a three-week period in

four representative rooms and one outdoor location in each residence hall. Within each of the buildings being studied, three Resident Assistants (RAs) volunteered to have the data loggers mounted in their rooms, one data logger was placed in a student lounge space, and one data logger was mounted to the outside of a window.

All data loggers were placed within protective cardstock boxes (Fig. 4), which obscured the data logging devices from view and included a label stating "Temperature Experiment in Progress. Please Do Not Distrurb." The investigator's contact information was also listed. The boxes were mounted to wall and window surfaces using 3M Command™ adhesive strips, which did not leave any residue when removed or damage painted surfaces.

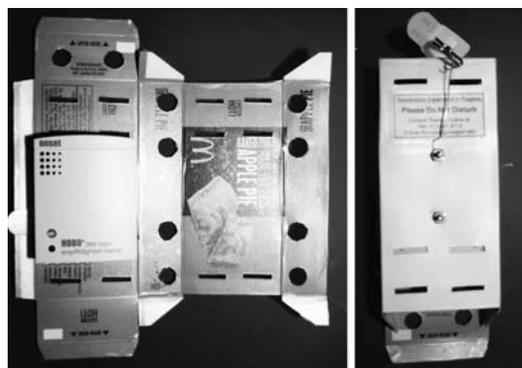


Figure 4: Protective Boxes for Data Loggers.

### **Electrical Utility Data**

The residence halls being investigated used the same utilities: steam and electricity. However, submetered steam consumption for the newer building (LLC South) was not available. Therefore, the study looked only at electricity consumption in the buildings. Electricity meters record kilowatt-hours (kWh) of power usage and are read monthly.

Utility data was provided by the Department of Utilities and Energy Management rather than being collected directly. This arrangement posed significant limitations on the study because the only available data was collected by someone other than the investigator. In addition, the data revealed complexities within the building metering that were not anticipated by the university or the investigator during the planning stages of the study, which impacted the data analysis process toward the end of the study.

## **Data Collection Procedure**

The data collection procedure was devised to accomplish the following objectives: to work within the limitations of a 10-week academic term; to limit intrusive contact with students living in residence halls; and to limit the amount of assistance and access that housing staff would need to provide during the study.

Several months before the survey and physical measurements began, a meeting was scheduled with the Interim Director of Housing to discuss the proposed research project in two residence halls. At a second meeting several weeks later, University Housing agreed to allow the study to take place in Riley Hall and the Living and LLC South building. Intrusive student contact and building access were to be minimized, but mounting data loggers in the building and conducting an occupant survey were approved.

One month before the study commenced, the final survey was submitted to the university as part of a required Human Subjects Protocol Application process. The application was approved in mid-October after several minor revisions were made.

The data logging commenced on Monday October 26, 2009. Five data loggers were mounted in each building. RA's provided access to the buildings and to specific rooms and supervised the mounting of the devices. The process took approximately 30 minutes in each building.

One week later, on Monday November 2, 2009, the online survey was launched. Fliers were given to housing staff several days prior to the launch for distribution under doors and posting on bulletin boards. In addition, an e-mail was sent by the housing staff on the day of the launch.

Later that week, during the second week of data logging, the devices in each space were checked. The procedure was to plug the data loggers into a laptop computer, download data logged to date, and check that the device was operating properly. Data logging was not interrupted while the devices were being checked. The process took approximately 30 minutes in each building.

On Monday November 16, 2009, two weeks after the initial launch, the online survey access was closed. The survey data was saved in spreadsheet format for future analysis.

The data loggers were removed from the buildings after the survey period ended. RA staff, once again, provided access to the buildings and specific rooms and supervised the collection of the data loggers. Each device was connected to a laptop computer and the data logged over the three-week period was saved in graph and spreadsheet formats for future analysis. The process took approximately 20 minutes in each building.

Survey respondents were given the opportunity to submit their e-mail address to be included in an incentive prize drawing for one of four \$50.00 gift cards to the school bookstore. The four prizes were given to the housing staff to distribute to the student winners during the week after the survey ended.

Monthly utility data for 2009 was requested in October, but was not available from the university until mid-January 2010. The data was obtained from the University of Oregon Department of Utilities and Energy Management in the form of spreadsheets.

## **Conclusion**

The research protocol described in this paper takes into account many of the challenges inherent in fieldwork within student housing facilities. The procedure was effectively implemented in two residence halls at the University of Oregon and could inform future studies in similar living environments. The lack of recent residence hall research may be due, in part, to the types of institutional concerns for student privacy and safety that were encountered in this research investigation. Nevertheless, carefully conceived research protocols may be one way to increase the number of studies being conducted in residence halls while providing assurance to institutions that intrusive contact between students and researchers can be minimized.

## **Acknowledgements**

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# INEFFICIENT BY DESIGN

## Habitat for Humanity in North Philadelphia

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### Abstract

The paper traces the evolution of a Habitat for Humanity over twenty-five years in its inner-city North Philadelphia neighborhood, focusing on the design of Project 1800, a half-block complex of new and renovated houses and outdoor spaces. The project was the local affiliate's most ambitious undertaking and redefined its modest house-by-house approach to providing homes to poor families. It sought to build upon the practice of repairing and healing the city fabric (Sennett, Alexander) to generate a new spatial structure (Alexander). Together with the Habitat staff and residents, a small team of architects and landscape architects would interrogate the complex problem of re-inhabiting abandoned neighborhood space in a human-centered paradigm. In order to sustain an emergent wholeness of place we grappled with several issues: How to make more potent the "inefficiencies" of human engagement in the design and building process while increasing production? How to reinterpret patterns inscribed in the physical fabric in response to fundamental change in habits of dwelling? How to create a porous environment that connects the individual to larger social and natural realms while maintaining boundaries that provide a secure foundation for dwelling? Without the funds or capacity to produce at a large scale, the design inventions in Project 1800 drew on its most available resources – time and collective imagination.

### The Growing Whole

When Habitat for Humanity opened its affiliate in North Philadelphia in 1985, circumstances in the city were bleak. Since its high point in 1951 Philadelphia was losing population at an alarming rate. In four decades the

unstaunched flow of the working and middle class from the city left North Philadelphia neighborhoods frail. The residential fabric mostly built in the decades following the Civil War for the middle and working classes had been neglected since the Depression, with racially-biased disinvestment and the post World War II middle class exodus further driving its decline. The collapse of an industrial economy had left huge rifts in the urban landscape and along with it a regular rhythm of empty lots where the micro-economy of small mom and pop stores had once anchored the neighborhood block structure. Virtually every corner was now vacant, and small services like laundries, garages and repair shops remained abandoned until demolition became inevitable. Urban Renewal had either done its job too well, relocating residents of decaying neighborhoods to superblocks of public and quasi-public housing, or it had defaulted halfway through its mission leaving behind territories of disinherited space un-built for decades.

Into this unstable landscape Habitat for Humanity ventured, establishing a modest foothold in a depleted several block area west of Broad Street. Without literally demarcating boundaries, the nascent North Philadelphia affiliate identified a focus area with deliberate care, settling in uncontested space near but not adjacent to Temple University, and in an interstice between the territories claimed by existing non-profit community development corporations competing for slim resources. Obligated by charter to abstain from taking public money Habitat North Philadelphia would follow a course that was less hampered by local money politics. (Tyree, 2003) Its work would take place at its own pace with productivity measured by its own terms.

While Habitat North Philadelphia was forming, it purchased vacant auto repair building providing its operational center - workshop, storage and eventually the office. Extending from 19<sup>th</sup> Street through to Gratz Street, the workshop's physical presence embodied commitment to the place, where the energy of on-going work could be seen, heard and felt. It became, as a matter of practice the nucleus of the emergent neighborhood that developed over time as Christopher Alexander calls a "growing whole" where

increments add to and continuously redefine the organism. (10-22) Over twenty-five years sixty-seven new or rehabilitated houses have been built – and built in a pattern that is distinctly unlike that of contemporary urban redevelopment --neither with the passive opportunism of “scattered site” infill development adopted by the public housing agencies, nor with the spectacle of brand-newness which characterizes large clean sweep urban renewal projects. Rather, Habitat’s projects began close to the incubating body of the workshop, circling it and then spiraling outward, growing organically, centering its activities and catalyzing further growth. (Fig. 1)



Fig.1: *Habitat Growth and Neighborhood Impact Patterns 1985-2009* (image T. Nawrocki)

Habitat is focused on people and place rather than simply production; the practice of volunteer participation and homeowners’ contribution of sweat equity makes the work a slow, freighted process. Looking back, the affiliate’s first director described the work as “inefficient by design” (Tyree 2003). Operating as part of a complex physical and social fabric, the construction of each dwelling carries with it the real weight and density of a deeper situation: it must weave

together the collective lived histories embedded in the neighborhood, engage the crossings of multiple urban trajectories, and speak to the private desires for growth and renewal that collectively build community.

### **Learning to Build in the City: Healing and Repair**

*Every increment of construction must be made in such a way as to heal the city... the word “heal” must be understood in its old sense of ‘making whole’. It includes not only the repair of existing wholes, but also the creation of new wholes* (Alexander 22)

The North Philadelphia Habitat was one of the first affiliates to be established in an inner-city, and at that time the parent organization had little to offer as a model for building in the urban situation where context was a strong presence. From its origins in rural Georgia, Habitat for Humanity’s objective of providing “simple decent housing for people in need,” was fairly uncomplicated: its detached one story wood frame housing was relatively easily built and did not need to negotiate the layers of existing social and physical realities found in a city site. The fabric in North Philadelphia, though aged and deteriorating, was nevertheless deeply inscribed and complex requiring a more nuanced approach to design and building.

Being inextricably bound to its place of operation the affiliate learned by trial and error to build in the city, gradually developing skill at using what sociologist Douglas Harper calls “live intelligence, fallibly attuned to the actual circumstances” (qtd. in Sennett p 199). Its first foray into new construction problematized the issues of intervening in an urban site. As a large vacant lot became available the young affiliate eagerly set about to make an impact on the neighborhood, and using plans borrowed from a suburban affordable housing developer, constructed ten new houses. Although it satisfied an immediate need for affordable housing, as an urban project it was opaque: it did not heal the city or make a new whole that would add to the organic growth of neighborhood. Low slung the homes seemed to shrink from neighborhood, and the car placed unsociably

between sidewalk and dwelling, permanently undermined the trace of street life that still existed.

Recognizing the project's weakness, the affiliate reconnoitered, and refocused its attention on rehabilitating abandoned row houses on the small streets adjacent to the new development. Healing and repairing the urban fabric became also a means of knowing the structure of the city from inside out. As Richard Sennett says in his book, *The Craftsman*, making and fixing are parts of a continuum. "It is by fixing things that we often get to understand how they work," (Sennett, 19).

The simplest way to make a repair is to take something apart and fix what's wrong, then restore the object to its former state. This could be called *static repair* ... A *dynamic repair* will change the object's current form or function once it is reassembled... A dynamic repair may involve a jump of domains, as when a mathematical formula corrects defects in observed data. Or a dynamic repair may invite new tools for working with objects." (Sennett 200, italics mine)

Indeed, the process that restored these houses to their former state revealed the inherent limitations of the existing type: 800 square foot homes on tiny lots could not accommodate Habitat's primary goal to provide for growing families who would stay and build the community. Through this careful process of static repair emerged a strategy of *dynamic repair* that would solve the problem of the too small house. The next project was more complex. By reassembling adjoining shells in various configurations the affiliate could create comfortably sized houses. Inside, kitchens were moved to the front and the utilitarian back sheds were rebuilt as well-fenestrated two story additions. Widened stairways extended the depth of the building, landing next to and expanding the zone of the kitchen. Reflecting on her experience, a new homeowner described a simple pleasure afforded by the design:

In the summer I can watch my kids out on the street from the kitchen and in the winter while I'm cooking my kids play on the stairway, smelling

what's coming up for dinner. It's nice family time. (Seitz, 2000)

### **Context of the City: Going to Scale**

As Habitat North Philadelphia undertook this process of urban repair it sought out Temple's departments of architecture and landscape architecture to join with them in conceptualizing new patterns of dwelling and neighborhood space at a larger scale. It was clear that the sea change of population loss and lowered building density in the post industrial decades was an irreversible fact needing a new paradigm for rebuilding neighborhoods. But the erase-and-replace strategy in play by the city and its development partners was not useful for the community-building agenda fundamental to Habitat mission. Taking into account the web of existing and emergent conditions in North Philadelphia's neighborhoods, our work would provide the basis for building an alternative vision.

We were alarmed by the market-driven policies that were reshaping whole cloth former urban neighborhoods. Philadelphia had inaugurated a new anti-blight program, the Neighborhood Transformation Initiative, which sought to repopulate abandoned city neighborhoods. Well-intended, but in a top-down process so much like those of past redevelopment initiatives, the city targeted blighted neighborhoods, properties were taken by eminent domain, residents were relocated and land cleared, eradicating traces of inhabitation embedded in urban landscape. New construction could proceed uncontested by neighbors and unfettered by existing buildings. With tax abatements and the flow of subprime mortgage money, what had begun as a trickle of interest from the private sector soon became a land rush as new markets in the inner-city emerged.

The large sites were rebuilt from scratch with a vision of low density suburban site planning, reducing densities from forty to twelve units per acre. The projects produced a new urban text that was flaccid, a field of objects surrounded with space leaking in all directions, without the energizing force of complexity, wholeness or continuity. Housing was designed with surface charm in hope of coaxing those people with middle class aspirations back into the city -- as

if by living in these homes they might complete the image. (Harrison, 1999) In this banal utopian vision, efficiency was the rule; repair was its antithesis.

In this context we formed our partnership with Habitat. Starting out we volunteered on-site so that we would share in their perspective of hands-on engagement, and as we gained our footing, began exploring the larger context. We formed a team of academics and neighborhood residents that walked the community and made detailed site-generated physical mappings of current conditions. Combined with demographic and historical research, these produced a narrative of the place at the crux of transition.



Fig. 2: *North Philadelphia's deteriorated context*

Among our observations were how the culture and the of the street had been transformed with the erosion of the building fabric, and that the existing row house types were often poorly attuned current habits of living – either too small for families (as was apparent on Morse Street) or too large to maintain, and with minimal private outdoor space. The primary grid streets were originally built up with large row houses which when converted to apartments became overcrowded and poorly maintained by absentee landlords. The properties decayed, and were abandoned creating uninhabited territories that had lost structured urban purpose. Beaten paths cut shortcuts diagonally across long partially eroded blocks. (Fig. 2) The overriding impact on the street life was profound - functioning now as corridors for fast-moving traffic they were dangerous to pedestrians and had been easily appropriated by the drug trade.

But within this overall pattern of decay we had also found places that were remarkably robust. Tucked within the grid were small intact enclaves one or two blocks long that seemed to have been untouched by the collapse around them. The houses were, atypically, of a medium size and fit well with the street scale. Strong spatial boundaries defined these intermittent streets, and freedom from through traffic allowed to residents claim the place as a whole. From the well maintained houses, to the in-between space furnished with lawn chairs and planting pots, to the sidewalks shaded with street trees, this kind of place could inform Habitat's understanding of how to build in the city. Seeing the possibilities for dwellings pattern that could reconcile the current housing needs with the problem of incremental urban growth, we turned our attention to planning and design for the Habitat neighborhood – a decade long undertaking that would involve partnerships with neighbors, builders, city agencies and affiliated professionals.

Beginning with the home – the basic neighborhood building block - we proposed a concept for new mid-sized infill house that would draw upon both our site observations and essential lessons about light, living space and material context learned from the reconfigured row homes being built on Morse Street. Several empty lots across the street would provide a testing ground for new construction that would make this tiny block whole. The ideas were passed on to another architect and the project was realized as three pairs of twin homes, simple, generous and neighborly. As an infill project it was small enough in scale to circumvent the parking requirement so the homes could be tightly packed, maintaining the rhythm of the street. Free of the structural uncertainties of renovation, the homes could be constructed with longer span floor joists and truss roof framing. A language of building that was both locally responsive and technically appropriate began to emerge. Through a process of learning from the patterns of the city, healing and repairing the fabric, engaging the deep structure of the place, Habitat was prepared to take its next step.

## **Growing a New Structure: Project 1800**

In the process of growth, certain larger structures, or centers emerge. These larger centers are distinct and recognizable entities, larger than any individual building... these centers emerge slowly. That is, there is no one act of construction which totally produces one of these structures by itself... These larger centers [...] take shape gradually and are always surprising, even to the people who helped create them. (Alexander 1987, 39)

Challenged, but ready to take on a larger project in its own terms, the Philadelphia affiliate sought to step up its production. Having steadily acquired vacant uncontested properties before the building boom had made them a market commodity; the affiliate had assembled a relatively large site ready for a new more ambitious undertaking. Dubbed Project 1800 because of its street addresses, the work would focus on the larger half of a block directly behind the Habitat's workshop, bordered by the 1800 blocks of Gratz, Montgomery and 18<sup>th</sup> Streets.

Project 1800 would have the complexity to make a "jump of domains" as Sennett would say, or, in Alexander's terms, to grow new structures for collective inhabitation. We worked with the affiliate to develop a practice of community-building through design as we began to plan the project. Together we would grapple with questions that address the multi-scalar phenomena of urban living and the practice of building as a social enterprise: How could we make more potent the "inefficiencies" of human engagement in the design and building process while increasing production? How might we reinterpret patterns inscribed in the social and physical fabric in response to fundamental change in habits of dwelling? How would we be able to create a porous environment that connects the individual to larger social and natural realms while maintaining boundaries that provide a secure foundation for dwelling?

Habitat had not yet identified the future homeowners so we developed the program for the design of site and dwellings

based on an accumulation of shared knowledge about the place derived from discussions with recent Habitat homeowners as well as those had lived in the neighborhood for years. A distinct sense of belonging emerged as residents began to project ideas about a development that they would not inhabit themselves but would impact and serve the larger community.

They were pleased to live in a neighborhood alive with the positive pro-social activity of daily construction, but they were distressed about the threat of crime came at nightfall. They wanted to reclaim in-between spaces, like their front windows and stoops, to watch over and engage the neighborhood. Parents yearned for safe space for their kids to play after school that they or their neighbors could informally supervise. Elderly residents reflected on their childhood experiences in the rural south where connection with the natural environment was seamless; here it was interrupted. One whose house front was planted with climbing roses described her dark but lushly decorated interior as a "garden without sunshine". Younger adults in the community talked about the tensions of living at close quarters with parents, and how their houses could not accommodate different spaces to gather. Families --often multigenerational and with changing household members - needed more fluid living space, more privacy, and unchartered space. And they needed space for the car.

The site was complex. The block at its south end was largely open from previous slum clearance initiatives, but in places it was peppered with existing houses, some vacant in various conditions, and some populated with families living in homes, retaining a tenuous foothold in a rapidly eroding fabric. The surrounding streets were also diverse in character: Montgomery, a once elegant street but now decimated and virtually devoid of context, fast-moving 18<sup>th</sup> street with its dilapidated three story row homes, and narrow, intermittent Gratz Street with a hodge-podge of three and two story dwelling, one-story gabled garages and the rear access bays of the Habitat workshop.

To bind together this uneven social and physical fabric we needed a pattern that would address lower building density without resorting to inner-urban sprawl. The city's current

preferred house-type -- the twin home with porches attached to the front and parking to the side - was a strategy so rigid that it demanded a fully cleared site. We settled on a tactical approach that would weave new housing into the existing fabric in a way that would rebuild the integrity of the street as a public space and allow a diversity of dwelling options. Vacant viable structures of various sizes would be rehabilitated and new attached homes would be introduced in groups of three, four and six filling in gaps between existing occupied dwellings, and establishing an anchoring presence at the open corner.

Of the many issues that had surfaced in Habitat's incremental process of building, the possibility of introducing new systems of positive open space had yet to be examined; but in design at a larger scale it was now relevant and critical. Ironically it was in seeking a solution to the most mundane and functional requirement -- parking the car -- that could generate a vision for incorporating collective outdoor space. Looking closely at the block structure we found a pattern that had all but dissolved in the physical decay but remained inscribed in the urban landscape. Long three foot wide alleys ran the length of the 19<sup>th</sup> century blocks, and were part of the street structure. Once providing rear egress from the densely built row house streets they were no longer used and regarded as a safety and security liability by residents. Narrow and overgrown, and often blocked with debris, they could harbor vermin and camouflage intruders. But reinterpreted they might provide a new kind of space. We proposed a scheme that re-envisioned and restructured the alley as a widened path that cut z-shaped through the center of the half-block. All homes, including those already occupied, would share the internal space; and would engage the different public domains of the three streets that defined the site's perimeter. The internal space could accommodate car-parking without eroding the street wall and provide space for play and informal communal gathering. This was in a sense dynamic repair at a site level, jumping from the domain of the traditional block, to a new urban structure.

A strategic idea, it developed tactically, with bends that navigated around existing lot lines, creating room-like

subspaces within. The pattern of the well-inhabited short bounded block that we had observed in our context research had resurfaced transposed to the interior of the block -- woonerf-like in between private and public. (Fig. 3)



*Fig. 3: Site axonometric Project 1800: Reweaving and reinventing the existing fabric*

And not unlike the mid-block beaten paths we had observed in our preliminary research, this space was a new kind of pore (Starvrides, Benjamin) in the larger urban fabric.

With a footprint half again as wide as the traditional row house, the infill homes would provide comfortable dwelling space. The unit design grew out of neighborhood discussions about program. Front porches, though not part of the existing typology of the area, were introduced as a vital social filter between the public and private domains. These were compressed into the façade of the new homes, both intervening and rebuilding the scale, rhythm and materiality of the street. Quite compact at 1350 square feet particular emphasis was given to the spatial qualities of the shared living areas. (Fig. 4)

Large windows and an additional foot of ceiling height would increase scale and porosity inviting natural light, view, and a flow of fresh air could create connections with social and natural worlds beyond the dwelling. The living

room was placed at the front of the house with large front windows on the street and kitchen and dining areas at the back over-looking the garden and the larger space of the



*Fig. 4: Project 1800 Phase I: Montgomery and Gratz Streets*

common driveway court beyond. Configured in an “L” the ground plan would capture part of the private outdoor space in a deck connected to the garden. The units could be built to accommodate either three or four bedrooms, with the potential for two side by side bedrooms to be converted to a large loft-like sleeping space, as household configurations changed. A deep basement, unfinished but well lit was included at the encouragement of the neighbors who advised during the design.

### **New Domains of Engaged Practice**

As the project moved from design we collaborated with an architectural firm to assist with documentation, and we were joined by an unlikely new partner, a suburban developer with an interest in supporting Project 1800 through the firm’s fundraising capabilities and professional experience in producing residential construction on a large scale. As designers who believed in the Habitat’s demonstrated commitment to place-making as a social operation, we were leery, but recognized that affiliate’s aspirations could not be accomplished alone. With a construction manager and three staff carpenters directing revolving teams of unskilled volunteers, and only subcontracting to specialized trades, the affiliate did not have the capacity to execute this complex project.

But having begun experimentation in the Morse Street twins with new construction methods, Habitat was ready

move into the next domain of engaged practice – one that would carefully combine site-based volunteer building with standardized production. (Fig. 5)

The developer proposed a method of panelized construction that would dramatically increase the efficiency of framing hitherto done by stick building. He offered his shop and framing team to produce wall panels sheathed and with openings in place. These would be trucked to the site and could be rapidly erected once the foundations and piping had been laid. Framing Project 1800 would have the effect a series of mini “blitz builds” with teams of volunteers following behind the construction crane and a small army of professional builders. In the first phase, the erection of wall panels and the installation of floors and roofs took less than two weeks. The open corner at Montgomery and Gratz Street, inert for so long had very visibly come to life. Framed, the project was ready for full participation.



*Fig. 5: Diverse building methods and housing types*

Meanwhile a steady program of renovations to the vacant homes gradually restored the fragmented existing fabric. A range of housing opportunities and a heterogeneous approach to rebuilding responded to diverse needs and possibilities for engagement. While the initial construction was planned the Habitat was identifying homeowners. The momentum created by the increased production also created a new domain of practice in homeowner participation and community-building. Now multiple families were engaged in the sweat equity that was an essential

component of the Habitat ethos. Far from undermining the beneficial inefficiency of holistic process, the accelerated pace of production had created a critical mass of communal participants. Working on their own homes as well as those of their neighbors, new homeowners developed an esprit de corps. As each of the subsequent phases of Project 1800 were initiated, homeowners who had already moved in organized celebratory barbecues in the emerging communal space at the center of the block. The excitement of shared participation in the process of building a new place, larger than their individual dwelling, grounded friendships that have been sustained to this day. (Musselman). In recent walk around the neighborhood, one of the original homeowners proudly gestured to the four houses on Montgomery Avenue where she and her neighbors live: "Oh yes, I built all of these houses." (Hall)

### **Emergent patterns of dwelling: Post occupancy observations**

Neighbors who had helped in the design process had a stake as well in the new project. The quality of life on their blocks in terms of both neighborhood appearance and defensibility had been tangibly improved as each new home became occupied. A privately owned drug house located directly in the middle of Gratz Street that Habitat had struggled for years to acquire or have shut down was finally surrounded. With more eyes on the street, and the back now giving out to a communally supervised space, its denizens were no longer able to operate freely and the drug dealers abandoned the property as the last phase of Project 1800 was completed. Indeed the neighborhood as a whole has been remarkably free of crime. (Musselman). Other privately owned vacant houses not owned by Habitat had begun to have a market appeal and several were bought and renovated by private owners. (Fig. 1) One enterprising resident rehabilitated a long abandoned corner store at the center of the neighborhood near the Habitat workshop. The new market is a convenient and busy center for informal neighboring. Ironically the emergent nuisance is the influx of university students into the neighborhood. (Hall, 2010) Fortunately Habitat's mortgage policy is an excellent hedge against gentrification.

The new homes of Project 1800 have been inhabited over several years, with the final renovation on Gratz Street completed in the fall of 2009. Only one house – a very early renovation -has been resold; the owner having found work in another part of the city. (Musselman). There is a feeling of settling in. Homeowners are pleased with their



*Fig 6: Porosity, front and back (upper left image by J. Johannssen)*

new houses. The porosity of the space with its fluid plan, its well-used front porches and generous outlook has created livable space that connects the residents with the worlds beyond their private domain. (Fig.6)

While the ground floor works well for the different families, the upstairs space has been less successful; bedrooms are too small and the option to join rooms together never undertaken. A designer's idea of flexibility may not be so easily done in real life...The basement, however, emerged as a very valuable flex space. It is almost always well used for storage, a workspace, or (not entirely legally) as a private apartment for adult children with babies, or a temporary place to stay for a relative looking for work. The neighborhood design consultants had vigorously insisted on having a "good basement", and we had defended it from the rigors of value-engineering, deemed by the developer as a \$15,000 waste of space. Our argument -- true in its

own terms-- that a basement would lift the home above the street, creating a situation that was more defensible and a scale harmonious with the adjacent buildings had been tough to advocate in the face of bottom line thinking. We were glad that the neighbors knew something we did not. If perhaps we had listened more carefully we would have reoriented the main stairway differently, so that access to the basement would have been more discrete and the landing could function as it did on the Morse Street houses as a place to hang out near the kitchen.

As we planned the site we had been worried about the unorthodox ownership of the shared courtyard space, especially in terms of maintenance and security. Private housing in Philadelphia was strictly lot simple, and this was a new pattern, neither a public street nor a private driveway with clearly assigned responsibility. The rear drive was built as an easement though private property, and though lightly used for vehicles we had decided that it be well-paved for sustainability, and has stood up well. Owners have cooperated in shoveling snow, and done spring clean-ups. With only one incident in five years, security has also not proved to be a problem. Security lighting installed at the rear of each home provides illumination at night. And space configured with distinct thresholds at its two entrances, reads as claimed and cared for. Although we had originally believed that a homeowner's association would be the best vehicle for managing communal responsibility, this has proved unnecessary, and perhaps in its efficient control would have undermined the neighborly cooperation that has emerged informally in response to the given situation.

The space has emerged as Alexander would suggest, in ways not fully anticipated. The original design had envisioned a space with rows of shade trees along the drive flanked by private gardens that were landscaped and partially defined by solid fences between patio of each dwelling, and low hedges at the communal edge. But as the economy began to soften, funds for the landscape and outdoor amenity were diminished. Wood fencing was abandoned in favor of chain link, and trees and shrubs never installed. As designers we were extremely disappointed at the outcome, concerned that without these

key design elements the place would be unused, un-cared for, and deteriorate.

Though is more ragged than the original vision, it appears to be a robust contribution to the neighborhood structure. A "loose space" it slips between private and semi-public domains. (Franks and Stevens) adding a new layer to the dwelling experience, increasing the depth of neighborhood affiliations. As one resident put it, "I have my street neighbors and then I have my backyard neighbors. We know each other in different ways."

The back court has been most vigorously appropriated by the children of the neighborhood. (Fig. 6) The children who live in the homes are its primary users; they "own" it the way that children do-- with an open-ended invitation for friends to join in gamest exists in semi-secret, frequented by kids who live in a two three block radius. Variants of kickball, and keep-away are favorite games, and at one end a family has in contributed a portable basketball hoop. On paved surfaces more generous than the narrow sidewalk kids jump rope and play hopscotch under the casual observation of parents or neighbors.

### **A Craft of Inefficiency**

A craft of inefficiency has been well-honed by Habitat North Philadelphia over its twenty-five years. Without access to mass capital resources and the capacity to generate mass production of a single commodity it defaults to its richer resource of time. In taking the necessary time to heal the neighborhood it has formed a model of building in the city that may be worthy of consideration by other entities. Inefficiency in production has allowed the emergence inventiveness as it draws into its process a rich program of ideas and actors. The hopefulness of the building enterprise is embodied in the participation of the community. With much at stake their unskilled – and inefficient - involvement constructs for them a heightened sense of the reality of the dwelling experience, of their connection to the neighborhood environment and of the craft of building. (Musselman). Project 1800's open-ended design process has yielded physical space that is similarly porous, loosening the discontinuities between the owned

and collective realms. Fundamental environmental qualities that have been excluded from dwelling by the harsh exigencies of living in poverty have been introduced through careful consideration of the in-between. Space that invites creative accommodation, that is infused with light and air, and that connects the dweller to natural and social systems and to the constructed history has emerged in time. Modest in its design, Project 1800 and the new situation it has evolved is nevertheless radical, as it has penetrated deeply to the root of the dwelling experience.

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# Rural Design: Establishing the Research Foundation for a New Design Discipline

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## Abstract

Rural areas in North America are undergoing profound demographic, economic, cultural, and environmental change, creating considerable challenges and stress for their residents and on the ecosystems upon which they depend for their livelihoods and quality of life. Critical global issues such as climate change, renewable energy, water resource protection, food security, and healthy human development will dominate international and local rural policy for years to come. The research issues are by nature interdisciplinary and require dialogue to understand them and respond with effective solutions. The research must recognize that human and natural systems are inextricably coupled and engaged in continuous cycles of mutual influence and response. This paper explains rural design and its differences from urban design; outlines its research foundation; and defines a rural design process that connects environmental, cultural, and social issues with educational, technological, and organizational research to help create a healthy and prosperous rural future.



Figure 1: Grain elevators on the Midwest prairie

## Rural Design

The design professions and schools have generally ignored agriculture, rural communities, rural architecture and landscapes, and rural quality of life. Urban design and urban planning exist as subdisciplines of the design professions to address urban issues, but there is no rural equivalent. How will the landscape of rural regions adjust to economic, transportation, demographic, health, and social changes? What kinds of land use planning and policy are required to take advantage of renewable energy from wind turbines, solar collectors, and biomass in the agricultural landscape? What are the opportunities to design for a stable food supply and food safety while also considering human, animal, and environmental health? These issues will dominate international, national and local rural policy for years to come.

Urban design and rural design have many similarities in that both embrace those unique characteristics in design that acknowledges social and cultural values to enhance quality of life. Urban design has been taught in design schools for some time, but rural design is an emerging design discipline. Urban design uses the spatial arrangement, appearance and functionality of buildings and infrastructure to shape the public realm for living, working and playing in the urban landscape. Rural design seeks to understand and embody the unique characteristics of the open natural and cultivated landscapes where buildings and towns are objects in the rural landscape. This aspect of the rural landscape requires a different methodology for addressing rural issues.

Rural design is a rapidly emerging discipline for meeting rural needs and resolving rural issues. To be effective and relevant, this new discipline must be founded on solid research, and practice must be based on validated data that will result in transformational changes. Using the lens of spatial arrangement and methods of community engagement, rural design helps rural citizens manage change and organize rural landscapes and regions for recreational, agricultural, economic, and ecological purposes that enhance rural quality of life.

In the United States, according to the U.S. Department of Agriculture, rural areas contain twenty-one percent of the population and comprise ninety-seven percent of its land

area (USDA ERS, 2008). Although rural design, as practiced by the Center for Rural Design at the University of Minnesota, is currently focusing on the ecosystems that comprise the Midwest and extend into the South, the eastern United States, and across Canada, the principles and strategies of rural design can be utilized around the world.

The Center for Rural Design at the University of Minnesota was established in 1997 in response to the enormous changes taking place in rural areas in the United States. The Center is the first of its kind in the world and as a result of its work, its definition of rural design has evolved as it gained experience working with rural communities. Thorbeck and Streng (2009) outlined rural design issues in a White Paper thus:

Rural areas are undergoing profound demographic, economic, cultural, and environmental change, creating considerable challenges and stress for its residents and on the ecosystems upon which they depend for their livelihoods and quality of life. Over twelve years ago architect Dewey Thorbeck noted these challenges, particularly in Minnesota and the Upper Midwest, and realized that the design and planning professions in the United States had generally ignored agriculture, rural communities, the character of the rural landscape, and rural issues. Although there were subdisciplines of the professions addressing urban issues (urban planning and urban design) there was no rural equivalent. In response, he founded the multi-disciplinary and intercollegiate Center for Rural Design and began to develop a new discipline: rural design.

Rural design is a methodology that can help bridge the gap between environmental science and public policy. Design is a common ground for scientists and practitioners to bring scientific knowledge into decision making about landscape change (Nassauer and Opdam, 2007). Rural design, as a problem-solving process can link science with society to resolve rural issues and assist rural communities to make wise land use, planning, landscape, and architectural decisions that promote economic development while protecting the rural environment and enhancing rural quality of life.

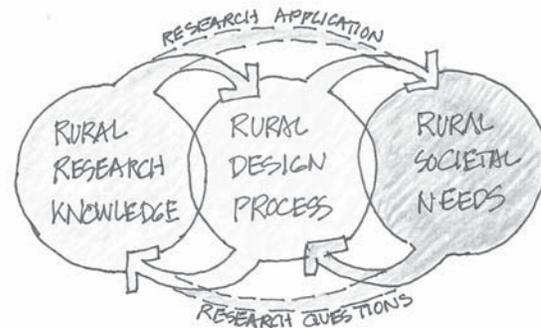


Figure 2: Rural Design as a link between research and society

Rural design is based on a rural land use philosophy that seeks a balance between quality of life, economic growth, and preservation of the natural and cultivated landscape. It recognizes the importance to all people, urban as well as rural, of respecting the unique landscape character of where one is living and working. A building on the flat prairie of the Midwest should be different than one in the rolling hills and forests of the Southeast

When making choices about using the land and constructing buildings in the rural landscape it is important to think and act holistically. What is the impact on the visual appearance of the rural landscape? What are the issues that need to be considered? Rural design can help define the kind of architecture that links traditional barn building, farming practices and fit with the landscape, with the latest technological and economic methods of producing food, fiber and renewable energy.

Rural design is most often the understanding and visualization of large open spaces with farmsteads, buildings and towns as objects in the rural landscape. It is a process to assist rural citizens to protect, create and enhance the beauty and diverse ecology of their landscape for future generations to appreciate and enjoy. Rural design is a way to connect economic, environmental and social issues for public good—and a way to ecologically view the world.

### Research Base

Based on the experience of the Center for Rural Design, areas requiring additional multi-disciplinary research that can form the research base rural design needs include:

Livestock facilities: Improving livestock facility design to consume less energy, emit less greenhouse and hazardous gases, and reduce the ecological footprint remains largely unresearched (Jacobson, 2009). The same holds true for improving worker safety and animal health, site and landscape design, social acceptance, and the use of more environmentally friendly building components.

The location, design, construction and management of commercial buildings for animal production has changed little over the past 50 years, yet the way people think about their rural environments and concerns about animal agriculture has changed significantly, leading to conflicts between new rural residents regarding the consolidation of livestock into larger operating units (Schmidt, Jacobson, 2007). The commercial confinement-type buildings being constructed today for animal agriculture have been largely designed by engineers. The resulting wood, post-framed, metal skinned structures look and operate the same regardless of where they are located, because the sites are leveled and utilize building systems that are identical regardless of where constructed.

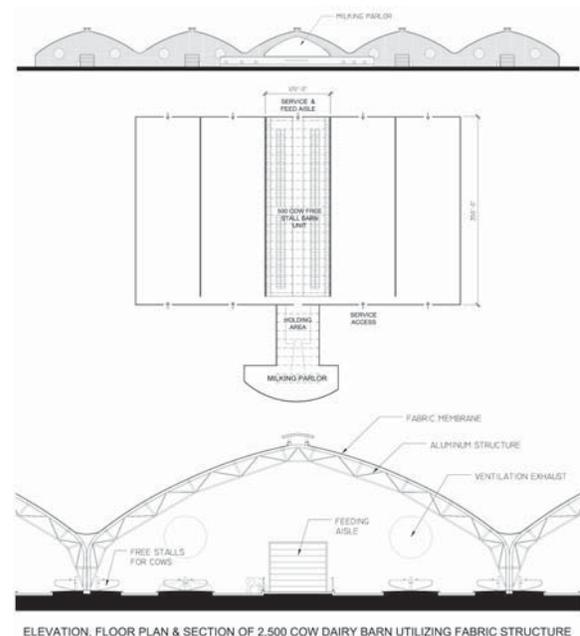
Traditional farm buildings and landscapes that were shaped and constructed by immigrants in the United States remain the “ideal” in most people’s minds. This contributes to their unease about commercial livestock production practices and their concern for animal welfare and sustainable land use. Little research has been conducted on the design of contemporary farm buildings constructed for animal agriculture and their important role in maintaining a sustainable healthy food system for a rapidly expanding world population.

Research that could develop integrated performance metrics for sustainable commercial animal buildings (rather than using prescriptive standards) will provide industry professionals and producers, processors, regulators, communities and other stakeholders a key tool in evaluating appropriate locations, site and facility design, construction, and management of animal production facilities. As developed by the Center for Sustainable Building Research Center at the University of Minnesota (Carmody, et al, 2009) these measurable performance metrics for environment and human health include:

- Building Metrics: including energy, water, wastewater, solid waste, materials, and indoor environmental quality

- Site Metrics : including transportation, physical activity, education, stormwater, soils, heat island, night sky, and food

Although these metrics were developed for human habitation they are very similar to what could be used for commercial animal agriculture. Today there is a significant gap in available science-based information about animal production facilities and this research will help all segment of society cope with the issue of what is good for animals, people, and society.



ELEVATION, FLOOR PLAN & SECTION OF 2,500 COW DAIRY BARN UTILIZING FABRIC STRUCTURE  
Figure 3: Proposed fabric dairy barn for 2,500 cows

Rural built environments that support human, animal and environmental health: Rural residents suffer higher mortality, disability, and chronic disease rates than urban residents (Jones et al., 2009). A critical need exists to study rural built environments’ health effects, including their ability to support active living, finding ways to make health care more accessible, reduce social and cultural isolation, and enhance contact with nature. The emerging global One Health idea looks at human, animal, and environmental health as one integrated phenomenon. It is defined as “the collaborative effort of multiple disciplines working locally, nationally, and globally, to address critical challenges and attain optimal health for people, domestic animals, wildlife, and our environment.” (Cohn, 2010). This concept had not previously recognized the role of design as a way to help

accomplish its directive, but the emergence of rural design and its problem-solving methodology has started to gain broad support from veterinary and human medicine at the University of Minnesota as environmental health and disease control has become an essential part of the One Health movement.

Designing landscapes for active living is a way to shape the outdoors and how people live and work within it to promote exercise as a way of life. Rural design can address this issue by redesigning how small towns and surrounding farms interact and communicate in the future. Through a research project (sponsored by the Robert Woods Johnson Foundation) with Isanti County in Minnesota, near but outside the Twin Cities metropolitan region, the Center for Rural Design worked closely with a community group to define and locate a trail system that connects residential, industrial, schools and commercial areas together to maximize active utilization of the trails while diminishing the need for the automobile.

Research observations from a project with the Minnesota Milk Producers Association indicates that when human, animal, and environmental health are interrelated, then rural design can be a very effective means of making synergy happen to achieve higher levels of environmental awareness and stewardship (Roos, et al., 2003). How the land is utilized for food production affects the transmission of disease from wildlife to domesticated livestock and is, thus, a food safety and health problem just as built environments that discourage active living are a health issue.

Design is a methodology to help clarify and organize connections between issues in the problem-solving process. Rural design can help shape rural environments in a way that recognizes the relationships between human, animal and environmental health, and offers an exciting new research opportunity.

Rural character perception: Rural character varies depending on the geology and climate of place and is differently defined by different communities. Perceptual research has been conducted on specific landscapes (e.g., Ervin Zube's work), and some have analyzed rural character that includes architecture (e.g., Brabec, Kaplan, Halfacree, Nelessen, Ryan). However, the research is immature and conclusions are limited in transferability, especially for which interventions do or do not harm rural character.



Figure 4: Rapidly changing rural landscapes in the Midwest

A new research framework for rural design is necessary that is more holistic and applicable to large, anthropogenic landscapes. It is crucial to understand the human sense of place and the meaning that sense provides to its inhabitants. If rural design is to be effective it must recognize the unique characteristics of place, including the natural characteristics of climate, seasons and vegetation, as well as the cultivated landscape and cultural and social history of place.

The architecture that responds to place can be contemporary, but is probably more understandable if it is based on historic precedents that reflect its location, geography, and climate. For example, a new agricultural building near the Minnesota River in the gentle, rolling landform of western Minnesota might have more sense of place if its architectural design reflects the glacial history that created the landscape and rivers of that region rather than an abstract or engineered design that looks and feels like it could be built anywhere.

Sustainable design, based on net zero-energy and carbon neutrality, will most likely become the standard in the near future as the world fights to diminish the impact of global climate change. To reach that goal, contemporary landscape and architectural design must be rooted and responsive to the uniqueness of place, and utilize performance metrics appropriate to that place. In addition, rural design, through rural character perception can help create synergism, collaboration, and cooperation across academic as well as political boundaries to improve rural quality of life.

**Multifunctional landscapes:** The costs to the environment and rural communities of large-scale monoculture farming (Cochrane, 2003; Mitsch et al., 2001) have generated alarm and a search for landscape patterns that produce wider benefits and less damage. Creating multifunctional landscapes is an emerging and promising area of inquiry (Jordan et al., 2007; Meyer et al., 2008), but their aesthetic and cultural dimensions remain unexamined. Their successful implementation and acceptance cannot happen without this design research.

Architecturally, multifunctional landscape issues might not seem to be important. Looking more closely, however, one might find that the design of buildings can have a big impact on public perception and understanding of the differences. As discussed above, contemporary livestock facilities that look the same regardless of where they are located reinforce monocultural imagery in the eyes of the public. If these buildings were designed and managed to reflect uniqueness of place, then animal production facilities would reinforce the imagery of the multifunctional landscape. It is this integration of issues that rural design research addresses.

These research directions and others will enable rural design to connect social, cultural, technological and educational issues to define rural place; integrate research and practice across the many disciplines involved in rural issues (e.g., agronomy; applied economics; community development; forestry; rural sociology; rural and veterinary medicine; tourism); and apply it to meet rural needs, provide new data, and provoke new research questions.

### **Design Methodology**

The purpose of rural design is to work with rural landscapes, cultures and communities utilizing innovative design strategies for dealing with rural land use issues that include these research tools and technologies as currently used by the Center for Rural Design:

- Envisioning alternative physical scenarios for rural community response by working with citizen committees and community-based design workshops to engage residents. By collecting data and research pertinent to the issue and then preparing and presenting alternatives based on that evidence the community becomes part of the process. Through visualization techniques, scenario alternatives educate stakeholders so they can understand how their choices could impact rural environments.

- Presenting a systemic and holistic point of view from an unbiased rural perspective using an interdisciplinary and collaborative design approach. Experts from within the academic community as well as agricultural industry representatives can provide knowledge to help ensure a more positive impact on the rural economic, social and environmental issue being studied. This integrated design process also can identify new research necessary to fully understand the issue.
- Working with interactive media, both electronic and tactile, such as communicating with geographic information systems (GIS) imaging, 3-D models and kits of parts, drawings, web-based social networking and print publishing to provide multiple methods for communicating information to educate rural citizens about possibilities and opportunities for economic and community vitality.
- Partnering with communities and organizations as a whole to find the linkages and connect the dots between local and regional opportunities to identify stakeholder issues and their participation in the design process.
- Identifying regional land assets, characteristics, and relationships that large scale communities may have in common to encourage collaboration and cooperation for economic development and environmental protection that cross jurisdictions at multi-township, multi-county and multi-state scales.

Rural design provides a process that connects environmental, cultural, and social issues with educational, technological, and organizational research to help formulate concepts for a healthy and prosperous future for rural areas. To accomplish this, its research foundation must be based on multidisciplinary evidence that can inform the rural design process.



Figure 5: Rural design process

In January 2010, the First International Symposium on Rural Design was held at the University of Minnesota with nearly 70 researchers from around the Midwest landscape, Canada, and the South. This symposium and the experience of the Center for Rural Design have identified potential new research areas that can inform and enhance the potential of rural design as a problem solving design process, such as:

- Sustainability: Identifying and clarifying the sustainable relationships between small scale farming and large scale farming in providing food for a growing population; and expanding research to link human, animal, and environmental health and there ecological impact on the design of landscapes and buildings in rural areas.
- Climate change: Linking ecosystem health with issues of net-zero energy and carbon neutrality and carbon sequestration with food systems and safety, ecological restoration, green infrastructure, water quality, multifunctional landscapes, and human animal and environmental health. This issue of global warming is more likely to be addressed by citizens when the research issues are linked.
- Community vitality: Linking cultural, social, and artistic opportunities with economic development, and tourism. People seem to like to visit and area as tourists for the same reasons people like to live there. Quality of life relates to all of those issues and is the bottom line of rural design.

- Practice of rural design: Linking economic opportunities, entrepreneurship and economic development through cross-jurisdictional cooperation and collaboration based on common geographic relationships and principles of rural design. "To compete in the global economy regions must create partnerships, prioritize investments, and spur innovation." (Drabentstott, 2009)
- Indigenous people: Seek to understand native peoples' values and spiritual connections with the land and the relationships and impacts of immigration and how both have changed over time as a way to enhance quality of life and meaning in shaping future rural landscapes for all people.
- Policies: Explore reasons and opportunities to cross boundaries in the resolution of rural issues to have positive economic impact on rural communities at the state, federal and local levels as well as with regulatory bodies.
- Education: Utilize all forms of communication, community workshops, rural design in schools, rural design camps, etc., to inform citizens, particularly young people, about the power of rural design in resolving rural problems.

### Summary

Rural design is the analysis, planning and design of rural environments, including small towns and cities. It uses design as a problem-solving process to communicate knowledge about the natural and man-made environments within which people live and work, and create opportunities to improve economic development and rural quality of life. Rural design can bring a regional perspective to the rural issue by illustrating the advantages of exploring and utilizing regional assets.

Rural design as an interdisciplinary and participatory design process can take many shapes, but its largest impact will be through examples of data-based rural design that promote economic development, improve the environment, and enhance quality of life. Rural design as an integrated design process can help academia and its research with rural communities to analyze and resolve issues for a healthy and prosperous future.

Rural design has been practiced by peoples around the world in a number of ways for better or worse over the

centuries. It just has never been called rural design. As a new design discipline it will continue to evolve, particularly as multidisciplinary research and data-based evidence is accumulated to inform the practice of rural design and its process. Although the work of the Center for Rural Design has focused primarily on the State of Minnesota, the principles and methodologies it is developing can be utilized anywhere because they are by definition rooted in the nature and culture of place.

The Center for Rural Design believes the emerging new discipline of rural design, through research connected to place, provides:

- information to policy makers of the spatial, ecological, and ethical impact of various alternatives and the choices they make;
- a methodology to resolve rural land-use issues at a variety of scales crossing boundaries;
- a process for geographic information systems (GIS) and other communication technologies to enhance rural citizen knowledge to enhance economic development;
- a community-based design process to empower rural citizens;
- an opportunity to create synergism and entrepreneurship through systemic and holistic linkages and connections;
- an understanding of regional quality of life and unique sense of place in the rural landscape; and
- a way to connect with the world.

Establishing the research foundation for effective rural design is a continuous and rigorous search for ecological, social, cultural, economic, and political and health meaning connected to place, while responding to climate change and a global economy.

These global problems require new approaches to resolving issues resulting from climate change such as new invasive species, diseases and pests; different crop and livestock yields; new compositions of native flora and fauna communities; water sources; and demands for carbon sequestration and reduced greenhouse gas emissions along with low polluting biofuels. The resolution of these issues will fundamentally alter the economic and social foundations of rural areas and the relationships between urban and rural areas.

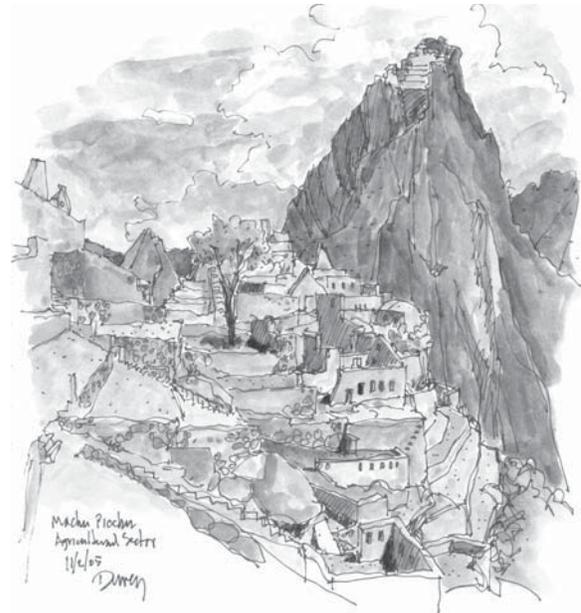


Figure 6: Machu Picchu as the epitome of integrated architecture and landscape

A critical need exists for an innovative and creative means to resolve these problems, challenges and opportunities at the scale at which they operate. Rural design is a means to engage these issues and the author hopes that this paper will enhance rural design as a new design discipline in three ways:

- By promoting discourse about rural design and its multidisciplinary research base to effectively resolve rural issues with all of the knowledge and tools available—without regard to disciplinary or jurisdictional boundaries;
- By creating a graduate level rural design curriculum program (similar to urban design programs) to train leaders to address design issues impacting rural regions in North America and worldwide; and
- By creating an international organization for rural design dedicated to understanding rural issues globally with strategies to resolve these issues while focusing on human and landscape culture related to climate and place.

### Credits:

The work of Stephen Streng, Research Fellow at the Center for Rural Design is acknowledged for his assistance in editing the paper and for his contributions to its content. The rural design ideas and projects of Stephen Roos, Senior Research Fellow and Tracey Kinney, Research Fellow that have helped clarify what rural design is are greatly appreciated.

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## PRESENTATION SESSIONS | **EDUCATION**

Session One

Moderator: Ashraf Ragheb



# The Teaching of Research and the Research on Teaching: Two Frameworks and Their Overlay in Architectural Education

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**Abstract:** The *teaching-of-research* as systematic inquiry can provide a specific home in architecture curricula for 1) nurturing numerous underserved aspects of designerly thinking and 2) complimenting the more freeform intuitive pursuits that usually typify design inquiry. Those benefits will be elaborated in this paper via the presentation of the six year development of one such undergraduate course. This paper also correspondingly examines *research-on-teaching* in the architecture academy as an equally underserved and increasingly vital activity. The same six year history of one course will be given as a viable model for the synergy of these two activities: teaching-of-research, and research-into-teaching.

- Common Ground: *definition, proposition, and wisdom in design inquiry and research inquiry*
- The Teaching of Research: *a sample course on Architectural Research Methods*
- The Research on Teaching: *pedagogy, scholarship, and assessment*
- The Classroom and Studio as Teaching Laboratories: *data collection, analysis, and application*
- One Course on the Teaching of Research

## Common Ground: Two Frameworks for the Teaching of Architectural Research Methods

One means of orientation to architectural research inquiry is to set it in context of what students are already more acquainted with as design inquiry (Figure 1). While student engagement in design inquiry is often more pragmatic and less theoretical than the research construct, design inquiry is nonetheless a reasonable way to begin considering research inquiry because the similarities and differences tend to illuminate thinking about both activities. Figure 1

compares the two modes of inquiry as simple linear processes for the sake of coherent conversation and clear illustration. In practice of course, both activities are more complex and messy, but the underlying theories concerning them both can be more readily examined if the basic relations are clearly stated as a conceptual framework.

What research and design share as modes of inquiry are three common punctuation points: beginning in problem definition, working toward a transitional midpoint proposition, and ending in new wisdom that advances the pursuit of architecture. At the beginning there are common bases in theory and quest for innovation. At the midpoint the shared emphasis is on identifying a propositional goal that is, hypothetically at least, something unique, situated, and provocative. This midpoint is critical in that it reveals the rich and complex essence of what was at first just a problem statement but becomes the "big idea" behind the entire project. In the sense of problem space, this midpoint is where the pregnant ambiguity of the situation has been identified and distilled. It is in this region of ambiguity that both design and research operate most creatively. Finally, as their common ultimate goal, both research inquiry and design inquiry strive to achieve an artifact that embodies new, useful, accepted, and generalizable wisdom... hopefully in both cases leading to validation through replication by others.

Where these two modes of inquiry differ is in the processes between those punctuations. While both can be described in the conventional problem-defining and problem-resolving sequence of analysis of the problem followed by synthesis of the solution, other aspects are actually reversed. Most fundamentally different are the roles of creative-philosophical versus generative-methodical thinking. In design inquiry, the process between beginning problem definition briefing and midpoint propositional design intention can be described as generative-methodical in terms of the analytical thinking it usually entails: programming, site analysis, precedent reviews, code analysis and other aspects of strategic planning. Once this generative-methodical process leads to an adductive proposition midpoint, design then continues with the more creative-philosophical process of physical design from conceptual to schematic and on toward the endpoint of a realized work of novel architectural wisdom.

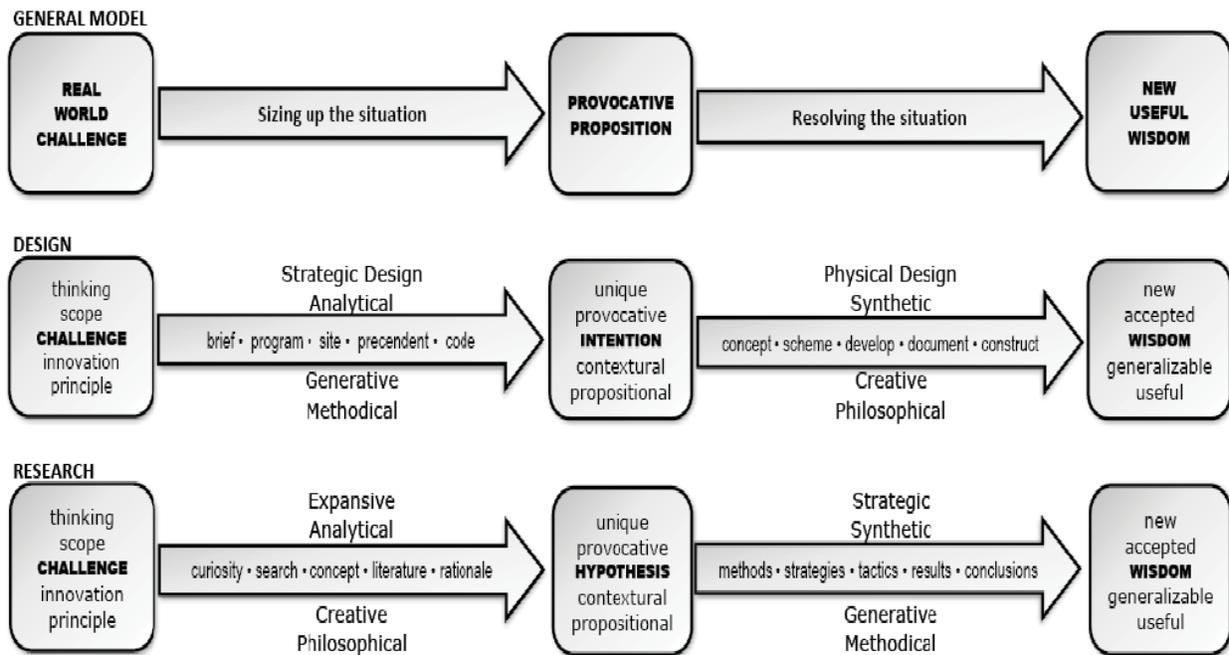


Figure 1. A framework for problem space models in design inquiry and research inquiry showing reversed roles of generative-methodical and creative-philosophical processes (by author)

In broad conceptual terms, research-as-inquiry reverses those two processes. Here the initial span from beginning doubt and curiosity to midpoint research propositional hypothesis is the creative-philosophical one. This is where a significant gap in existing knowledge is identified by analysis and exploration of existing knowledge. Everything after that in research is essentially methodical-generative towards the synthetic results and findings published for peer review.

Now this is not to say in absolute terms that the generative-methodical modes of design programming or those of research methods do not require creativity and inspiration. Clearly the strategic planning aspect of a design challenge requires much imagination and novel thinking as does the experimental design phase of a research project. It would also be wrong to suggest that either the researcher or the designer ever works with only half of their cognitive skills activated at any one time. The main point here is that the authorship and creative credit of research lies in a reversed formulation of processes compared to that of design. It is through this sort of conceptual understanding that the

common ground and varying processes of design and research can illuminate one-another.

This first framework of the general argument aligning research and teaching corresponds to Walter Gropius' term "the accumulated wisdom of architecture." As already noted, this is the ultimate goal of both design inquiry and research inquiry. An inquiring intention of adding to the accumulated wisdom of architecture thus serves to bond the value sphere of research-as-inquiry with that of design-as-inquiry. It might be claimed, for example, that differentiation of a good but normative building from critically worthy architecture is staked on identifying what new wisdom the subject work adds to our thinking about what architecture can be and do. "Commodity, firmness, and delight" are not enough; new and better ideas are always required to advance the cause. Research inquiry is likewise grounded in the pursuit of new knowledge, understanding, or wisdom.

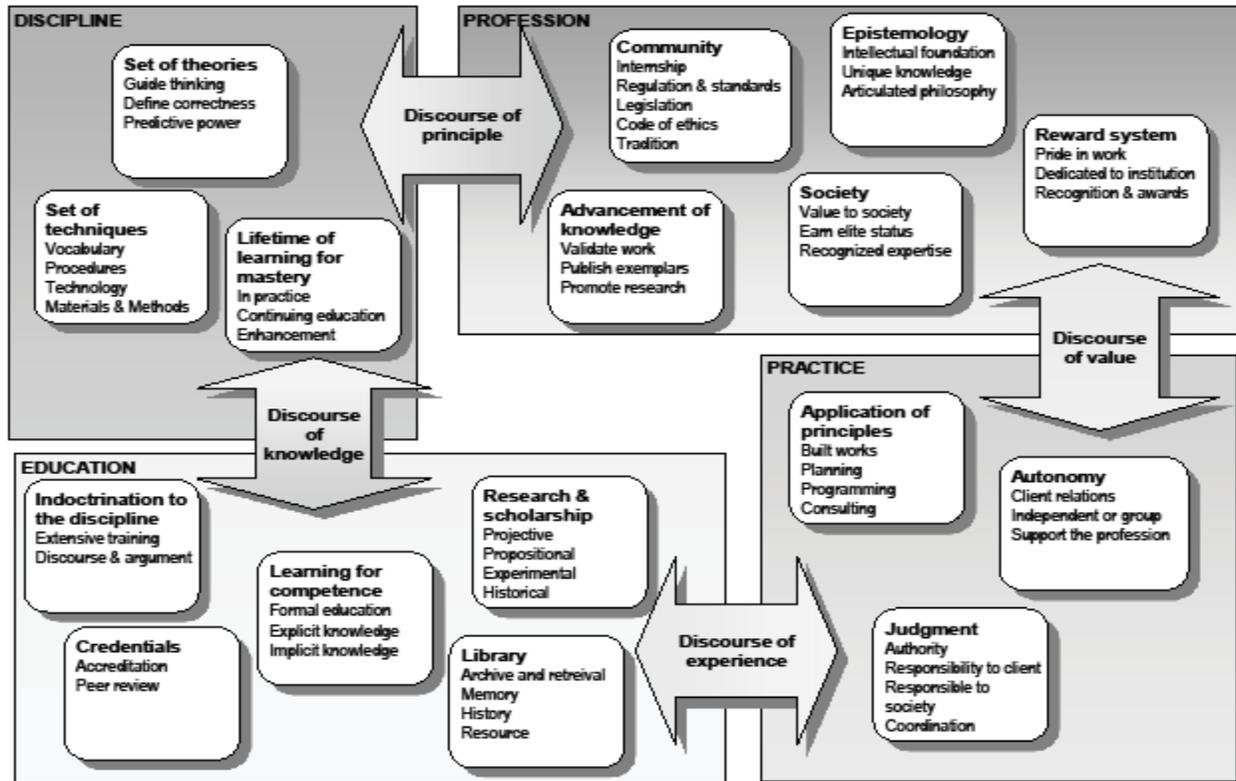


Figure 2. Domains of architecture showing four realms and four discourses, after Snyder 1977 (by author)

This commonality frames many parallels between the analytical - synthetic, generative - creative, and methodological - philosophical matrix of processes shared by design and research. It also demonstrates a potential shortcoming in the erroneous substitution of intuition in place of analysis. As Figure 1 diagrams, taking intuitive leaps of faith from design brief directly into design intention misses the generative-methodical identification of the rich, opportune, and unique essence every new design challenge presents. The corresponding sensitivity of research inquiry to such intuitive shortcuts is even easier to grasp. Without the exploration of a literature review critique of existing knowledge, for example, it is unlikely that the proposed question or hypothetical basis of such work would actually contribute to new architectural wisdom. More likely it results in self-serving exploration and is summarized as a report. Leedy (2001) has more to say on this threat.

A second framework (after Snyder, 1977) is offered to situate research-inquiry firmly in the complete domain of

architecture (Figure 2). Like any such professional domain, architecture is comprised by realms of professional principles, occupational practices, educational orientation, and disciplinary knowledge... all connected by discourses in knowledge, experience, principle, and value. Given that architects are allowed a monopoly on this particular domain of the built environment, it is incumbent on them to master a "large and difficult body of knowledge" (Snyder). That mastery includes attaining such difficult knowledge (education), service to society (profession), application in practice (occupation), and the nurturing and growth of relevant knowledge (discipline). Research represents the requisite disciplinary nurturing of architectural wisdom.

Overlaying these two frameworks in a single classroom pursuit activates the alignment of research-as-inquiry with design-as-inquiry. Whether for theory building or episodic practice, for rhetorical argument or empirical testing, or for performance versus aesthetics... research and design are equal, compatible, and commensurable means toward that shared ultimate end: new and novel architectural wisdom.

Table 1: Course calendar for Architectural Research Methods

Week	Topic	Mon. Team Meeting	Wed. Online Quiz	Fri. Interactive Topic	Due Fri. 9am
1	Information Literacy	Introduction	Focus Groups online	Scholarly Literature	Focus Group
2	Research Tools	Film: William Whyte	Quiz 1: Syllabus and Intro	Research Tools	Article Review 1
3	Literature Reviews	<b>Labor Day</b>	Quiz 2: Preface, Chapters 1&2	Literature Review	Article Review 2
4	Research and	Team Building	Quiz 3: Chapter 3	Research into Theory	Bibliography
5	Research and	BIM, and IP	Quiz 4: Chapter 4 & 5	Research into Design	Literature Review
6	Logical Argument	Concept Map of Topic	Quiz 5: Chapter 11	Logical Argumentation	Literature Review
7	Case Study Methods	Facts, Ideas, Opinions	Quiz 6: Chapter 12	Case Study Methods	The Question
8	Emancipatory	Argument Map	Quiz 7: Mid Term	Emancipatory Methods	Rationale
9	Historical Interpretive	Argument Map:	Quiz 8: Chapter 6	Historical Interpretive	Introduction
10	Qualitative Methods	Strategy, Tactic	Quiz 9: Chapter 7	Qualitative Methods	Methods 1
11	Simulation Research	Outline of Proposal	Quiz 10: Chapter 10	Simulation Research	Methods 2
12	Correlation Methods	Concept Map:	Quiz 11: Chapter 8	Correlation	Discussion
13	Experiment Methods	First Draft of Poster	Quiz 12: Chapter 9	Experiment	Proposal
14	Review	Review for final exam	<b>Thanksgiving</b>	<b>Thanksgiving</b>	Poster Draft 2
15	Poster Week	Review for final exam	Present in Atrium	Present in Atrium	Poster
16	Final Exams	Study Period	Final Exams	Final Exams	
17	Final Exams	FINAL EXAM	Final Exams	Closing of Semester	

## The Research on Teaching

One specific course is used here to illustrate and call for attention to the increasingly important but still greatly underserved topic of research on the pedagogy of architecture. While there is a great deal of well reasoned argument in print, the amount of empirical measurement on which to base and advance such arguments is slim and wanting (Bachman and Bachman, 2006, 2009, 2010b). Aside from the inherent value of using such research to better understand how the teaching and learning of architecture can be advanced, there are at least two other significant stimuli that will encourage this activity.

The first stimulus is best captured by the Carnegie Foundation's Academy program for the Scholarship of Teaching and Learning (SOTL or CASTL) which was launched in 1998. Part of the stated mission of this major initiative is explicitly to "bring to faculty members' work as teachers the recognition and reward afforded to other forms of scholarly work. (Carnegie Foundations, 2010)" Additionally, by making the usually private act of innovative teaching into a public discourse the program seeks to

"render teaching public, subject to critical evaluation, and usable by others in both the scholarly and the general community."

In short, the Carnegie Foundation is encouraging architectural educators to use their classrooms and studios as teaching laboratories, to publish the data and findings from those labs, and to claim scholarly accomplishment for the research such work entails. Currently, more than 200 universities, disciplinary societies, and higher education organizations are affiliated with CASTL in a "commitment to the scholarship of teaching and learning by exploring the place of such work in their settings, and undertaking activities that provide support and recognition for ongoing inquiry into evidence-based improvement of student learning."

*Table Two. Student learning objectives in Architectural Research Methods (from course syllabus)*

Use library and internet tools to search, locate, and collect appropriate and current information
Distinguish between primary and secondary literature as well as scholarly, peer reviewed, professional, and popular literature
Distinguish between research inquiry and design inquiry by comparing their variously differing and parallel endeavors of analysis, proposition, and synthesis
Given a particular work of architectural research: Identify its techniques of inquiry in the continuums of quantitative to qualitative and positivist to naturalistic... Describe its means of evidence and truth value... and delineate the position of the researcher as embedded, involved, or detached
Work within a team setting to produce a research proposal by use of shared discourse and critique, including the documentation of team discourse and the collaborative construction of concept maps
Write article reviews to analyze published works of architectural research and identify their essential components: primary question and sub-questions, situation against previously published work, epistemological and ontological assumptions, method of investigation, findings and limitations, and their generation of new lines of inquiry
Identify the role of research inquiry in the practice of architecture as episodic problem solving, programming, strategic planning, precedent analysis, commissioning, post-occupancy evaluation, and other empirical activities
Distinguish between personal subjective bias and shared basis of architectural critique, including the distinctions of heuristics, fallacy, qualitative versus subjective, adductive versus inductive, normative versus positive, and other relevant philosophical canons.
Identify the components of theory development in architecture, including explanatory frameworks and compelling truth value, Kuhn's principle of scientific evolution, and Popper's principle of falsification
Write a literature review of a discrete and specific architectural topic by organizing relevant publications into themes, critiquing each theme, and constructing a gap statement identifying potential new questions within the topic
Identify a novel, unique, and useful research question and write a logical argument to illustrate its generalized merit, anticipate reasonable objections, and to indicate how the question can be practically addressed
Link the nature of a research question to appropriate research methods of addressing it by selecting an appropriate mix of logical argument, case study, historical interpretive, qualitative, correlational, simulation, and experimental strategies as befits the respective characteristics, strengths and weaknesses of each strategy.
Construct a written plan for addressing a research question and describe the methods, strategies, and tactics involved
Continually use instructor's written narrative critique of recent submissions as feedback (generalized to the entire class); compare that feedback to the personal or team score received along with the published criteria for evaluation; correct the corresponding submitted work and reflectively refine personal thought processes and learning outcomes

The second imperative toward evidence-based research in architectural education is that of program assessment, evaluation, and accreditation. The new National Architectural Accrediting Board (NAAB) 2009 Conditions for Accreditation, for example, is clearly shifted toward an alignment with the Commission on Colleges (COC) annual reporting policy (COC 2010):

"The institution engages in ongoing, integrated, and institution-wide research-based planning and evaluation processes that incorporate a systematic review of programs and services that (a) results in continuing improvement, and (b) demonstrates that the institution is effectively accomplishing its mission."

The 2009 NAAB Conditions for Accreditation and 2009 Procedures for Accreditation require annual program reports with both statistical and narrative components that describe ongoing changes to the program. Section I.1.5 of the 2009 Conditions specify a culture of research and self assessment closely parallel to the COC policy of evidence-based research. Note how the following describes a research process of collecting data, organizing it into information, processing the information, and inferring new knowledge from it:

"The APR must include the following (NAAB 2010 p. 13):

- A description of the school's self-assessment process, specifically with regard to ongoing evaluation of the program's mission statement, its multi-year objectives and how it relates to the five perspectives.
- A description of the results of faculty, students', and graduates' assessments of the accredited degree program's curriculum and learning context as outlined in the five perspectives.
- A description, if applicable, of institutional requirements for self-assessment.
- A description of the manner in which results from self-assessment activities are used to inform long-range planning, curriculum development, learning culture, and responses to external pressures or challenges to institutions
- Any other pertinent information."
- An extra credit end of semester student survey using the validated Teacher Behavior Checklist (Keeley and Smith 2006)
- Student course evaluations (SCE) now completed online and digitally available as datasets for correlation and factor analysis
- Peer evaluation rubrics on final poster presentations
- Guest critic evaluation rubrics on final poster presentations
- Detailed item analysis from machine scored, 30 item, standardized final exam; including difficulty, validity, and discrimination index for each item and frequency distribution of each answer foil

It is critical to note here, that by incorporating the institutional requirements for self-assessment, the COC policy dictating continual internal research and curricular refinement becomes a mandatory component of NAAB reporting in all accredited programs.

### **The Classroom and Studio as Teaching Laboratories**

In the case of the subject course here on architectural research methods, several sources of data are mined and used for comparative measures of improvement. These data are typically available in most such courses. Note that much of the data collection is largely automated by the use of a course learning platform such as, in this case, Blackboard™:

- A required entering student course survey on prerequisites, expectations, resources, and interests
- Student performance against grading rubrics across the semester
- Itemized and categorized student performance statistics from online quizzes
- Student feedback from classroom response systems (CRS) on clicker survey questions given for attendance credit
- Student CRS scoring on interactive topic session clicker questions (automatically uploaded to Blackboard Grade Book)
- Student file access statistics on the course learning platform
- An extra credit end of semester student exit survey

Naturally such data are used to improve the course in the traditional mode of student course evaluation data and relative student performance on different course topics and the related learning objectives. Furthermore, the data collection process should contribute to the Institutional Effectiveness reporting to COC and NAAB (Table 3). Most importantly to the central argument of this paper however, the data are also the basis of scholarly research and the transition from the aforementioned "usually private act of innovative teaching into a public discourse." This present paper is the second such research publication to come directly from this course; the first being a study of benefits derived from the implementation of a classroom response clicker system (Bachman and Bachman 2010a). Given the background culture of assessment and accountability, the complimentary roles of design and research inquiry, and finally the growing public discourse on the scholarship of teaching and learning... the direction seems both valid and desirable.

### **One Course on the Teaching of Research**

Background for this entire discussion focuses on a required course in Architectural Research Methods, as taught in an undergraduate professional degree program in the third year of study. The prerequisite courses are two conceptual level technology courses and two Survey of Architectural History courses.

Table 3. Template for a course data reporting form that would feed into COC and NAAB reporting data

Instructor Name and Rank	Leonard R. Bachman, Associate Professor														
Course Number, Section & Name	ARCH 3365 10102 Architectural Research Methods														
Semester and Year	Fall 2009														
Average GPA Grade Given	x.xx (y.yy if only calculated for those who completed the course and took the final exam)														
Date this Report was Submitted															
Grade Distribution: enter frequency of each grade earned (number of students in course awarded each grade) and average GPA of all students who passed the course															
2009 Current Semester (from PeopleSoft records)															
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	Drop	W	Total	GPA
Cumulative 2004 -2009 inclusive... cumulative GPA for those who passed course is x.xx															
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	Drop	W	Total	GPA
2008 (from PeopleSoft records)															
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	Drop	W	Total	GPA
<b>Overall course goal as subset of the college's defined program learning outcomes (PLO) and mission:</b>															
Students successfully completing this course will have demonstrated the collateral abilities of finding and evaluating relevant project information, composing a worthy question that potentially expands the "accumulated wisdom of architecture" (Gropius), defending and critiquing the worthiness of such questions, and of formulating a systematic approach to addressing those worthy questions. Underlying development of teamwork, argument, discourse, critique, and reflection on one's own thinking processes are inherent in this process.															
<b>Student performance criteria from current NAAB accreditation standards that are addressed in this course:</b>															
<b>Course student learning objectives (SLO) including behavior, condition, and criteria of evaluation (minimum of twelve):</b>															
<b>Primary SLO's (at least two or three) examined this semester, preferably different from SLO examined in the previous three semesters:</b>															
<b>Changes implemented in this course since last time it was reported on:</b>															
<b>Description of data acquired in measuring SLO this semester and the instruments used to collect it:</b>															
<b>Description of other data collected in this course this semester for use in improving teaching and learning:</b>															
<b>How is the integrity of all the data validated? How reliable is the data? Describe for each data set collected this semester:</b>															
<b>Interpretation of the data as a diagnosis of course productivity and directive toward indentifying potential areas of improvement:</b>															
<b>Critique of the course learning productivity this semester in terms of its goals and SLO in the context of the college's PLO and mission:</b>															
<b>Summary of most recently received Student Course Evaluation data and comments, including workload management and learning culture:</b>															
<b>Plan to improve this semester's reported SLO and other SLO for this course, including workload management and learning culture:</b>															
<b>List all attachments, including data and data analyses:</b>															
<b>How is the reported data archived so that it is permanently available for administrative review?</b>															
<b>How is the privacy of the data being permanently secured in compliance with FERPA, the family educational rights and privacy act notice of student's rights? <a href="http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html">http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html</a></b>															
<b>Extenuating circumstances encountered this semester:</b>															
<b>Narrative:</b>															

This is a hybrid format course with Monday team meetings, Wednesday online quizzes, and Friday interactive topic sessions using “clicker” classroom response systems (Table 1). Students also work in about 20 groups of six each to collaboratively prepare a research proposal in weekly phases of submitted project work following the typical “personal curiosity, impersonal organization, and transpersonal methods” approach (Zeisel 1984). Work is submitted through TurnItIn™ plagiarism detection software on a Blackboard learning system. About half of the semester is spent in literature gathering, the literature review, formulation of a “gap statement”, and finally getting to the research question. The process of preparing a proposal rather than a complete research project circumvents the issue of simultaneously learning about research and actually conducting it at the same time. It also avoids the actual time and resources necessary to conduct a full research project.

Groat and Wang’s *Architectural Research Methods* (2003) is the textbook for this course. Student Learning Objectives (SLO) are given in Table 2. Taken as goals to which the SLO are tactically aimed, the course seeks to enhance a number of abilities specific to the realm of architecture and the general mission of architectural education:

- Information literacy
- Logical argument and discourse
- Teamwork collaboration
- Face to face interaction as well as online collaboration
- Self-critique and metacognition
- Shared critique and intersubjective agreement

The strategies of the course thus involve a plan based on interaction and shared outcomes (Table 1). A mixed format is employed:

- An opening focus group discussion is conducted online with randomized groups of students from the class to identify what students feel should be pursued as new architectural wisdom... within a theme developed for that semester’s course offering
- Focus group response data is chunked into general areas of interest around which a research topic list is generated and for which individual students sign up into teams, usually two or three teams per topic
- Blackboard™ discussion web pages are established on the course learning platform for hosting and

documenting each team’s “asynchronous” interaction outside of actual meeting time

- Monday class time team meetings are held during which a collaborative product (often a concept map) is produced each week toward development of a research proposal
- Wednesdays are given back as outside “hybrid format” time for twelve weekly, required, online, open book, reading exercise quizzes... these are “due” during what would normally be scheduled class time each week, but may be taken at the students’ convenience up to the closing date... one quiz is a mid-term
- Friday interactive topic sessions are held using classroom response clickers with four or so clicker questions sprinkled into the topic PowerPoint™... these topics are the same as the ones covered on the Wednesday quiz (Bachman and Bachman, 2010a)
- An end of semester poster session is organized as a public display of the work and as an organized critique both peer to peer and with expert guest critics...
- A comprehensive 30 item final exam is given: multiple list answers, Scantron™ machine scored with detailed item analysis, and standardized questions have been developed across several years so that essentially the same exam is given each time and results can be compared

## Conclusions

Our postindustrial evolutions increasingly engage the value of proactively creating a better future through collection, interpretation, and strategic implementation of information. This is the basis of our information society, knowledge economy and learning organizations. The corresponding motivations to provide architectural research education in an era of increasingly evidence based and interdisciplinary driven design environments is matched in the profession by the advent of Building Information Modeling, Integrated Practice, and the increasingly cybernetic ability to see complex and dynamic relations that have been heretofore beyond both visualization and comprehension. The same thrust of proactive and knowledge based inquiry has created a culture of strategic planning, assessment and accountability into how we teach in the first place. This paper attempts to show how those activities intersect in the model of one course: the teaching of research and the research on teaching.

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## PRACTICAL RESEARCH IS AN ONGOING DISCOURSE OF UNCERTAINTY

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Architectural research within a design practice has different working conditions than conventional academic research. The activities of academic research are typically well-defined, independent from teaching activities and aimed directly at making knowledge. The activities of practical research are integrated into the work and are typically concurrent to parallel project activities that aim at making something useful such as a building or a neighborhood plan. The knowledge gained in practical research is in part a tool used for advancing the work of the practice and in part a byproduct of the design process. Practical research can be grouped into three general types according to different uses of the knowledge gained: research *for* practice, research *about* practice, and research *from* practice. In all three types, research is paired with practice. Furthermore, in all three cases the knowledge gained needs to be extracted and documented so that it can be shared and used beyond the project at hand. Without an extraction process practical knowledge remains internal to the project and, even though such knowledge educates the practitioner, it does not constitute research.

Research activities within a practice are often difficult to distinguish from design activities. This is because the knowledge-making activities and the documentation of the knowledge gained generally use the same tools and depend upon the same skills as those used in design. Nevertheless, research activities are often made to *appear* neatly packaged on either end of their employment: when they are described as future work for a proposal and when they are described as past work in a quarterly report.

However, even though successful proposals and reports rely upon such careful packaging, the actual activities of research in the day-to-day context of a design practice are not independent of the practice environment and often merge into the work of ongoing projects.

Likewise, questions that are relevant to a design practice are not easily packaged. There are two general reasons for this. First, the design *process* is non-linear and open-ended. Second, a design *practice* is shaped by physical science and social science, which both have a degree of uncertainty. This inherent uncertainty increases as questions expand from the performance of a single building to its impact on the environment. Uncertainty increases more as a single building design is expanded to a neighborhood plan or to large-scale planning and land-use policy. The design challenges of our time, addressing problems such as climate change and health risks from industrialization, are made of uncertainty and require us to learn to take into account not only those things we know, but also the things we don't know.

Research in the context of uncertainty is not a simple activity of replacing a lack of knowledge with knowledge, because some problems have uncertainty as a primary ingredient. These complex problems are part of practical research.

### **Gulf Coast Community Design Studio work in East Biloxi, Mississippi**



*Gulf Coast Community Design Studio  
workspace. Image © Alan Karchmer 2008*

The Gulf Coast Community Design Studio (GCCDS) has been working on the Mississippi Gulf Coast since Hurricane Katrina in a physical and social environment that is especially uncertain. The GCCDS is a program of Mississippi State University's College of Architecture, Art and Design, and has provided planning, architecture and landscape architecture services to many Gulf Coast communities and non-profit organizations since 2005. The GCCDS operates as a university research center with funding from grants and contracts for service. However, the day-to-day activities are not only research; they are a combination of research, teaching and practice.

The GCCDS full-time staff consists of a director, who is a licensed architect and Associate Professor, two planners, a landscape architect, and around ten architectural interns. In addition to sustaining a full-time professional staff, the GCCDS has organized three spring semesters with students and has employed both paid and volunteer summer interns. The GCCDS staff interacts daily with community members and workers of partner non-profit organizations.

Much of the work of the GCCDS is in East Biloxi, a low-income, racially-mixed part of Biloxi occupying a peninsula around one mile across and four miles long. The Gulf of Mexico is to the south and the Back Bay is to the north. The population of East Biloxi before Hurricane Katrina was around 10,000. In 2009 the East Biloxi population is estimated to be less than 7000 because of Hurricane Katrina's destruction. The storm surge inundated the entire East Biloxi end of the peninsula. Of the approximately 5000 houses, over half were destroyed and the other half of the houses were flooded.

The GCCDS has a unique opportunity to work in a context shaped by uncertainty. This is because Hurricane Katrina revealed that living on the Gulf Coast carries a higher risk than previously assumed, and because the unprecedented amount of collaborative and subsidized work following Katrina has created an unusual work environment. Both of these conditions have prompted the creation of new modes of practice that are well suited to work in a context of uncertainty by working beyond the limiting self-interests of private ownership. Hurricane Katrina increased the public awareness of environmental vulnerability, causing a type of forced enlightenment to the general population. There are more people organizing and attending "green" activities than in the past, and the discussions suggest that people are becoming increasingly concerned about sustainability

and resiliency. In such a context the GCCDS is inventing a type of subsidized practice that is able to work beyond the limiting self-interests of private ownership.

The subsidized work of the GCCDS in East Biloxi has evolved as new resources became available and as the work of various partners has changed. The evolution of the GCCDS illustrates three important general relationships between research and practice:

1. Research and practice can be combined into funded projects.
2. Research activities run parallel to practice activities.
3. To become research, knowledge should be extracted along the way.

The GCCDS has been successful at securing grants and contracts to support its work on the Gulf Coast. Since its establishment soon after Hurricane Katrina in late 2005, the GCCDS has received over three million dollars in external funding. The following chart shows a general overview of the grant and contract income for 2009.



The initial funding that supported the establishment of the GCCDS was a HUD University Rebuilding America Partnership Grant (URAP). Soon after Hurricane Katrina, HUD announced a one-time grant opportunity for universities to work on the Gulf Coast. Mississippi State University was one of seven universities to receive a URAP grant. The grant was not only important financially to create the GCCDS, but also had two other outcomes. First, the URAP grant application led to a partnership between the East Biloxi Coordination Relief and Redevelopment Agency (since renamed the Hope Community Development Agency). Second, receiving the HUD grant gave the school's effort on the coast validity in the eyes of the university research office and proved to be an effective base from which to seek and receive other funding. The URAP grant and much of the other funding that followed have broadly defined scopes of work, a way of working which has enabled the GCCDS to provide a wide range of design services to low-income communities and non-profit organizations. The effectiveness of the GCCDS to combine research and practice has depended upon maintaining broadly defined funding to respond to evolving community needs and opportunities.

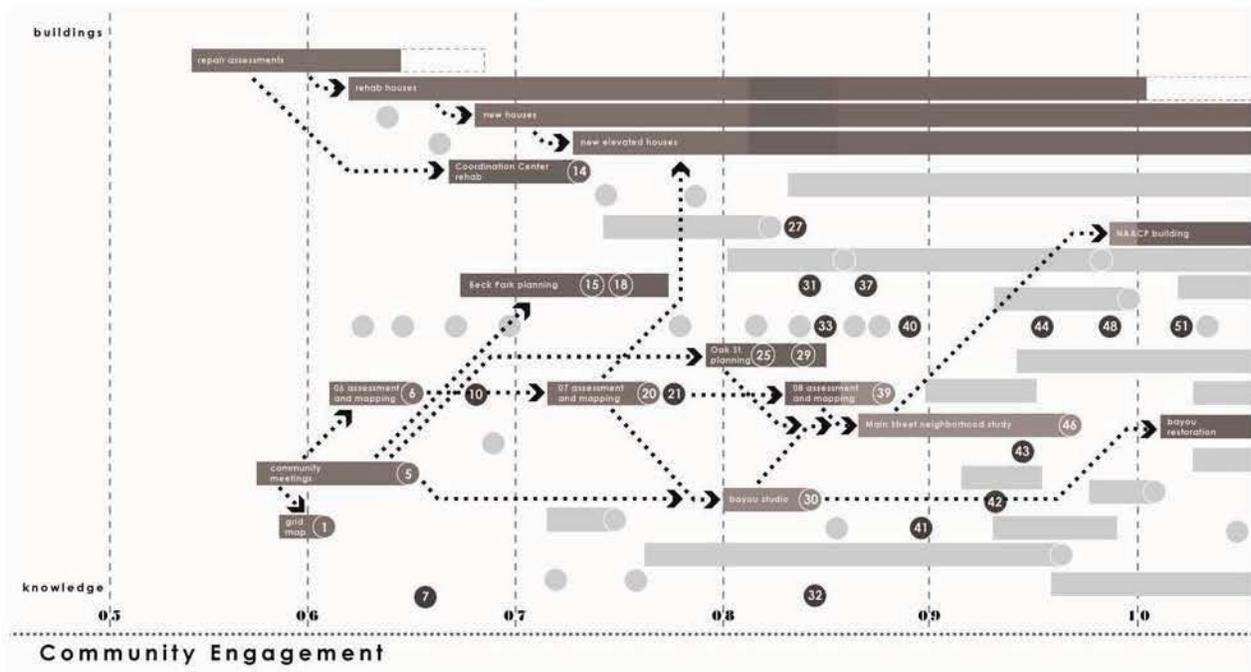
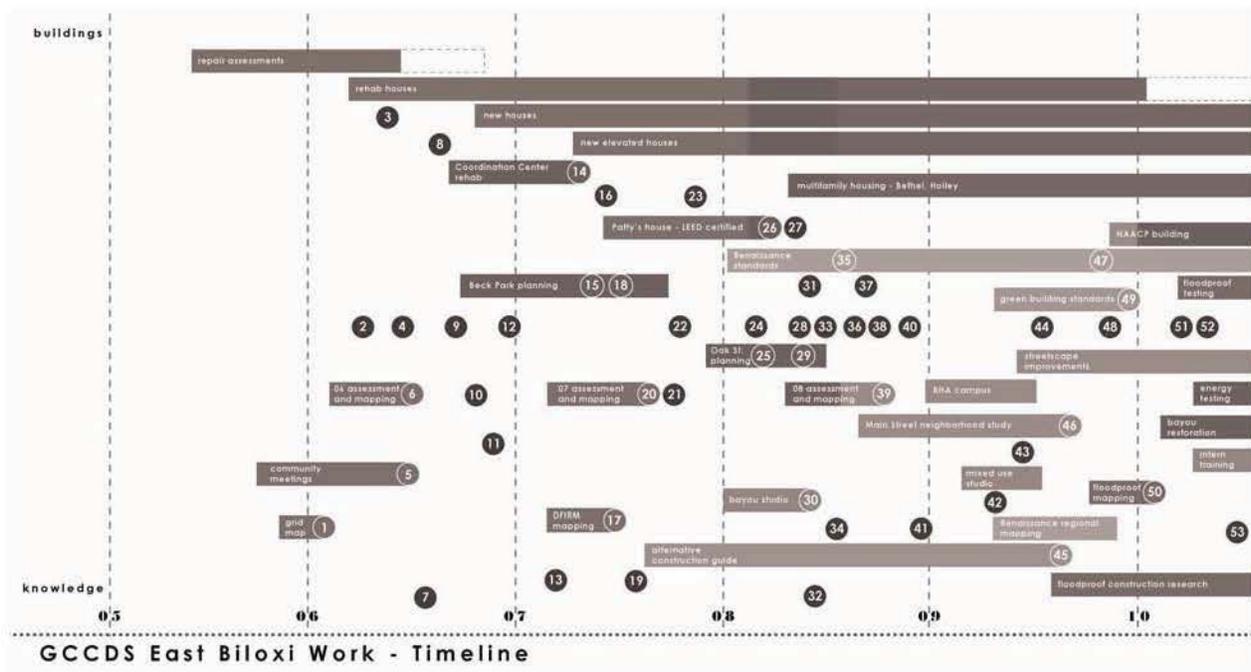
The planning and architectural design work in East Biloxi illustrate how research and community projects run parallel in a grant supported practice. The first diagram on the following page shows the projects that make up the GCCDS East Biloxi work. The diagram tracks projects over time, arranging the projects from those that produce buildings at the top to those that produce knowledge at the bottom. The projects are color coded by funding with outputs designated at they occur throughout. These outputs are activities such as community meetings, reports, publications, exhibits, and presentations that are used to extract and disseminate knowledge gained from the work. There are two target audiences for such outputs. In some cases the audience is the local community, which benefits from information and guidance to help address local problems. In other cases, the audience consists of professional and academic groups that are reached through journal publications, conference presentations, and invited lectures. The GCCDS website serves as a medium for both audiences.

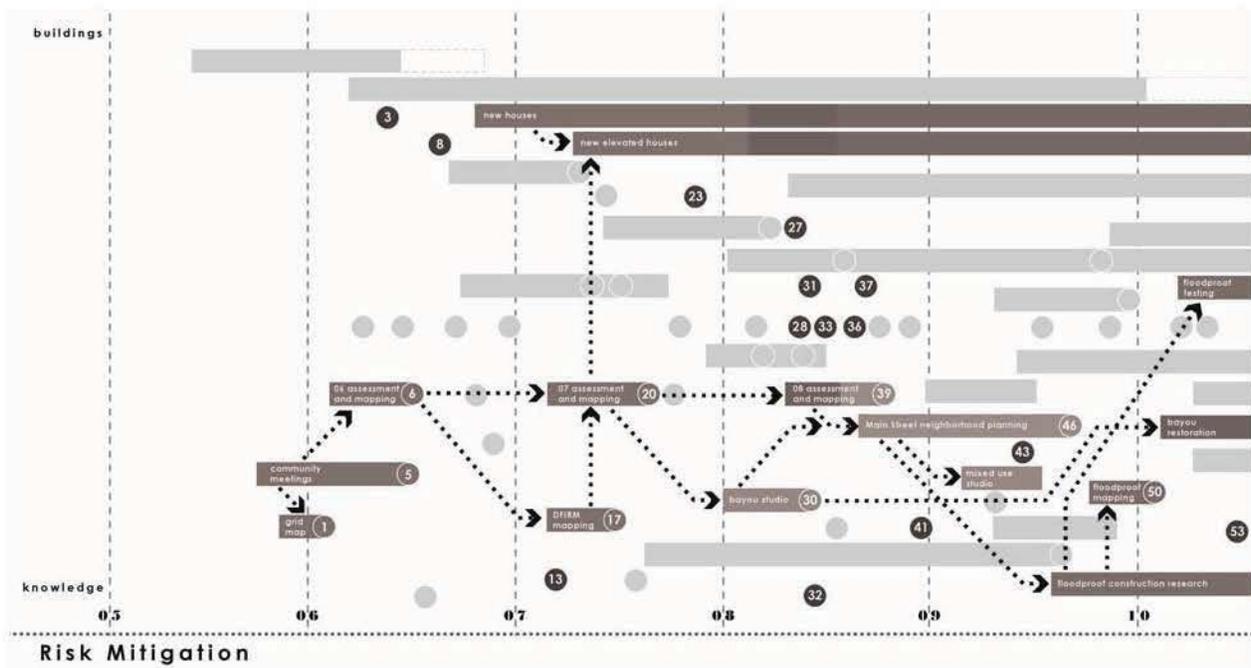
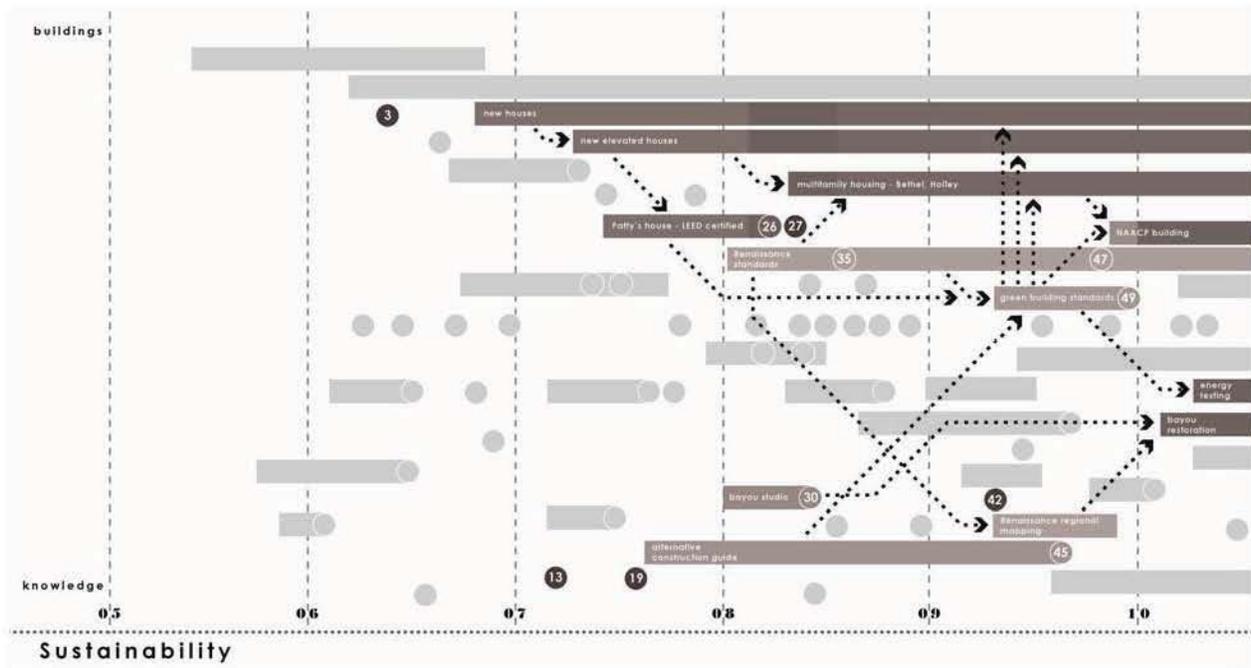
The work diagram illustrates the complexity of practical research and the pragmatic advantages of such complexity. Any design practice has multiple objectives, including such concerns as user well-being, energy conservation, environmental protection, economic security,

public appreciation, and formal expression. A practice has multiple lines that connect various activities. Some activities are focused on completing building projects, other activities are focused on creating new tools, knowledge, and techniques, and other activities are focused on communication. The diagrams on the following pages show some of the connecting activity lines of the GCCDS East Biloxi work, highlighting community engagement, sustainability, and risk mitigation.

### **Risk Mitigation Practical Research**

A line of activity that is particular to the East Biloxi work is staged by the question, "How does a community build in an environment that is now seen to have a higher risk?" This question is addressed by both technical and social means and is the sort of question that is relevant to the design challenges of our time in any city. The line of activity around environmental risk is a line shaped by precaution and uncertainty and is shown in the last diagram of the four that follow.





The line of risk mitigation activities began soon after Hurricane Katrina with a series of six community meetings, a resident survey, and GIS mapping of post-Katrina property conditions. The meetings and surveys were organized in partnership with the East Biloxi Coordination, Relief and Redevelopment Agency and Warnke Community Consultants. The primary output was the *East Biloxi Community Action Plan*, a document that compiled the concerns and priorities of the community for rebuilding after Hurricane Katrina.

The resident survey offers some insight into the community's reaction to an increased awareness of risk. When asked what people liked most about living in East Biloxi before Katrina, the top response was "sense of community." The closely ranked second response was "friends and family." These two responses were selected more than twice the other choices, such as "affordable housing," "schools," and "good place to raise children." Likewise, when asked to choose three things they most wanted to see rebuilt, restored or improved in East Biloxi, the greatest proportion of respondents chose "affordable housing" followed by "sense of community." Placing affordable housing as the top priority is expected with hundreds of families displaced and living in FEMA trailers. However, knowing that the respondents placed sense of community next, rating it above other choices such as employment opportunities, low crime rate, schools, and social services, echoes the reasons people gave for liking to live in East Biloxi. It is a clear indication that the residents value the social support of the community, especially in a time of crisis, and that they identify East Biloxi as a place known to have whatever people imagine when they use the phrase "sense of community."

The activities along the line of risk mitigation are not exclusively technical. Rebuilding a sense of community in an environment of uncertainty requires various activities that aim to provide useful knowledge to the community. Concurrent with the community meetings and surveys the GCCDS produced one of many such information outputs with what came to be known as the "grid map," a map dividing East Biloxi into 24 numbered blocks in order to communicate and coordinate the relief and clean-up efforts. Stacks of the color grid maps, reproduced on 11" x 17" paper, were used by dozens of organizations to plan and distribute relief and rebuilding activities. The pragmatic task of making a well-designed map had a magnified impact. The primary function was coordinating relief activities, but there were two further byproducts of the

grid map. First, the community looked at the map and was able to imagine an organized relief effort at a time when everyone felt overwhelmed and confused. Second, the grid map introduced the community and the many relief organizations to the architects and planners of the GCCDS. Many people in the community were already suspicious of outside planners because of the highly publicized Mississippi Renewal Forum Charrette. In spite of the charrette's support from the state's elected leaders and its positive publicity, many residents were upset that they had been left out of the planning process and were offended that a planning firm from California was showing them "what East Biloxi could look like." The fact that the GCCDS simply made clear and useful maps was an important part of gaining the community's trust.



*East Biloxi neighborhood grid map, distributed to assist volunteer relief activities*

The grid map is one of the many maps that the GCCDS created for use by the community. These various maps include flood maps made to clearly explain the otherwise confusing FEMA flood levels, maps showing the disproportionate impact of the hurricane damage on Biloxi's Vietnamese community, and maps showing the change of policy for casinos now allowed to be built within 800 feet of the coast line. The GCCDS initiated a comprehensive inventory of all the residential property in East Biloxi and created a detailed GIS database of the land use, building condition, and the rebuilding status of the approximate 5000 residential lots in East Biloxi. The East Biloxi GIS database has been updated twice with the help of volunteers, architecture students and GCCDS staff. The data has been used to produce maps describing property conditions, location of FEMA trailers, vacant lots, and rebuilding status. Many of the outputs shown on the work diagram include information created from the GCCDS

property inventory. As the East Biloxi work progressed the GIS property data served as the base for neighborhood planning activities. Future mapping efforts are planned to create in-depth information about the disposition of the over 2000 vacant residential lots in East Biloxi to help the community address issues of ownership, property value, and maintenance, and to consider the benefits of a land trust or land banking to help preserve local ownership and increase community stewardship.

House projects have been a major part of the GCCDS work. To date, the GCCDS has provided full architectural services for over 120 completed new houses, has assisted at a variety of levels in over a hundred rehabilitations of damaged houses, and has provided design assistance on dozens of multi-unit and single-family housing projects. The house projects are an ongoing part of the GCCDS practice. At any time each of the designers in the GCCDS has five or six house projects that are either in design or in construction. In most cases the house designs are particular for a client and site. The GCCDS has been a clear and consistent advocate for sustainable design and for including the home owner in the design process. Each partner organization has been influenced by this design emphasis and has become aware of the benefits of involving residents in design to produce well-built houses that are well-suited to the site and family, are well-loved by the home owners, and appreciated by their neighbors.



*East Biloxi resident Edward Parker with a GCCDS-designed home. Image © Alan Karchmer 2008*

An important lesson for practical research is shown in the diagrams indicating how activities are grouped into various grants. The house design activities have been ongoing and continuous even though they have been supported by different grants with different project periods. Some of the funding is tied into the program being used by a partner organization. For example, a large funding source for rebuilding in Mississippi is HUD Community Development Block Grant (CDBG) funding administered through the Mississippi Development Authority. The GCCDS has a HUD grant that supports design assistance to other recipients of the CDBG funds. Because the GCCDS is paid directly from HUD, the cost of the professional services is not a burden to the homeowner or to the partner non-profit organization. Other GCCDS funding is tied into housing issues. For example, the GCCDS received a grant from the Department of Energy to advance the energy performance of houses being built in East Biloxi. The grant supported research of different energy standards and the creation of design tools to make decisions about building materials and systems. Finally, the GCCDS has funding from a private foundation with a mission of supporting affordable housing and economic development. Such broadly defined funding is helpful to fill the gaps between more defined research grants.

A particular research issue that is part of the risk mitigation activity line is the design of houses that are required to be elevated due to increased flood requirements following Hurricane Katrina. The design of elevated houses has structural, social, economic, and experiential factors, which all require research to gain useful information for design. In addition, as with any design activity, ideas about building and landscape are implemented and inform the language used to engage the client in the design process. These inputs are examples of the type of research *for practice*. The knowledge produced is important to advancing a practice from one project to another.



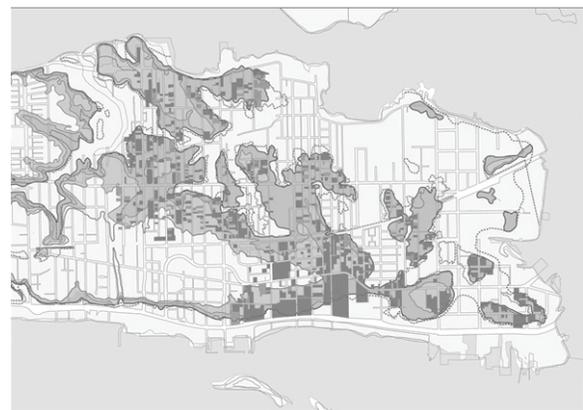
*A new GCCDS East Biloxi house elevated 13' above grade. Image © Alan Karchmer 2008*

The elevated house projects of the GCCDS also teach lessons that can be shared with others. These lessons are examples of research *from practice* and the outputs are as varied as the audience. The diagram shows some of these outputs. They include professional outputs such as AIA design awards, AIA conferences, professional publications such as *Architectural Record*, and open-house events for local architects. The outputs also include peer review conferences such as *Structures for Inclusion*, the *Association for Community Design*, and *Association of Collegiate Schools of Architecture*, as well as publications such as the *Journal of Architecture Education*. There are also many opportunities to share the lessons learned with the general public through local media, to non-profit organization in various conferences and meetings, and to dozens of people that have visited the GCCDS. These outputs are not part of a research grant; however, they are a necessary part of research. Without such outputs practical knowledge remains internal to the practice and does not constitute research.

A return overview of the risk mitigation line of activities shows that the line proceeds from survey, mapping, and house design to neighborhood planning. The primary supporter of the East Biloxi GCCDS planning work is the Knight Foundation, which provides funds through the Biloxi Housing Authority. The audience for the planning work is layered. After Katrina the Biloxi Housing Authority provided

leadership within Biloxi to bring together four other housing organizations to form an informal association that agreed to work together and not compete in purchasing property and seeking funding. The GCCDS was included to help coordinate neighborhood development plans and to be a planning resource for all of the organizations. In addition to the five housing organizations, the audience for the East Biloxi planning work is the residents and leadership of Biloxi.

The formal output of the East Biloxi neighborhood planning work was a final report and presentations to the Housing Authority, to other partners, and to the general community. In a practice, however, informal outputs are often more effective than formal ones. One such informal output has been an ongoing assistance to help the Housing Authority and other partners identify property to purchase. The GCCDS produced a map combining vacant lot information gained from the property survey with flood information from FEMA to show the vacant lots that require less than six feet of elevation for new houses. This map has been useful in a different way than the “grid map” described above and illustrates the evolution of the GCCDS work in the changing context of hurricane recovery. The grid map was needed at the time when hundreds of volunteers were cleaning out and repairing houses. The vacant lot map was needed when housing organizations began to receive funds to purchase property to build new houses.



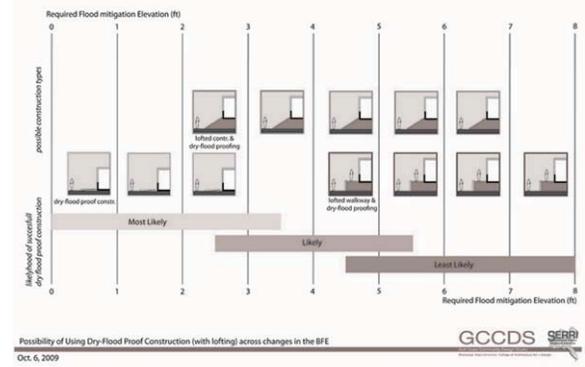
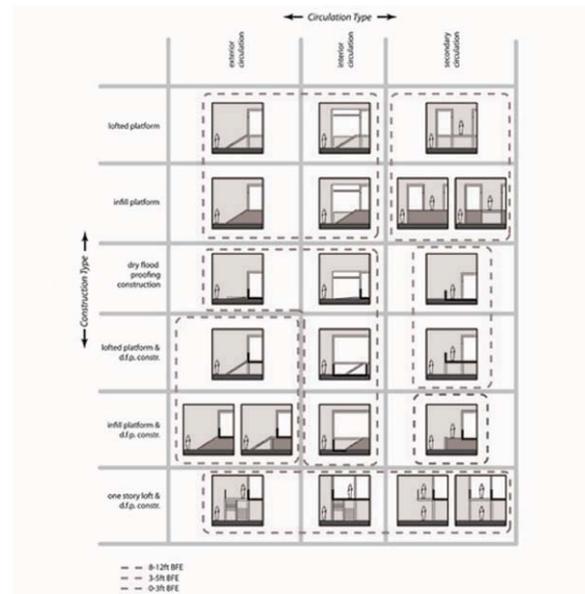
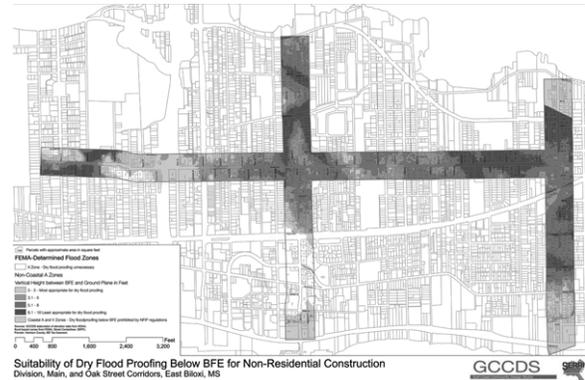
*Map showing vacant East Biloxi properties on higher ground*

The East Biloxi planning work report is not a conventional “master plan” for the neighborhood with drawings of an imagined future with tree lined streets and picturesque shops. Instead, the report is a document with useful

information on existing conditions, available buildings and property, market needs and opportunities, prototype developments, suggested streetscape improvements, and detailed information on the flood mitigation factors that will shape future buildings. The information of flood mitigation is especially relevant along the line of activities addressing risk and is a part of the research that connects the planning work to other later and future projects.

East Biloxi has several historic commercial streets that are now in flood zones following Hurricane Katrina. The base flood elevation (BFE) requirement - the required height of occupied floors above sea level - varies with topography and requires different building responses. Housing is always required to be above the BFE, but there is an allowance for commercial space in some cases to be located below the BFE if the construction meets the requirements for flood-proof construction. However, flood-proof construction is unfamiliar to developers, architects, flood-plain managers, insurance companies, building inspectors, and to the general public. While developing the neighborhood planning work the GCCDS realized the lack of community knowledge regarding flood-proof construction. When a funding program was advertised to the university from the Department of Homeland Security's South-East Region Research Initiative (SERRI) the GCCDS already knew that flood-proof construction was an area of research needed by the community. The GCCDS successfully proposed a SERRI research project to combine planning and architectural research to investigate the flood-proof construction and to create useful educational tools to help Gulf Coast communities better understand the cost, performance criteria, and regulatory and insurance factors of new commercial buildings in flood zones.

The planning component of the SERRI project is illustrative of the continuing evolution of the GCCDS work. The map shown below analyzes the primary commercial streets of East Biloxi and shows how changes of only a few feet in the BFE lead to different flood mitigation responses. The map shown requires a higher degree of GIS expertise to create than the grid map or the vacant property map; the information produced is likewise more technical and advanced. The accompanying building diagrams show different types of flood mitigation strategies.



Flood-proofing schematic building design diagrams

The GCCDS is in the first of two years of funding from the Department of Homeland Security. The SERRI research will include full-scale testing of wall assemblies for strength, water penetration and moisture retention. The output will be aimed at a broad audience and will strive to help the community understand the factors of flood-proof construction. However, along with the general audience there are two other applications for the research. The Biloxi Housing Authority has purchased several parcels along Division Street and Main Street and plans to develop some mixed-use projects. The GCCDS will work with the Housing Authority to explore the feasibility of using flood-proof construction. The other target application is less defined, but comes from the realization that having information on hand will almost certainly lead to opportunities. There is an aspect of hope in the research that the information on flood-proof construction will help a developer choose to build in the low-income community of East Biloxi, bringing much needed jobs and business. As with other GCCDS work the flood-proof construction research will find outputs beyond those promised in the grant agreement. The grant budget includes funds to present the work at several national conferences.

## Conclusion

An open ended practice such as GCCDS is well suited to work in a context of uncertainty because the complex problems of any community have many factors and require long-term work. Even though there are some factors that have available solutions that can be applied to community problems, there are other factors that are inherently uncertain, especially factors associated with environmental risks and health effects of industrialization. Much of the work of this century is destined to address the side effects of modernization, hazards that were once not known, and to proceed with the realization that we will continue to produce side effects with risks that are currently not known. The simple diametric model of knowledge versus lack of knowledge has been replaced by gradual degrees of non-knowing. Uncertainty can no longer be seen as defining those things that will be known once we have better methods of inquiry; it is a primary ingredient of contemporary problems. The threatening risks from the once unknown effects of industrialization are accumulating at a pace that does not give us time to wait for science to clear up confusion and disagreement. Making decisions in the twenty-first century requires the ability to function within different types of non-knowing in order to manage the

effects of what we know and to proceed with caution, knowing how to mitigate the risks of what we don't know.<sup>1</sup>

Uncertainty of this sort should not be confused with probability. The interventionist economist John Maynard Keynes defines the uncertainty of complex problems. As early as 1936 he taught:

By "uncertain" knowledge . . . I do not mean merely to distinguish what is known for certain from what is merely probable. The game of roulette is not subject, in this sense, to uncertainty . . . The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence . . . About these matters there is not scientific basis on which to form any calculable probability whatever.<sup>2</sup>

Practical research, such as the work of the GCCDS, addresses complex community problems with a degree of uncertainty. The research is shaped by the needs of the community because the problems are tied into actual projects. Grants support the work of producing both buildings and knowledge. The grants also create sponsorships that shape the work. Such subsidization should not be seen as a negative complication. A subsidized design practice mitigates the self-interests of private ownership by replacing the simple two-point model of the architect working for a client with a three point model of the architect, the user, and a separate funding source. Community design has traditionally aimed at bringing design services to segments of the population that are not able to pay. In the past, bringing design assistance to low-income communities was enough of a cause to justify the effort. However, in the working space of uncertainty bringing design services to under-served communities is only part of the work, because the impact *on* low-income residents as well as the impact *of* any project beyond its own boundaries should be taken into account. Even in community design, merely pleasing a client is a low standard of success. In other words, there is more at stake than to merely replace a paying client with a non-paying client. The problems of our time require practices that get beyond the limited interests of *any* single client. A practice such as the Gulf Coast Community Design Studio, which combines community projects with research, has the

opportunity to address today's complex problems and produce useful knowledge that helps others do the same.



*East Biloxi residents Nghia and Ban Tran with their GCCDS-designed house under construction. Image © Alan Karchmer 2008*

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**NOTES:**

<sup>1</sup> Theories of knowledge and non-knowledge are part of Ulrich Beck's description of "Reflexive Modernization," in his influential 1992 book *Risk Society: Towards a New Modernity*, and his later writings, especially *Reflexive Modernization*, 1994, and *World at Risk*, 2009. Beck compares linear theories of knowledge in which non-knowing is not relevant, to non-linear theories in which the "types, constructions, and effects of non-knowing constitute a key problem in the transition to the second, reflexive modernity." See Ulrich Beck, *World at Risk*, Polity Press, Cambridge, 2009, page 125.

<sup>2</sup> John Maynard Keynes, "The General Theory of Employment," *Quarterly Journal of Economics*, 1936, page 213-214.

## ***Pedagogical Insight from Complementary Fields:***

### *Engaging Sustainability through Environmental Education and Curriculum Theory*

***Traci Rose Rider, North Carolina State University***

#### **Abstract**

With the emphasis on sustainability and green building continuously growing in both practice and academia, it is important to explore complementary fields that could provide insight and guidance on the inclusion of these themes within formal architectural education. In the absence of a multitude of published works focusing on sustainability in design education, it is beneficial to look to other fields for commonalities. The purpose of this article is to explore the fields of Environmental Education (EE) and Curriculum Theory in search of potential influences to help assist in the much needed shift toward environmental integration in formal architectural education. A number of themes exist within EE literature that can be applicable to architectural education such as systems thinking (Kohak); program and course management (Kim; Moody et al.; Yeung); affective components, such as the use of feelings within courses and designs (Moody et al.); and applied knowledge versus foundational knowledge (White and Mayo). Curriculum theory literature illustrates how connectors between courses and recurring themes in courses and overall curriculum outline a framework and touchstone to establish learning priorities. Though the educational tradition within architecture is important and revered, this is a time for reflection and adaptation. Long-standing traditions do not need to be dismissed, but can be shifted with insight from other fields that have developed research where translations are appropriate. The Environmental Education and Curriculum Theory fields are ripe with insight applicable to the integration of sustainability themes in architectural education.

#### **Introduction**

Acknowledging an attention on sustainability that is permeating modern culture, it is increasingly necessary to reflect on the methods being used to teach sustainability themes within architectural education. Traditionally vague and foreign to other disciplines, the pedagogies and structures within architectural education are built solidly on both tradition and repetition. The scaffolding structure of the curriculum is rigorous and uniform; a focus on the integration of new themes is rare. While architectural education rarely looks beyond the boundaries of its own world through the history and culture that has developed over time, a daunting task such as the integration of sustainability makes it essential to move beyond the traditional scope and considerations. Though sustainability is being addressed more frequently in higher education literature, the number of published works focusing on sustainability in design education is small; we must look to other fields for insight. Two fields that have much to share are Environmental Education and Curriculum Theory. The goal of this paper is to highlight similarities with the field of Environmental Education and Curriculum Theory, and underscore possibilities for insight into the integration of sustainability themes in architectural education.

#### **Environmental Education**

The field of Environmental Education (EE) has its formal roots in the early 1970s, and is a field that is constantly evolving. While the scope of EE started out focusing on topics such as nature study, outdoor education and conservation education, overtime additional topics began to be incorporated into EE's reach, including solid waste management, land-use management and energy use (Hungerford). With the expansion of issues and the inclusion of additional complexity, the Tbilisi Declaration was crafted at a United Nations Educational, Scientific and Cultural Organization (UNESCO) conference in 1977 held in Tbilisi,

Georgia (USSR). In an article published in *Connect*, the UNESCO/United Nations Environment Programme's (UNEP) joint Environmental Education Newsletter in 1978, the Tbilisi Declaration charged the EE field to focus on environmental problem solving, suggesting a focus for the educators in the field (UNESCO/UNEP).

EE now not only examines K-12 education through its root focus on outdoor education and nature study, as is most popular and identifiable to other fields, but has also developed extensive literature on the integration of environmental themes into courses at the university level. A number of these methods and suggestions can be easily applied to and are important in the development of architectural curriculum, and can lend valuable insights to architectural educators interested in the integration of sustainability.

Many of the considerations, goals and challenges for EE are exceptionally similar to those of sustainability and green design in architectural education, as evidenced by the following excerpt from the Tbilisi Declaration:

...environmental education should provide the necessary knowledge for interpretation of the complex phenomena that shape the environment, encourage those ethical, economic and esthetic values which, constituting the basis of self-discipline, will further the development of conduct compatible with the preservation and improvement of the environment; it should also provide a wide range of practical skills required in the devising and application of effective solutions to environmental problems.  
(UNESCO/UNEP)

The foundational issues of EE as noted here, such as addressing "complex phenomena shaping the environment," balancing "ethical, economic and aesthetic values," "self-discipline," and "the devising and application of effective solutions to environmental problems," all speak directly to training the future leaders of and practitioners in the green design movement. Given the similarities in goals, though notably with different contexts, EE advocates and suggests a number of different implementations that can also be seen in, or applied to, architectural education. These include the creation of context, issues with management and assessment, and the importance of affective components within the education process.

### ***Creating Context***

One of the common concerns found between the two fields of EE and green design education revolves around the intertwined issues of scope, complexity, and context. Specifically, the interconnectedness of issues within each field continues to grow, and with that expansion comes the challenge of incorporating additional issues into courses and curriculum. The questions become:

1. What concerns are realistically within the scope for a certain course (or semester or year or program)?
2. How are the selected issues managed without overwhelming the students, but still ensuring that they are aware and equipped to address an array of environmental concerns as they arise in the profession?
3. How is scope and complexity addressed within courses and curriculum to create context for the issues, enabling comprehension and problem solving skills to develop appropriately?

In EE, these issues are often addressed through systems thinking, incorporating ecological and societal systems beyond the traditional scope of a more narrow course or topic (Cortese; Zoller; Gough; Martin; Stephens et al.; Kohak; Sobel). By broadening traditional topics and connecting them more readily to related issues, concerns and possibilities, EE breaks apart the linear and encapsulated "subjects" and exposes students to a more accurate understanding of linkages, problem solving, and cause and effect. This creates a networked context enabling more informed decision-making.

Many faculty and practitioners in the green building design and sustainability movement support the design integration of systems within projects at all levels, from the educational level to real-world construction projects. These methods are often termed *integrated design* or *interdisciplinary design* (Tgroup and Reed; Yudelson; Keeler). The basic notion behind this effort is that a building designed in a cyclical and integrated process, receiving input from all parties on a regular basis (owner, architect, engineers, ecologists, etc.) is able to better address potential barriers to sustainability, as well as capitalize on further opportunities, more readily than the traditional linear design and construction process. In this way, through repeated

conversations with other team members, each contributor is able to better understand and appreciate the larger systems and connections within a design from different viewpoints, enabling the team to capitalize on potential opportunities for efficiencies while eliminating would-be roadblocks at the same time.

Bringing this whole-systems perspective into the architectural curriculum, however, poses some difficulties. Similar to green building themes in architectural education, EE often finds that it is competing for exposure in an overcrowded curriculum, seen as yet another topic to address equally in curriculum structure (Barry). Architectural curriculum typically covers a vast amount of subjects in an already-expanded five- or six-year degree, and the thought of adding “supplementary” information to this crowded curriculum can make any educator’s head spin. However, by integrating these themes uniformly throughout the existing curriculum, the larger subject of sustainability is broken down into manageable parts and applied to existing courses as appropriate, intertwining with existing subjects and courses without the added pressure of introducing another “strand” of topics to address. In other words, instead of incorporating a string of courses on sustainability and green building, highlight green building themes that already exist in history, design theory, materials, structures courses, etc.

As mentioned in the previous EE overview and shown in recent research on the topic of integrating sustainability into design education (Rider), enabling students to understand and address complex and multiplying environmental issues is an important consideration when looking at integration methods. Specifically, by providing architecture students with various frameworks that can help them comprehend issues, strategies and considerations throughout the design process, the overwhelming goal of living lightly on the land becomes more manageable. Some examples of constructs include the use of various green building rating systems and guidelines (including LEED, Green Globes and The Natural Step); emphasizing specific strategies at various levels of education; and using technologies such as energy modeling or the heliodon. In sum, it is important to provide students context and a framework that they can build upon to not only assist them in organizing their thoughts around an incredibly complex and ever-changing issue, but also provide a structure that can be modified as their knowledge, experience levels, and concerns grow over time.

### **Management and Assessment**

Major barriers to integration of environmental literacy in higher education at the foundational level have been identified as program coordination, clarity of course or program criteria, and quality verification for courses offered (Moody et al.; Calhoun and Cortese). This suggests that sustainability integration is frequently felt to be important in the higher education realm, but there are often significant issues of management within departments and institutions. Issues are also cited within program and course management, such as how are environmental themes included at different levels and how they are assessed for quality and consistency (Kim; Moody et al.; Yeung).

Similarly, ecological literacy itself has been generally agreed to be an important inclusion to design programs (Gould and Hosey; Kim; Moody et al.; Yeung). However, the inclusion of these themes remains inconsistent both in individual programs and nationally. While there are often solid supporters at many accredited programs, they may serve as the only supporter, expert and lone advocate in the faculty body. There are also no guidelines with which to measure environmental and ecological themes within architecture programs, nor are there agreed upon goals or assessments for this type of integration. Unlike skills that can be measured through tests and licensing, such as structural integrity and occupant comfort, the introduction of many environmental themes is still so new to the field that no assessment criteria has been agreed upon.

### **Affective Components**

Highlighting the work of the Tbilisi Declaration, the article *An Inventory for Assessing Environmental Education Curricula* notes an emphasis of awareness and attitudes in EE, supporting the importance of integrating of an affective component within education (Kim). In line with Moody et al.’s (2005) position that crafting elements within courses to specifically create and impact the feelings of the students, directors of EE programs cite emotions when describing their involvement and investment in the environmental fields (Reis and Roth). One participant in Reis and Roth’s study (2010) says, “My general approach is having [students] fall in love with the world...” Then, referencing her own journey, continues, “...the heart of the matter is in the wetlands and I am totally in love with it.... Include all the parts, include the body, include the heart, include the soul, include the mind...” Another participant in the study “articulates the intertwined nature of emotions and the objectives of her program, which also suggests that students develop an emotional tie with nature after coming into contact with the environment. According to her,

emotions bring meaning to what students learn in the program.” These examples of EE implementation suggest that affective and emotional components are integral to the effective inclusion of environmental themes in education.

This affective quality - relating to moods, feelings and attitudes - is frequently overlooked in formal education, especially in science-based fields such as architecture and engineering, but may be more easily accounted for in these types of programs' foundational tracks (Moody et al.). This affective, foundational level has been where most success is seen in higher education regarding environmental education, and where the most information is retained by students (Moody et al.). Within the pedagogy of inquiry-based learning at the foundations level, students are forming their own opinions, values and foundations for knowledge that comes later. However, it has been shown that educators place more emphasis on the integration of sustainability into the courses addressing applied knowledge instead of those concentrating on foundational knowledge (White and Mayo). This also produces a conflict between the most effective way to implement environmental education and the perception of educators as to the most valuable way to educate regarding the environment.

Though not regularly addressing any affective elements regarding the students themselves in architectural curriculum, there is frequent reference to the intangible qualities of design that any design students should consider, specifically focused on the occupants. Much time is dedicated within the studio setting to creating beautiful, resonant buildings that elicit certain feelings from the users and public. It would be difficult to argue that the instruction of design in any of the accredited architecture programs in the United States does not speak to emotion and feelings. Given this, the translation of these affective methods could be translated into the instruction of the material instead of rather than just as a product of the designs.

### ***Environmental Education Summary***

It may be that architectural educators interested in sustainable and green building themes begin to more readily refer to themselves as environmental educators in the formal sense, specifically identifying with the field that has been running on a parallel path since the early 1970s. As described by one EE supporter,

Environmental educators attempt to provide the knowledge and skills people need to make wise decisions on environmental issues. Environmental educators help people examine the range of positions associated with environmental issues and encourage them to make their own decisions. They do not simply advocate one set of positions or values. Environmental educators provide people with critical thinking and citizen participation skills. They do not advocate particular actions but provide the skills necessary for people to be responsible citizens who can effectively make informed decisions. (Wilke)

These are goals and intentions seen frequently in formal architectural education, especially in reference to sustainability themes. By identifying with EE on issues such as the creation of context, logistic issues regarding management and assessment methods, and the importance of affective components within the education process, architectural educators can continue to move forward in understanding possibilities for and insights to the integration of environmental themes in their curriculum.

### **Curriculum Theory**

Architectural faculty often have not initially focused on how to teach; they teach as they have been taught, or tweak their own personal experiences as students through an overlay of their own developed values and perspectives, which often result in a similar education method with maybe a slight shift in emphasis. While this has worked for centuries, the profession and concerns to be addressed in the profession are changing. Curriculum Theory can provide insight into the integration of sustainability themes into architectural courses and curriculum. One possible example is the notion of a “big idea,” which uses larger constructs (themes) as connectors between ideas and strategies (Wiggins and McTighe). These types of connectors are already used in some architectural education programs, bridging the different topics to cover within a curriculum, depending on the school's particular focus. These connectors, and the recurring themes, in turn establish learning priorities. This type of educational strategy based in supporting common values within a program helps to find ways to integrate foundational themes into one course, a series of courses, or a whole curriculum as a touchstone to which each faculty and student can return. The

development of these types of theoretical constructs at any level - either across the field, in a specific program, or in an individual course - could greatly impact the retention and frame of reference around sustainability as students move into practice.

It is necessary that as society evolves, higher education curriculum evolves as well. This necessitates continued evaluation and updating of curriculum on all fronts, in all subjects. One of the primary topics covered within the education literature concerning curriculum evaluation is the question of *what* exact qualities are being evaluated and assessed during reviews. It has been proposed within the humanities that emphasis is placed on the actual content of courses, rather than the application of skills once an individual leaves the program (Helm). Helm also notes that it may be important to understand the true goals of the curriculum, rather than in terms of contents, such as how many of what types of courses are offered. This approach favors core values and foundational training instead of strictly catering to applied skills without a solid theoretical foundation, and combats the regurgitation of facts and skills on demand without the student critically questioning what or why.

More specifically, the issue of quality management within curricula is an important aspect of evaluation and is well-covered in education journals. Curriculum is frequently broken down into three specific aspects including *Quality of Design* (QD), *Quality of Conformance* (QC) and *Quality of Performance* (QP) (Widrick, Mergen and Grant; Mergen, Grant and Widrick). The *Quality of Design* category pertains to how well the curriculum addresses the consumer's requirements, which, in the scope of design curriculum, would be the greater field of architecture and possible employers; the *Quality of Conformance* criteria addresses satisfying the design requirements and traditional standards, such as the service being provided and the ultimate gratification of position and pay achieved by a graduate; and the *Quality of Performance* addresses the satisfaction of the end user, in this case the student's satisfaction with their experience. Widrick et al. (2002) propose measures to evaluate each of these three categories – quality of design, quality of conformance, and quality of performance - within a program's curriculum.

Similarly, Gilbert (2000) notes that there are three levels through which some research programs, such as doctorate programs, can be evaluated: quality of individual projects as noted by both the professors and the individuals themselves; the quality of the field of study itself and additional contributions to that field; and the completion of specific stated goals as well as the intrinsic worth of those goals from the beginning. Both frameworks reviewed thus far identify three major – and similar - criteria applicable to all educational disciplines. Though architecture and design are typically viewed as non-traditional in the overall scope of higher education due to the use of studios and the resulting culture, it can still be viewed through this established three-part framework of product, process, and experience.

The three-tiered framework broken out into additional categories of evaluation. Evaluative measures can also be addressed as *intrinsic* and *extrinsic* (Gilbert). *Extrinsic* issues deal with the ultimate “pay-off” of a program, such as achieving program objectives and goals; *intrinsic* issues address “questions about the worth or value of the stated objectives themselves” and question other outcomes that may not be addressed in published or stated objectives (Gilbert). Encompassed in the *intrinsic* values that Gilbert mentions are the curriculum values of *awareness* and *attitudes*, noted repeatedly in literature on environmental education evaluation (Kim).

Methodologically, a number of specific elements can be looked at in standard curriculum evaluation: courses offered and sequence, including course content and coverage of topics; appropriate faculty expertise; admission requirements; employer satisfaction of the new employees; type of employers recruiting; licensing board results; and starting salaries (Widrick, Mergen and Grant). Additionally, in research based programs such as doctorates, elements such as graduate satisfaction and research quality would be reviewed (Gilbert). While some of these elements such as salary, admission requirements, and recruiting employers can be quantified, other aspects are left to qualitative methods such as expert reviewers, especially in the case of the doctoral and research programs.

Another framework to reference when speaking about course development is ‘Backward Design’ as described by Wiggins and McTighe (2005). This design outlines the course development process by identifying the goal of the course first, and then identifying what elements in class may work toward reaching that goal with the students, enhancing the level of true understanding of a topic (Wiggins and McTighe). The notion of understanding is central to the course development process by highlighting ‘big ideas’ to prioritize learning, similar to the intrinsic issues noted earlier (Gilbert). This also mirrors the *Quality of Design* category reviewed by Mergen et.al (2000).

Wiggins and McTighe (2005) identify a ‘big idea’ as a theme that “connect(s) the dots for the learner by establishing learning priorities.” They also use the term ‘linchpin’ as a descriptor for those big ideas; the key to designing courses that work toward true understanding is to identify these ‘big ideas’ and deliberately design tasks around them, instead of touching on every

topic that might be of importance in each applicable subject. The subject matter addressed in courses can be categorized into three tiers. There are elements that are *worth encountering*, which would provide scope and context; things that are *important to know*, such as tasks and overarching theories comprise the middle level; and *core concepts* and 'big ideas' should be found at the heart of the course. In line with this idea of enduring understanding in course development, six elements are outlined to support the development of understanding: the ability of the students to explain, interpret, apply, have perspective, empathize, and have self-knowledge (Wiggins and McTighe). These six facets of understanding ensure that the core topic – or big idea - is wholly comprehended and the knowledge has transferability to other applicable realms. This can only truly happen when a deep understanding is achieved.

Understanding that skill-focused courses, as often found in fields such as engineering and architecture, are also frequent and important, Wiggins and McTighe (2005) outline tips for how to implement the 'big ideas' in this type of coursework. Specifically, they propose that 'big ideas' can be found in the following skill-based elements: the value of the skill and why it is desirable; underlying concepts that support the use and defense of the skill; issues of strategy and effective tactics about when the skill is applicable; and the underlying theory of the skill and why the skill is successful.

To summarize, according to the literature reviewed on curriculum evaluation, three primary perspectives must be assessed when evaluating curriculum: the final product, the process of getting to that final stage, and the individual's experience through the journey. Additionally, these can each be viewed through an *intrinsic* or *extrinsic* lens. Wiggins and McTighe's framework (2005) is similar in its emphasis on core values, as mentioned repeatedly in other curriculum theory literature (Helm; Mergen, Grant and Widrick; Widrick, Mergen and Grant; Gilbert).

In contrast, the evaluation of architecture programs generally consists of topics such as: program overview; providing support and opportunities to students; training students for participation in the profession; diversity within the student population; review of the self-assessment process; review of promotional media; sufficient human resources and support staff; physical and reference resources, including studio space, classrooms and library inventory; financial resources within the greater educational institution; and student performance (NAAB). In relation to the three-tiered framework of product, process and experience referenced previously and common in curriculum theory literature, the emphasis is primarily on the product and the experience, not the process. Regarding the *intrinsic* and *extrinsic* qualities, architecture programs are primarily reviewed with respect to extrinsic considerations, relating to graduates employed, literacy in skills taught, pay scale, etc. Reviewing the *intrinsic* element of programs is not as emphasized, looking at "questions about the worth or value of the stated objectives themselves" (Gilbert).

## Conclusion

Shifting demands on the architectural profession, and therefore on architectural education, require that the standard educational methods seen in formal architectural education are frequently revisited. EE and curriculum theory literatures each have identified elements within their fields that can inform and help to develop sustainability themes in architectural education. EE relies heavily on systems thinking while battling logistical issues with assessment, standardizations and integration methods; similar trends and troubles are seen in architectural education. Additional awareness can be found in EE literature regarding the benefit of incorporating affective components into coursework to emphasize environmental themes.

Most importantly, EE and curriculum theory share similar perspectives on the integration of themes into courses and curriculum. EE emphasizes the creation of a framework to help orient students to the issues and concerns of the field, while the use of a core concept across curriculum is identified in curriculum theory literature as an important key to developing a touchstone and reference point for both faculty and students. Each field addresses barriers to the integration of a common theme throughout programs, recognizing potential methods for extended success. This paper illustrates the value of reflecting on the fields of curriculum theory and environmental education as a vehicle to establish relevant educational opportunities in light of the changing face of the architectural profession.

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## PRESENTATION SESSIONS | **EDUCATION**

### Session Two

Moderator: Michael D. Kroelinger, PhD., AIA, FIIDA, LC



## Mixed Movements - performance-based drawing

Helle Brabrand

### **Body and the making of architecture - summary of aims:**

*Mixed Movements* is a research project engaged in performance-based architectural drawing. The project works with dynamic drawing, relating architectonic implementation to body and movements. My intention with the actual work is to present the drawing material as interactive 'space-time tablets'.

Architectonic implementation is a question of relations between the human body and a body of architecture. These relations are activated by our different approaches to drawing materials. A drawing

may explore architectonic problems at other levels than those related to building. This exploration is a special challenge and competence implicit in the type of architectonic research we call artistic development work. The project *Mixed Movements* generates drawing material not primarily as representation or communication but as performance-based media, making the body being-in-the-media felt and appear as operational forces.

### **Mixed Movements as interactive 'space-time tablets' - summary of method and implementation:**

'Space-time tablet' is a concept you may think of as a kind of computer game or installation, presenting a series of projected interactive drawings and related architectonic 'questions'. The tablets present different tectonic motives related to different forces of movement. The 'player' meets a drawing tablet as an articulated pulsating architectonic statement and, from here on, will be able to 'walk into' the drawing, transforming and deforming its material.

Acting with a dynamic drawing, the player uses her own body movement. The body movements are

simultaneously transmitted into different parameters of the drawing material and also gives rise to discuss scales and levels of implementation. The concept of scale is understood here as a matter of different levels of meaning and presentation, as well as possible courses of acting rather than a matter of size or drawing conventions.

Frames from different drawing-fields of a space-time tablet are presented as figure 1-3.

### **Transformation, deformation and singularity - summary of theory and method:**

In questioning conception of architecture, the notion of transformation and deformation seems especially suitable as two different categories of composing.

Transformation is the domain of diagram or 'thinking with architecture'. A diagram is an arrangement of material and flow-through forces, which may transform the material. Diagrams transform a material from one form to another. The moves of the transformation produce new places or singularities in a transformation series. The diagram operates by making something appear and what emerges is the *Figure* switching between force and form and between transformation and deformation.

Deformation subordinates movement to force and also abstraction to *Figure*. Deformation disturbs or twists the *Figure*, directly related to the different sense organs of the body. Sensation, *Figure*, is already an 'accumulated' sensation related to rhythm – a rhythm running through a drawing as it runs through a piece of music. *Figure*-rhythm relations are the vectors of sensation – they are what make a sensation pass from one level to another. In the coupling of sensation, rhythm is already liberated; it confronts and unites the diverse levels of different sensations: it is now resonance.

### **Keywords**

mixed movements, space-time tablets, interactive drawing, transforming and deforming, diagram as 'thinking with architecture', resonance model, the body being-in-the-media,

## **Body and the making of architecture - aims:**

### ***How to challenge architecture by the capacity of the body to affect and be affected by movement?***

*Mixed Movements* is a research project engaged in performance-based architectural drawing. The work inscribes itself in a tradition that conceives the history of body and architecture as interwoven. Sanford Kwinter characterizes such shifting relations. He points from the ideal body of the renaissance, regulated by geometric figures we know from Vitruvius, to the present understanding, where this ideal body gives way to plastic movements of a surfer.<sup>i</sup> Kwinter describes the surfer not just as a 'first mover' but as a body effort that, in the middle of currents and waves, finds emerging features, singularities and unfoldings she can interact with and melt into through fluent techniques.

The drawing being challenged by this contemporary body is the starting point for my project. Architectonic becoming is a question of relations between the human body and a body of architecture with the relations being activated by our different approaches to drawing materials. A drawing may explore architectonic problems at other levels than those directly related to building. This kind of exploration is a special challenge and competence implicit in architectonic research as artistic development work. *Mixed Movements* generates drawing not primarily as representation or communication but as a performance-based media, making the body being-in-the-media felt and appear as operational forces.

*Mixed Movements* starts in the middle of the current and considers the ordinary walking body as an event of tempo, rhythm and affect. Body movements are video recorded, and the rhythm of both steps and mode of moving are reconstructed into a series of notations and into figures and rhythms of the drawing.

In that way, the work is initiated by a focused sensing of the architect with the sensed being transferred into the drawing. The drawing relates to hidden forces; it points out and incorporates the forces and makes them stand out as modes of operation as well as expressions.

Art is able to anchor perceptions and feelings in a material. Thus, art is able to articulate perception and feelings as independent blocks of sensations. To sense is to meet and exchange: the sensing is connected to the sensed and is thereby changed – i.e., 'sensual becoming' is to become other, to come into being through an encounter with forces inscribed into surroundings, events and materials.

Architectonic becoming exchanges the body of the drawing with the body of man. Space-time motives of the drawings break through as differences or possible

worlds, meeting the sensible human body. From the beginning, the way of tying forces and motives in material and media is oriented towards indefinite life thus challenging everyday repetitions. From the start, aesthetics and ethics are closely related endeavours, incorporated in the transforming and deforming of drawing.

Deleuze talks about the role of art as being able to appeal to the world we live in here and now.<sup>ii</sup> Characteristics of everyday life are repetition and return of the same. Art, therefore, must incorporate these repetitions in order to expose their limits and thereby extract what is different and virtual. The task of a work of art is to open passages from the actual to the virtual thus interrupting repetition and converting copies into simulations and a play of forces. Art extracts 'a little time in a pure state' from the everyday repetitions and thereby opens the capacity of the body to be affected by change.

Converting copies to simulations is an already well-known bodily capacity. Deleuze talks about the everyday body and the ceremonial body, the ordinary movement and the aberrant movement. He argues that these poles rather generate a passage than a difference from the one to the other: the non-perceptible passage from attitude or position to gesture or kinaesthetic twist. To twist body images is art's mode of operation. The 'images' of the body are different to all other images - I know them from without through perception but also from within by feelings. These feelings of body/world forces are the material of art. Art's challenge is to catch and present these forces, not to reproduce or to find shapes - 'not to render the visible, but to render visible'.

*Mixed Movements* opens a composition plane, questioning the passage from ordinary to aberrant movement, from normal to grotesque body:

How to catch the current of everyday life and twist it into dissimilar rhythms, challenging ordinary sensor-motor experience?

How to exploit transgressing power, to measure rhythmic intensity, and to effect and activate the body as part of the drawing process? That is, how to incorporate intuitively created rhythmical changes into the slow work of assembling and breaking up motives, scales, materials and techniques?

And how to unfold these poly-rhythmic and polyphonic drawings so that the compounded other-body of the material may resonate with the acting of the human body?

## ***Mixed Movements as interactive 'space-time tablets' – method and implementation:***

### ***How to kinaesthetically interact with different scales and levels of implementation?***

'Space-time tablets' is a format you may think of as a kind of computer game. The interactive space-time tablets present projections of tectonic material activated by operational forces; they do not mime possibly built spaces. Nevertheless, the idea with the tablets is to provoke 'the whole body' and thereby exploit kinaesthetic know-how.

The space-time tablets present different tectonic motives related to different movement forces. As a 'player', you 'walk into' a tablet and meet a rather advanced drawing material: a pulsating architectonic statement that consists of parallel levels of articulation. From here on, you can interact with the material using different kinds of moves. Acting in/with a dynamic drawing, you use your own body movement related to features in the drawing material. For example working with Wii- or Microsoft interactive consoles, your handling of the material gives rise to sensual interactions as well as to 'discussions' of scale and level of implementation. The concept of scale I address is a matter of different levels of meaning and presentation, and also of possible courses of acting, rather than matters of size and drawing conventions.

The project will present four space-time tablets, each opening up with a specific relation between tectonic motives and movement forces. And each organized as a series of different drawing-fields or modes of operation.

The project is work-in-progress and the figures selected are from a storyboard. Only one of the tectonic motives is active in figure 1-3 below, dealing with a kind of woven fabric- or composite of surfaces- or membranes and lines- or rib/frames, related to a forward-backward rhythm.

The first drawing-field is set up as an animated map or context. The map presents a tectonic and morphologic topology you may scale ambiguously, creating variable condensations and sites for possible new inserts. The player may move parameters of the map components forward and backward, affecting rhythm and form of the individual characters, and thereby change their interrelations.

The diagram force of the drawing-field is this back and forth displacement of the components transforming local situations. The accompanying moves by the player softly deform the situations, twisted also by fine suture- or cutting lines and lines of associative-words. Figure 1 is a frame selected from this first drawing-field.

The second drawing-field uses frames from the animated map as a context for new space-time experiments. The player may choose a single frame from the 3Dmap that hereby is changed into a 2Dmaterial. This 2Dmap-frame now acts as a template for 'intrusion' of new components constructed as local inserts or fragments. The fragments show up as surfaces negotiating with the map-territory – like fronts or entries suggesting 'something not yet defined'.

These new components activate a new diagram, which I call a passage-diagram that organizes different passage-motives as different types of pathways into the field. Figure 2 is a frame selected from this drawing-field. A third drawing-field described below will relate to the 'series-passage' situated in the right lower corner of figure 2, and composed of the same fragment seen from different angles.

The third drawing-field chooses a passage-motive, i.e., the series-passage-motive, and now functions as a drawing laboratory experimenting with space-time figures related to the motive. The field now works with provisional 3Dfragments, constructed as supple surfaces and contours you may break up, negotiating heterogeneous characters, different thresholds and times. The passage is searched creating a 'resonance model' or kind of transparency between more times and places, using multi-exposures along with selection and rejection of component parameters. This multi-views as well as techniques 'inverts' the figure, inversion being one of the operations you may use to question and disturb a composition. By that the setup of passages operates as a probing into what I call 'kinaesthetic twist', seeking to articulate the passage as a figure that resonates between different space-time positions and between transformation- and deformation forces.

The passage-diagram, then, indicates a type of pathway, but also points at hybrid, resonating techniques used to explore the drawing-field. Sensor-motor patterns related to conventional use of drawing-techniques such as section, elevation and perspective are questioned, provoking the involved space-time-figures. Also the exchange between 3D- and 2Dconstructions negotiates the drawing-field in a more open way, twisted as it is into changing orientations and 'depth' of light and texture. 2D'flight lines' cut up, demarcate, gather and outline potential new contours and profiles, questioning the whole drawing-series. The passage-diagram, thus, makes the player move her point of view - in contrast to the diagram of the first drawing-field, where the player is

supposed to move the components. Figure 3.1-3.4 is series of frames selected from this third drawing-field.

**Transformation, deformation and singularity - theory and method:  
How to make heterogeneous materials and forces resonate in architectonic creation?**

Questioning conception of architecture, the notion of transformation and deformation seems especially suitable, as different categories of constructing/composing.

Transformation is the domain of diagram. A diagram works through the control of force-relations; it is an arrangement of material and flow-through forces that may transform the material. Transformation forces relate to the material but are at the same time different from it: they work like a flow of energy passing through, not as an inner source. Rules-of-change of a transformation relate to material, not to substance: to function, not to shape. Dependent on motive, the diagram as a 'body-plan' or a drawing machine may transform and actualize a material as widely different concepts: folded and curled in some sequences, it appears as lion; squeezed and dragged in other sequences, it shows up as zebra.<sup>iii</sup>

Diagrams produce and formalise: compose, limit, stratify, territorize and 'map' the relations in 'abstract machines'.<sup>iv</sup> The recurrent moves of the transformation produce difference – create possible new places or singularities in the transformation series. The diagram controls but also opens up for a resistance – control and resistance function as 'inside' and 'outside' of force relations. A diagram operates with a call for an outer point of resistance, asking what kind of 'outsides' may be confronted to make the diagram productive. Diagrams and singularities make thoughts move, challenged by related force-flows that never cease to shake the abstract machine and provoke the yet-not-thought. The diagram actualises and exposes the drawing process as 'thinking with architecture' – how can architecture be working? What kind of conflicting elements may be thrown into the implementation as new participators?

The setup of a diagram transforms the material from one form to another. The diagram operates by making something appear, and what emerges is the *Figure*. The *Figure* is a condition made visible by switching between force and form, between transformation and deformation. The *Figure* emerges at once and is also gradually constructed as a series. The *Figure* works by making the incorporated space-time motives and forces of the material break through as sensuous operational form.

Deformation subordinates movement to forces and also the abstract to the *Figure*. When deformation disturbs or

wrings the *Figure*, it is directly related to the different sense organs of the body. Every sensation, and every *Figure*, is already an 'accumulated' sensation related to rhythm – a rhythm running through a drawing as it runs through a piece of music.

In his book about Francis Bacon, Deleuze refers to deformation and transformation as two very different categories.<sup>v</sup> He also points out two directions of getting around figuration, i.e., either by abstract form or by the *Figure*. The concept of *Figure* here designates the sensible form related to a sensation – the *Figure* acts immediately upon the nerve system, which is of the flesh, whereas abstract forms are addressed to the head, and act through the intermediary of the brain, which is closer to the 'bone'.

Bacon is cited for recurrently talking about sensation as an act of passing from one 'order' to another, from one 'level' to another, from one 'area' to another – he understands these passages as acts of making sensation the master of deformation. Bacon criticises both figurative and abstract painting as passing through the brain and not acting directly upon the nerve system, failing to reach sensation, and failing to liberate the *Figure* because they remain on the same level. These painting modes implement transformation of form, but cannot attain deformations of bodies.

Bacon is, therefore, concerned about deformation and not transformation. Transformation of forms may be abstract or dynamical, but deformation is always bodily and 'static'. Deformation is obtained by affecting form at rest at the same time as the whole material starts to stir: cloth curls like burning paper. Everything is now related to forces: everything is force. Force constitutes deformation as an act of painting, neither working as transformation of form nor as decomposition of elements. And Bacon's deformations are rarely forced or constrained; they are not tortures despite their appearance. On the contrary, they are the most natural postures of the body when reorganized by simple force exerted upon it: the desire to sleep, to vomit, to turn over, to remain seated as long as possible.

So, paint the sensation! It is essential rhythm, although dependent on the *Figure*. *Figure*-rhythm relations appear as the vibration that flows through the body - it is a vector of sensation making it pass from one level to another. In the coupling of sensation, rhythm is already liberated; it confronts and unites the diverse level of different sensations: it is now resonance.

Figure is connected to outbreaks of the singular. The singular is characterized by coming from without; it stands out as 'other' - as an intensity that may change the view upon the material, which a diagrammatic move has set into action. I shall briefly point out some types of emerging singularities and different intensities or rhythms related to architectonic implementation and the making of the space-time tablets. Once more in a dialogue with Deleuze, the types may be summarized as follows: force, resistance or wild singularities and accompanying, expanding or contracting rhythms.<sup>vi</sup>

Force singularities stand out as special characters in a series, produced by a diagrammatic transformation. The singularity emerges from the transformation as special frames or sequences chosen by the search of an accompanying move. Force singularities come up as suggestive, thought-provoking differences, creating unfamiliar impulses and conceptions. Initiated by different diagrammatic series, this kind of singularity is used throughout the whole implementation.

## Conclusion

Exchanges of space and time, as well as exchanges of object-oriented and performative unfolding, are basic features of architectonic implementation. Architecture is created through working forces - tectonic action works through animation. My project *Mixed Movements* transfers tempi and affects of the 'outer' world into figures and rhythms of the drawing-field. These incorporated space-time motives of the drawing break through as differences and possible worlds meeting the sensible human body. From the beginning, the way of tying forces and motives in material and media is oriented towards indefinite life thus challenging everyday repetitions. From the start, aesthetics and ethics are closely related endeavours, incorporated in the transformation and deformation of the architectural drawing.

Resistance singularities expand or contract a field, assembling and breaking up chosen characters. Arranged in open drawing-fields, resistance singularities may arise as new oppositions, confronting the characters of the field - textual experiments may also be part of these strategies. Parallel to this, the expanding and contracting of a drawing material are set up as resonance models. A resonance model couples different characters and techniques and modulates or deforms components and parameters of the field. The resonance model twists conventional categories of scales and representations, with the player ambiguously both 'moving her view upon' and 'being into' the drawing. In the drawing, she resonates with more localities and depths, with more tempi and levels of meaning.

Wild singularities are non-distinctive forces that stay non-integrated, open to 'other worlds' in the material, for instance, as virtual exchanges between micro- and macro-cosmos. Wild singularities are sought out as 'flight lines' that mutate: break up and assemble, seize and stretch out different domains in and outside the drawing.

*Mixed Movements* addresses the world of architecture as an artistic development work. The project presents the space-time-tablets as an interactive installation, as well as discusses the work-field in a context of education. Common to both agendas is the explorative drawing, engaged with multisensory capacities of the body. Creating and teaching architecture you may challenge the drawing as presentation opposing re-presentation. Investigating space-time you may generate modes of operations that sensualise colliding questions and provisional hypothesis – making the drawing performative.

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<sup>i</sup>Kwinter S. *Architectures of Time. Toward a Theory of the Event in Modernist Culture*. London, MIT Press, 2002

<sup>ii</sup>Deleuze G. *Cinema 2, the Time-image*. London, Athlone Press, 1989

<sup>iii</sup>Oxvig, Rivad, Thau Red. *Diagram*. København, Kunstakademiets Arkitektskole, 2007

<sup>iv</sup>Deleuze G & Guattari F. *Hvad er filosofi*. København, Gyldendal, 1996

<sup>v</sup>Deleuze G, *Francis Bacon, The Logic of Sensation*, London, Continuum, 2003

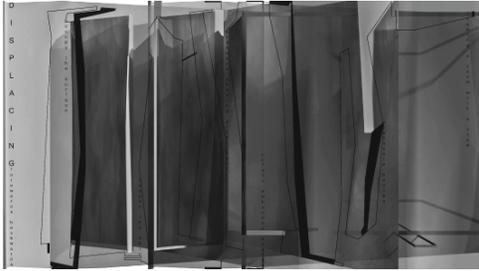


Figure 1.1

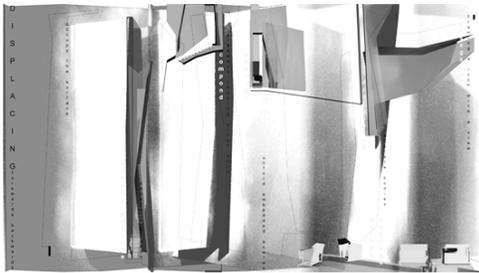


Figure 2.1

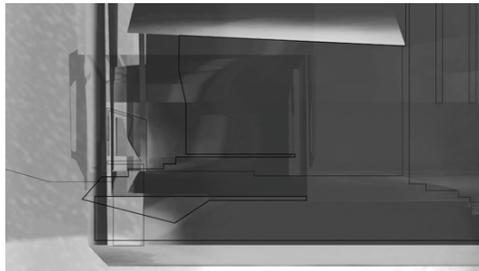
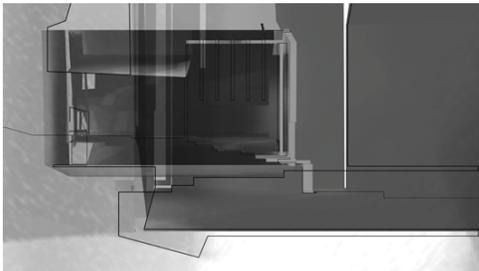


Figure 3.1, 3.2

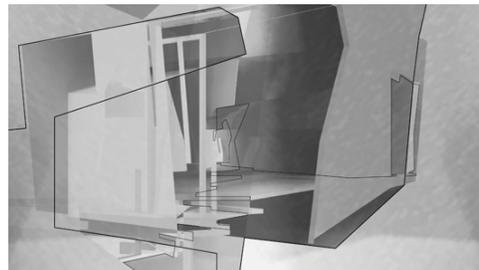
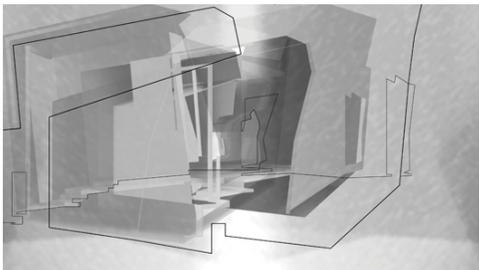


Figure 3.3, 3.4

## ***Private space / public space – Questions of scale***

***By Henrik Oxvig***

This paper will deal with concepts – amongst other things. It will seek to question how concepts may help to distinguish or assemble other things than concepts. Nevertheless, the matter at stake is concepts. The paper assembles concepts, forms sentences, but is at the same time keen to raise awareness about how it does that. It is keen to call attention to what the key concepts mean, or may mean, for the sentences to help analyze and develop the assemblages, or relations, that we call architecture.

The concept of 'scale' will be crucial in this paper. The subject matter, however, is public space and in particular, perhaps, the scalar difference between public and private space. But the paper will approach the subject indirectly. It will proceed through a discussion about the concept of scale, as it remains unclear what it means to say that there is a "scalar difference between public and private space." The reason behind this obscurity is – among other things – that it is but seemingly clear what is meant by the concept of scale.

It requires but a brief moment of reflection upon the ways that the concept of scale is used in various contexts to realize that its meaning is far from uniform. I will provide with examples in the following. For now, in this preamble, it suffices to underscore that the ambition is not to identify one irrefutable meaning independently of the meaning that the concept has – and receives – in various concrete contexts, through concrete assemblages and relationships. Quite the opposite. The paper does not probe for an essence behind the concept but rather for possibilities to work relationally, with a discursive attentiveness to relations. The main thesis is that the meaning of the concept is dependent upon its use, that is, its actual application in concrete instances. As I will try to explain, scale is a question of relevance. The relevance of scales is partly determined by observing the properties of the things one attempts to describe. Partly – when it comes to the conception of things, such as architecture – relevance is determined by the factors worthy of being taken into consideration. My argument is that the conceptual confusion does not rest upon forgetfulness of what the concept means in general. Much rather, it is based on a neglect to consider if it may help, under the influence of certain particular circumstances, to produce, and to attain, particular meanings. There is confusion because a general term takes a bearing of different things – without differentiating them.

In other words, the claim of this paper is that we do not alleviate a conceptual confusion with a firmer definition of the concept's meaning, independently of its concrete applications. To the contrary, we may only help the situation by reflecting thoroughly upon how it is used, what it actually does. And I claim that this focus on use holds creative potentials, for instance possibilities of cross-fertilization between what is commonly called theory and practice.

It should be emphasized that I am not proposing an argument for what some would term conceptual relativism: This paper claims neither that concepts can mean anything nor that what we refer to as "reality" is a mere linguistic construction. Reality is a construction: an assemblage of differences and relations, and language can contribute to the processes of construction, assembly and separation. However it does claim the existence of real relations other than language, and that language can be used to treat reality in a more or less relevant manner. This must be tested on a case-by-case basis. Amongst other things we use language to act in and create (in) reality, which is why our use of language - including the meanings we attribute to our concepts - impacts our understanding of that reality whose new challenges and potential assemblages ultimately render it more and other than language.

This paper draws on the writings of Manuel De Landa. In the programme for his book *A New Philosophy of Society* he points out that his work is ontological and writes that "like any other ontological investigation it concerns itself with the question of what kinds of entities we can legitimately commit ourselves to assert exist."<sup>[1]</sup> This does not mean that language - or its use - has no part to play. Language cannot indicate immutable essence. What it can do is play a part in - and through - the establishment of real constructions of assembly. "The realist social ontology to be defended in this book is all about objective processes of assembly: a wide range of social entities, from persons to nation-states, will be treated as assemblages constructed through very specific historical processes, processes in which language plays an important but not a constitutive role."<sup>[2]</sup>

On one hand this paper attempts to align itself with De Landa's realism, his insistence on "the autonomy of social entities from the conceptions we have of them"<sup>[3]</sup> – on the other it is inspired by Dalibor Vesely's indication that we - the moment it becomes clear that concepts cannot be fixated with unchangeable references or essence - must understand that we describe the world in order to participate, to create, together: "What we normally refer to as reality, believing that it is something fixed and absolute, is always a result of our ability to experience, visualize, and articulate – in other words, to represent so as to participate in the world."<sup>[4]</sup> The space of participation, communal space - this is what Vesely calls "communicative space".

To emphasize the fact that this paper is about the relationship between private and public space considered as the question of (what) scale (does and hence means) I shall quote Rafael Moneo's presentation of Rem Koolhaas' early oeuvre up to around 1990. Moneo writes:

"Koolhaas is interested in hitting upon the right scale. We will discuss this at length when we get to the illustrations of his work, but briefly for Koolhaas scale is inextricably linked to how people – individuals and masses – will use the architecture. His book *S, M, L, XL* addresses this interest in scale while serving as a framework through which to present and organize his work. At the heart of his interest in scale is the importance he gives to the uses that architecture is to serve. Scale is therefore a category that leads from the private to the public. It's what makes it possible for architecture to satisfy the needs that arise in the sphere of the individual and address the spatial requirements of masses. Through skillful manipulation of scale, architecture puts itself at the service of a society defined by mass culture, thereby recuperating the usefulness it had in the past. Koolhaas considers that it's the spontaneous operators – the developers – who have best understood this new usefulness of architecture from the perspective of finding the right scale." [5]

There is no doubt in my mind that Moneo, in referring to the question of scale - is pinpointing a decisive aspect of Koolhaas' architecture. Yet it is not entirely clear what Moneo means by scale. Is scale "a size" as in "The right scale" or does scale refer to communication between different "sizes"? "Scale is therefore a category that leads from the private to the public." Is this a question of different scales: smaller scales, greater scales - like scale models, yet present simultaneously as different aspects and sizes (private, public) of realized architecture? This lack of clarity is widespread to the point of being common - and hence interesting.

Danish landscape architect Jakob Kamp draws the question of scale into his description and critique of the Copenhagen development of Ørestad in Danish daily *Politiken* on 20.08.2009.

Kamp writes: "The difference between other parts of Copenhagen and Ørestad is its scale, or rather its lack of human scale." This would appear to indicate the same ambiguity as Moneo's comments: Scale in the singular must indicate that the Ørestad is characterized by a single scale, one size, that this district of the city has a given size or scale. However, it would perhaps be more correct to say that this area is dominated by an awareness of other scales than the human one, whence Scale to Kamp is potentially a question of a multiplicity of real sizes, which ought to be related, assembled, in a manner which also considers the human scale.

Later in Kamps article, it will become clear that not only is the latter the case, it is also the problem. To put it more precisely: We shall see not only that Kamp wants an architecture capable of communicating between a number of real sizes, between several specific scales, but also that he believes this lack of communication between scales in the Ørestad to be due to the fact that this is a district planned on a single (cartographic) scale, i.e. through a scale model which has occasioned and facilitated work on - and awareness of - one particular "real" scale.

Kamp writes that Ørestad was planned from an infrastructural starting point based on the national level - with the freeway and the regional trains leading to nearby Copenhagen central station and the international Airport - as well as the urban level - with the metro and major roads both leading into the city centre. He goes on to write that this has created a particular type of urban space, designed to the scale of the traffic network. These are urban spaces designed for trains and cars rather than for people. The scale of the car is dominant rather than the human scale: As Kamp points out, the problem here is that all the public spaces were designed for cars.

The scale of cars has been decisive for the scale of these urban spaces - possibly at the expense of other scales. Here lies the object to be investigated and discussed in this present paper: scale is considered in the singular right from the conception of this urban development; as a kind of essence rather than as a question of relations - relationally. Presumably this singular perception of scale means that scale is in the singular insofar that it denotes the relation to reality embodied by individual scale models. One consequence of this individuality is that we forget to consider the meaning of any choice to work at one particular scale. We forget to consider that there is a question of relevance underlying the choice of cartographic scale (e.g. kilometres, metres, centimetres or millimetres). Furthermore, we forget that the widespread notion of identity between reality and model bar the scale is associated with a particular way of utilizing scale (i.e. working with scale models). Instead we tend to experience the fact that reality can occasion working at - and with - several different scales as an unnecessary complication. This applies not only to kilometres, metres, etc. but also to non-metric scales such as those indicated by De Landa and to which I shall return later.

Moneo wrote of finding the right scale - this might be one scale in reality and another in the drawing - but it may be possible to identify the two with one another using an indication of scale precisely because each has only one scale. Kamp sees a connection between considering merely the single scale of cars in creating reality - at the cost of others - and that understanding of (cartographic) scale which ensures identity between reality and the scale model. He writes that Ørestad seems to have been designed at the scale of 1:1000. All buildings, exterior spaces, urban spaces, roads etc. are on the same scale (i.e. that of cars), which leads to a suffocating lack of variety. Kamp goes on to note that these issues are exacerbated by the fact that all exterior surfaces are covered in the same grey, Chinese granite.

The question is whether the choice of cartographic scale - which concerns the relation between drawing and reality - constitutes the underlying cause in the realization of an urban district built with regard for only one scale? In other words we must consider whether working with an awareness of several scales already during the analytical phase requires a certain attention to the significance of this choice: The choice of cartographic scale affects the outcome of analytical processes. Furthermore when it comes to the conception of an architecture that works on several scales rather than seeking "the right scale" we must consider our choice of representations - perhaps working with a number of different ones to prevent representations from determining the

outcome.

As I stated earlier this paper has no ambitions to suspend (conceptual) confusion by insisting on an overarching or essential understanding of scale. Instead the ambition is to be aware of this confusion: perceiving it as a testimony to the challenges that provide the option of considering how the concept of scale works - and may perhaps be made to work - in order to solve some of the real problems manifested in places like the Ørestad and indicated by Kamp. This confusion is pregnant with creativity: Perhaps it is possible to compose an architecture of an entirely different complexity (read "multiplicity of scale") if we abandon the notion that reality exists at one scale while drawings exist at another - an idea that appears quite easy to work with, but which is given reality only in architecture - and does so with unfortunate consequences.

As I already indicated - and a point to which I shall return later - De Landa claims that reality is characterized by a multiplicity of effective scales, effective relations, including scales which are characterized by other properties than metric extent. Instead of reducing the complexity of reality out of consideration for our tools and concepts we should develop them to handle a complex reality in order to give form - to give space.

In the following I shall briefly - with reference to Vesely and Philippe Boudon - seek to imply how the development of the cartographic scale has historically been associated with surveying, with geometry, but in such a way that what was measured and the process of measuring were effectively abandoned in favour of geometry. The consequences have been fatal: The reasoning of geometry is characterized by being true independently of size, of measurement, of scale. Thus I shall first introduce what Boudon referred to as the scale-oblivion of architectural history and his insistence that "architecture is not geometry insofar that architecture always has scale- measurement" before - drawing once again on De Landa and Boudon - I move on to consider partly how real scales, real assemblies may be described, and partly how these scales may be called on as a particular form of attention in the conception of space and form that is architecture.

In his previously quoted book *Architecture in the Age of Divided Representation* Dalibor Vesely describes how we are now experiencing a gap between Instrumental and Communicative understandings of the world. We do not know the world in and of itself as a definable, immutable essence, but through representations that reproduce pulsating relations, assemblies, such as colours meeting on a plane to mimic life. Representations are communication and have through history been carried - rather than enclosed or embraced - by different techniques[6]. Yet the cultural history described by Vesely is the history of how the relationship between pulsating communications and technique have so to speak been reversed so that over time it has become technique, science, that surrounds, includes, measures this pulse. Technical representations are autonomized and encapsulated: separated from life as various systems of expertise. According to Vesely this also affects architecture, previously characterized by the creation of assemblies between differences and as such by its contribution to communicative communions between private and public, between that which we may understand and that which is incomprehensible, yet perceptible etc., etc.. Up through the 18<sup>th</sup> century to the present time we have - according to Vesely - experienced an increasing degree of scientification of existence as well as of everything else - including architecture.

As previously indicated Philippe Boudon pointed out that the invention and development of geometrical systems - of great usefulness to architecture - meant that questions of scale, which are vital to architecture but of no significance to the insights of geometry - were forgotten. This is an ancient problem and an intricate one. As Michel Serres and Gilbert Simondon tell us in each their way, the discovery of scale was associated with the discovery of geometry insofar as geometry was invented by the philosopher Thales through his desire to measure the size of the pyramids: Thales realized that his own shadow on the sand when the sun was at a certain height corresponded to his actual height and proceeded to measure the shadow of the pyramid with the sun at the same angle. The fact of identity between the pyramid and the shadow not only provided him with the measurements of the pyramid, but also with the possibility of producing a scale model of the pyramid, which would fit in his pocket: This model was identical with the pyramid - bar its scale. This was a relational identity of proportions between the sides of the triangle and the pyramid, not of size. Later, during the architecturally decisive epoch of the Renaissance, this proportional identity between building and drawing came to be considered the essence of architecture. This was the basis for later oblivion vis-à-vis not only the relationality of geometry and architecture, but also the fact that architecture - unlike geometry - features relations between actual sizes, between different scales. Science - geometry - on the other hand was busy enclosing art and architecture in what was later to become a claustrophobic embrace.

Through his dialogue with instrumental thought, 17<sup>th</sup> century philosopher René Descartes arrived at the belief that we may best understand ourselves and everything else by our experience of being positioned as an object in geometric space. However we all spontaneously have a different experience: this is not how we find our bearings in the world. What counts is not the body as it actually is: an object in objective space, but a system of possible actions, a virtual body with its phenomenal "place" defined by tasks and situations. Let us - in reference to Kamp's critique of the Ørestad - term this experience in which we all partake "the human scale" and maintain that it is a question of living pulse rather than metric measurability and that this may be why it is easily overlooked in instrumental, geometric planning. That science which according to Vesely was predominant from the 18<sup>th</sup> century on - and of which Descartes' philosophy is a significant exponent - certainly did not find that this was a relevant way to truly describe and understand our world and has thereby contributed to the overlooking of this scale in the name of respect for

science and precision not only in our verbal descriptions, our language, but also in and through the architecture we create.

Yet it would be wrong to overlook the fact that a great deal of modern architecture has actually been created with a sense of human scale. Indeed this architecture is characterized as outstanding and unusual. The works of architects like Frank Lloyd Wright, Adolf Loos, Le Corbusier and Mies van der Rohe were created as spaces for the virtual body with its phenomenal place, defined by its tasks and situations. However these spaces remain islands - and modern architecture has rarely managed to make the scale of the body enter into dialogue with other scales: There is no communication between the architecture of Mies van der Rohe and Hans Scharoun at Berlin's Kulturforum. Vesely calls this gap "a grey zone" and writes:

"In one sense the gray zone is a metaphor for a deep discontinuity in modern culture; in another sense it is a metaphor for the problematic attempts to resolve the discontinuity from a single, relatively narrow position. The typical example is a loose and arbitrary connection established between a highly personal experience and ideas of universal validity." [7]

The problem outlined by Vesely can be traced a long way back through cultural history and which cannot of course be easily solved. Yet Vesely's experience at the Berlin Kulturforum is the same as we see in the Ørestad: islands of good architecture designed with due attention to the human scale Kamp perceives to be missing in the spaces - the public space - between the buildings: grey zones. Hence Vesely's description also appears relevant for the Ørestad - and hence for the question of how we communicate between several different real scales which currently seem to fall apart from one another to dominate each their separate spaces: the body in the private sphere, and the car in the public one.

Boudon proposes a clearer outline of the question of scale, maintaining that it has to do with size and measurement, but relationally so: If it is the case that modern architects like Wright, Loos, Le Corbusier and Mies were attentive to the non-metric dynamic scale of the body in creating their spaces, they have none the less used measurable elements to grasp this non-metric quality. The box of cartesian space is broken to reveal perception in constant motion: creating space in dialogue with the elements of architecture. But perception encounters a number of split levels and these levels are measurable. The architect is capable of seizing an immeasurable spatial dynamic through understanding and rendering it measurable: giving it measurement, scale, concretion through the physical elements of architecture. Furthermore he does so because the bodily scale - when it comes to architecture - must be fitted to other scales like those of materials and constructions which are also - by their nature - measurable: how great a load can they bear - and how so?

Boudon terms this space where the different scales meet and relate to each other and that which we may measure *the conceptual space of architecture*. It must be said that although awareness of measurables and conceptual space does not give rise to great architecture in and of itself, it does appear as though such awareness - including the question of which scales to assemble and give measure - is decisive in altering a situation where good architecture at best constitutes islands in grey space. Differences in scale between public and private space must be determined not only by relative size - the largeness of one in relation to the other; instead we must consider what relations work and form spaces; what scales we may term real, effective and as such worthy of being attentively drawn into conceptual space, where the question of a goal like inter-scalar communication can be addressed and solved with a certain amount of artistic nerve.

I have indicated that De Landa's sociology is interesting in this context; he insists on working scientifically and precisely. However the alternative to such a scientific description of reality is not to establish a position of opposition to science, but involves - amongst other things - reconsidering the borders of science as it is currently effective and working with a certain amount of awareness to what it cannot see, cannot understand, and which may for example be indicated by the human scale: This virtual, non-metric body which we all are and of which we are - perhaps - aware.

Henri Poincaré, a pioneer of topological geometry who inspired i.a. De Landa to be aware of non-metric formations and scales, developed topology partly on the basis of an understanding that science, geometry, does not describe the things themselves: their essences, but rather relations between things (or in the case of geometry between points, lines and planes) partly because he did not find our everyday bodily space of experience to equal that of geometry ( i.e. Euclidian space, which at this point in time was still the space to which Descartes referred and which remains dominant to this day). This was what underlay Poincaré's decision to invent a suitably descriptive geometry that permitted other plastic relations and alterations between its elements than did traditional geometry.

Taking his cue from topology - and from formations that behave in a non-metric fashion - De Landa describes effective scales constituted by relations that may or may not fold and may be considered decisive although their geographic extent is less than that of many other scales, relations and systems (although these may be less intense). The internet is an example of an immaterial scale that may be characterized as a large scale of decisive significance. We experience its effects first-hand in the physical world where buildings - corporate headquarters: call centres - are erected in specific locations and gain significance for their measurable qualities attributed to that specific locality, like the large corporate headquarters erected in the Ørestad.

Like the bodily scale, the immaterial scale of the internet must be communicated through the measurable aspects of the conceptual space of architecture, which are real because architecture gives measure to our world - give measure to scales in and through the relations established by architecture. Boudon writes:

"If Poincaré in the context of everyday space considers that the space of experience is not that of geometry (of Euclid) and sets himself the task of discovering a suitable geometry, then we must correspondingly understand that this suitable geometry is preceded by the dimension of the scales drawn into its conception; rather than speaking of an experience of conception associated

with the space of everyday life, we should discuss an experience of conception that has perception as one of its scales.” [8]

As previously quoted Moneo wrote of Koolhaas' work “scale (...) a category that leads from the private to the public” but also that Koolhaas “is interested in hitting upon the right scale”. When Moneo discusses the 1988-91 Lille-project towards the end of his Koolhaas presentation he says “as on so many other occasions, he wholeheartedly accepts the scale of the contemporary metropolis and the impact of the infrastructure that characterizes it” [9] - hence we understand that according to Moneo Koolhaas' architecture presents us with an awareness of communication between different scales rather than an ambition of striking the right one. For Moneo never expanded on what he meant by saying that scale leads from private to public - so we may wonder whether this is because Koolhaas is not in fact interested in working with scale as a question of relations, communications, and of assembling different sizes.

Sociologist Albena Yaneva spent a couple of years 'in the field' with Koolhaas and OMA - at the time the studio was working on an extension project for the Whitney Museum in New York. Yaneva described the work of the studio through her project, first in the article “Scaling Up and Down” and more recently in her 2009 book *The making of a building. A Pragmatist Approach to Architecture*.

If we are to follow Yaneva it makes no sense to discuss the work on the Whitney project as a question of “finding the right scale” in the singular. Instead this is a work spanning several scales, not only in terms of the models which switch between larger and smaller models of the project, but also and by extension - the scales of reality: Smaller-scale models allow for a working awareness of certain real scales: relations to the surroundings, to the city; while larger-scale models reveal others, more internal to the building itself. Furthermore, the continuous shifts between these two kinds of models - and yet more models (ideas from one model are carried over into others and vice versa) shows studio work to be in dialogue with scale as a relational complex. Furthermore this is not a linear, process progressing from smaller, rougher models to larger, more detailed ones; it is complex. Conceptual spaces are established, altered and transcended through awareness, feeling, pulse. In her preamble to the above-mentioned article Yaneva writes:

“In the scaling venture, two alternative states of the building are simultaneously achieved and maintained: a state of being “less-known”, abstract and comprehensive; and a state of being “more-known”, concrete and detailed. After multiple up and down transitions between small- and large-scale models, the building emerges, become visible, material and real. These scaling trials bring the building into existence.”[10]

Perhaps we are on the track of how working with scale - not as essence but as relationality - may lead from private to public, establishing mutual interchange between the two “scales” in order to enable architects to create pulsating, communicative spaces.

[1] Manuel DeLanda, *A new philosophy of Society. Assemblage Theory and Social Complexity*, (London: Continuum, 2006), 1.

[2] Ibid., 3.

[3] Ibid., 1.

[4] Dalibor Vesely, *Architecture in the Age of Divided Representation. The question of Creativity in the Shadow of Production*, (Cambridge, Massachusetts: The MIT Press, 2004), 4.

[5] Rafael Moneo, *Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects*, (Cambridge, Massachusetts: The MIT Press, 2004), 316.

[6] Vesely writes: “Thus, as Hans-Georg Gadamer points out, in contrast to the conventional understanding, “representation does not imply that something merely stands in for something else as if it were a replacement or substitute that enjoys a less authentic, more indirect kind of existence. On the contrary what is represented is itself present in the only way available to it.” On this account, representation more or less coincides with the essential nature of making, and in particular with the making of our world.” Vesely, *Architecture in the Age of Divided Representation*, 13.

[7] Ibid., 34.

[8] Philippe Boudon, *Sur l'espace architectural*, (Paris: Éditions Parenthèses, 2003), 35-36. Author's translation .

[9] Moneo, *Theoretical Anxiety and Design Strategies*, 357.

[10] Albena Yaneva, “Scaling Up and Down: Extraction Trials in Architectural Design”, in *Social Studies of Science* 35/6, (London: SSS and SAGE Publications, 2005), 867.

## Extended Drawing<sup>1</sup> Within (Embryonic) Design Processes Robin Schaefferbeke, Sint Lucas, School of Architecture (Belgium)

While we evaluate design through the designed objects the designing process generates, thought processes within design are mainly judged through the production and interpretation of graphical artefacts: drawings, images, models and diagrams.<sup>2</sup> Historically design sketches and poetic models used to dominate embryonic<sup>3</sup> thinking within design. Now, the advent of digital drawing and processing techniques has brought about a sheer endless stream of combinatory possibilities to visualize creative thought which changed our designing practice on many levels. Exploring possibilities, combinations and opportunities within new and old media gave rise to a new and certain freedom to approach representations of designerly thought processes and, eventually unprecedented conceptual paths to approach designerly decision making. Nowadays it seems that expressing design has evolved towards a, to some extent, elusive process of intuitively layering, processing, treating and filtering different modes of drawing and image making. Within a few decennia the afore mentioned evolutionary process has constituted a shift in paradigms when considering graphical exploration and thinking processes within design and beyond. The proliferation of digital drawing and editing tools, the emergence of online search engines and the easy availability of digital photography is constantly transforming the way designers and certainly novices perceive preliminary designing processes and is changing the historically established status and value attributed to drawing as a commodity of design.<sup>4</sup>

Within the following we would like to explore and share some of our intentional and conceptual (research) strategies to rephrase (designerly) graphical processes as a hybrid and integral activity within design and more specifically it's education. The following combines research within design and within teaching through the extension of established drawing techniques and processes in order to broaden (graphical) paths leading to design conception. Our project is looking for an adapted approach for graphical explorations within design education and is, ultimately, searching for a "conceptual framework" to redefine the

concept of drawing within design in order to re-approach and re-position the craft within curricular development.

To inquire alternatives within design related drawing and representation we conceptualised *MWM [Messing With Media]*. *MWM* was introduced as a research alter ego which is fuelled by a personal and active trajectory within design, teaching, music and research. As a research project *MWM* messes with media, design, research, teaching, communication and as a practice *MWM* messes with devices, tools, carriers, itself and whatever useful to the concept. *MWM* explores designerly and creative edges from an instrumental point of view in order to inquire the making and doing within creative processes. The intuitive mixing and blending of concepts, practices and approaches is at the core of *MWM*'s research strategy. "Messing" should be read as a pejorative shorthand for artistic expression, improvisation and following one's gut when working towards emerging creative solutions. The "Media" we supposedly mess around "with", consists of a big pile of instruments, tools, carriers, interfaces and what not to enable creative minds to "materialise" embryonic ideas. Research-wise, our "Media" inquires different ways to layer, communicate, visualise and disperse ideas. *MWM* defines "Media", to paraphrase Marshall McLuhan, as "any extension of one's self".<sup>5</sup> From there on *MWM* finds it's main field of inquiry amidst the unlimited combinations of (designerly) extensions to express designerly thought. Since *MWM* is conceptually fuelled thanks to a big variety of people, *MWM* regards itself as a plural entity rather than as a personal venture.



image 01

Thinking about drawing within contemporary design implies questioning its importance, status, value and use within contemporary design practices as well as within our teaching practices in order to position the craft amidst a myriad of graphical possibilities to express design-erly thinking. Thinking about drawing within contemporary design education implies reviewing and reconsidering the medium for a predominantly digital generation, raised in an era where analogue thinking and doing has become an oddity, almost alien. It is our contention that there is a need to rejuvenate the craft to keep pace with current evolutions within the medium and maintain its place amidst the apparent constant stream of novelties and possibilities which are being developed to aid designers to explore graphical thinking in one way or another. While software developers are constantly searching for the intuitive freedom of freehand drawing, *MWM* likes to turn things around through exploring combinatory processes of freehand drawing allied with different interfaces, techniques and approaches in order to discover hidden possibilities within design drawing and to see if the process is able to inspire other ways to inspire design-erly decision making.



image 02

Within curricular approaches and design-theory there is a strong tendency to consider freehand drawing as an isolated and ascetic activity. We tend to disagree with this view since the tendency to isolate the activity seems to ignore the medium's position within design practices today. Drawing, within contemporary practices, is (still) regarded as a (valuable) design tool amidst a myriad of graphical possibilities enabling designers to communicate design-erly thinking. Drawing is an accessible, fast and effective way to explore and visualize spatial and conceptual moves within thinking processes. Nevertheless design curricula still maintain to regard freehand classes as an isolated course. These curricula introduce novices within the craft of drawing through focussing on the development formal and technical (drawing) skills to develop and express spatial thinking within design.<sup>7</sup> But designers do not draw for the sake of drawing, the activity serves a purpose within the process and the produced images and drawings are the only way to communicate the thinking processes within. Design-erly drawings serve a purpose outside the drawing and this is what distinguishes design-erly drawing from drawing as a artistic expression. In that sense isolating the craft rules out many opportunities to incorporate design-erly thinking within learning processes. While it remains clear that developing skill within drawing remains an important asset to examine graphical spatiality we have to start asking ourselves whether developing the ability to draw well, still constitutes the primary base to explore design-erly thinking or to develop one's self as a designer.<sup>8</sup> Contemporary designers and novices within design develop their expressive skills through the initiation and exploration of a variety of drawing techniques, Computer Aided Drawing, digital modelling and rendering techniques, model making, image editing and whatever might seem useful to develop a personal way to express design-erly imagery. Still, a lot of educational programs seem to fail to adopt an integrated approach towards developing personal media strategies. Mixing, layering and blending media within education implies a change in attitude from students and teachers alike where we will have to deal with differences on many levels. Then again, we have to accept that the designing practice has changed and that it is our responsibility to reflect these changes within our curricular approaches.

*MWM* has introduced *extended drawing* as a concept to investigate the possibilities these changes bring about within design-erly drawing. *Extended drawing* is considered as a collective noun to include different ways to

deal with changes within the designerly drawing process. The term *extended drawing* is inspired by extended techniques within musical practices and is looking into improvised music<sup>9</sup> to inquire intuitive processes within practice. Within musical practice and certainly within improvised confines, extended techniques are used to change the aural manifestation of existing instruments or instrumental techniques through manipulating sound with external devices or deviant playing techniques. Within improvised music extended techniques are inquired and used as a way to broaden the musical capabilities and possibilities of the players within the act of improvisation. Likewise *extended drawing* searches for alternative, deviant and layered approaches to treat and/ or manipulate drawings in order to broaden the *palette* within designerly drawing and consequently -thinking. Embryonic thinking within design typically tries to keep things open-ended in order to avoid to get stuck within already fixed concepts and ideas. Within this preliminary process the exploration of designerly opportunities seems to thrive upon externalising and communicating personal, instant and intuitive responses triggered by a certain design question without being overtly specific about it. The presumable presence of instantaneous and intuitive reactions within design-thinking drove us to peek into musical improvisation to see how the ability is developed within

that practice. *Extended Drawing* is looking for possible conceptual parallels between improvised attitudes and the practice of graphical thinking and decision making within design. While we are well aware the practices may seem far apart, the act of graphically exploring design and the act of instant composing<sup>10</sup> share at least some characteristics. The practices think within the act of doing and/ or do within the act of thinking and both the thinking and the doing are interconnected, inspiring each other's creative elaboration. On top of that the practices share a reliance on one's creative qualities such as personality, moment within time, available and embodied information and instruments, external stimuli, collaborative thinking and skill within the making and doing to purposefully add value to the creative evolution of the thing one is working on.

*Extended drawing* (ab-)uses mixed-media approaches to inquire whether the concept is able to generate intuitive and instant reactions triggering decisions leading to design conceptions. The concept is being inquired within curricular development as well as within personal experiments within architectural thinking. Through research, making and doing the project intends to inquire and nourish integrated paths within curricular development through investigating alternative learning processes within designerly drawing. Through repositioning designerly drawing as a (valuable) starting point or intermediary tool within a process rather than as a autonomous activity *Extended Drawing* searches for an updated vantage point to approach media within design curricula. *Extended Drawing* draws upon one's individual capabilities (and shortcomings) within drawing combined with a personal quest to augment one's thinking by processing preliminary representations through thinking and doing, through combining and layering different media. As such the project tries to get away from general contention that expressing design is a matter of learning how to draw well by embracing evolutions within graphical media and (re-)searching an adapted position for drawing within the myriad of possibilities designers can attend to within the process of exploring design.

*Extended Drawing* is directed towards the moment where action drives the thinking and how that moment is possibly influenced through the use and outcome of graphic manipulations. *Extended Drawing*, as an activity, is paralleled with the active improviser's state of mind in order to inquire whether this state is able to explicit and inspire strategies to deal with a certain intuitive freedom

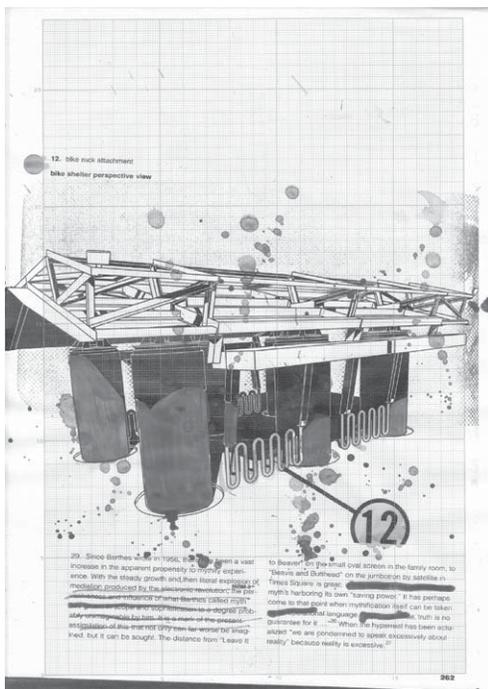


image 03

within the act of expressing preliminary thought. Freedom within improvisation, and we have to be clear about this, doesn't imply one does as one pleases. Improvisation is mainly regarded (or misread, depending on one's vantage point) as a quality to creatively deal with unforeseen hazards or the practice is (mis)interpreted to allege in defence that a certain activity is subdued to possible failure. The appearing chaotic and unruly nature of improvised performances (and music), certainly doesn't help here. While it may seem that musicians appear to act within ill defined goals and intentions and have a tendency to break with every possible rule defined within our, dominantly western, musical guidebooks<sup>11</sup> it's precisely this tendency to attack and/or question certain doctrines within practice which is potentially able to offer starting points to question our very own dogma's within designerly drawing and it's teaching. Underneath the seemingly unorthodox character of the practice and it's performances lies a dedicated attitude of *constant preparation*<sup>12</sup> and an ability to deal with changing paradigms within the musical flows. The manipulation of certain artistic rules is achieved through practice within the characteristics of a repertoire of musical figures, through the development of reflexes and skill to instantly deal with (pitfalls attributed to) certain rules and characteristics within performance.<sup>13</sup> Which in turn takes practice, discipline and

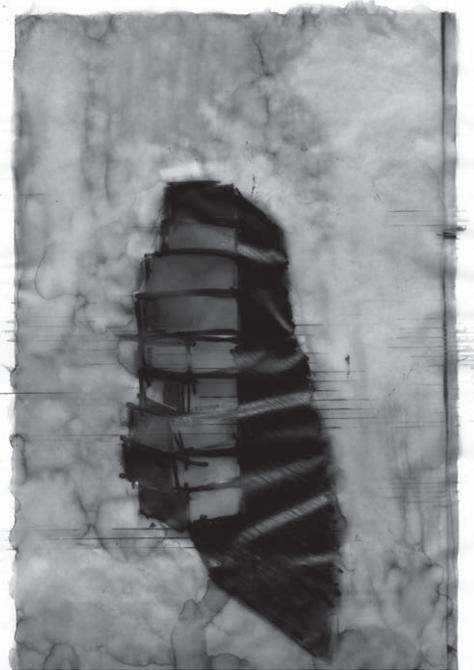


image 04

a dedication to deal with and augment personal preferences, explore and expand boundaries within one's own capabilities as well as within the musical boundaries of a certain musical ideology in order to develop a individuality and expertise within the subject material. This dedication is what *Extended Drawing* is aiming for in order to develop a personal approach within expressing designerly thought. Through exploring improvisation as an attitude within design the project searches for a more critical approach towards the concept of drawing and whether inserting concepts, practice models and intuitive reactions inspired by the practice of musical improvisation is able to open up opportunities for a better understanding of (some of) the intuitive processes within designerly decision making by the use of graphical thinking.

Currently a *MWM-workshop* is being defined and furnished to inquire the the concept of *Extended Drawing* practically.<sup>14</sup> The *workshop* intends to, in time, replace the traditional drawing room while keeping drawing at it's very centre. The *workshop* fuses cutting edge, vintage, mechanical, analogue, digital, experimental and instrumental extensions and intends to instigate and investigate possible instant expressions within design. Through considering the fusion of different media as as an integrated pedagogic approach *MWM* is interested to see what will happen to the teaching of basic designerly drawing and ultimately the effect upon designs within the designing studios. Through conceptually extending the drawing process *MWM* will actively inquire whether the concept is able to open up or change personal (graphical) vocabularies and/ or affect (the development of) drawing and reactive skills towards designerly questions. Our biggest *headbreaker*, here, remains whether the concept is able to have an effect on designerly thinking at all. The *workshop* is set up to inquire and develop the concept of *Extended Drawing* through making, doing and acting within a more or less contained environment, isolated from certain constraints of daily practice such as clients, project deadlines and so on.

Research-wise the *workshop* activities are complemented and fed by the structuring of a conceptual framework. In order to delineate the concept of *MWM* and it's idea of *Extended Drawing* the framework investigates possible and referential practice based and conceptual levels which are communicated within a printed and self-published medium. Our *MWM-zines* are written, illustrated, designed and fabricated to give an account of the project's

proceedings, findings and inspirational aspects.<sup>15</sup> Through adopting a more informal writing style, as opposed to a more academic approach, the *zines* intend to inform and draw a broader, practice oriented, audience consisting of colleagues, teachers, students and practitioners within allied fields. The idea of producing *zines* was developed as a personal strategy to get on with the (research) work and to develop the framework through exploring and communicating concepts, vantage points and whatever may be of interest to the research project and/ or considered worthwhile to share with an audience. The *zines* travel along wherever they can generate value and/or input to the project (conferences, interviews, schools, tutors and promoters) and provides the project with a visual identity to the world outside. Producing *zines* forces us to externalise developments outwardly in order to generate feedback towards developing material and actively broadening the project's interest group. Both the framework and the *workshop* activities are used as tools to investigate alternative approaches and processes to explore, express and think within embryonic design processes. The combination of research and practice searches for a mutual amplification of the concepts and practices governing the project.

*MWM* and it's concept of *extended drawing* is not intended as a conclusive study. Rather than that it is intended to gain and produce knowledge through defining on-going investigations within contemporary (designerly) drawing and embryonic graphical thinking, to redefine the process and teaching of designerly drawing. As such the building of the *workshop*, the deliniation of a guiding framework, together with the broadening of the research and interest group has to assure a continuation of the concepts and thoughts developed within the project. The, more or less, personal vantage point and writing direction, inspirational practices and sources intend to add

and expand knowledge to research communities within design, design based drawing as well as to the practice of improvisation and beyond. *MWM* is not looking for a definition, theory or exploration of improvised design; rather than that the project is looking for an understanding within process based thinking where creativity prevails over object-oriented solutions. Through consciously approaching graphic explorations within design as an improvised act the project searches for a better understanding and practical application of the intuitive creative processes which govern personal, meaningful design decisions and improvisations. (designerly) Drawing finds itself in an an adaptive and hybrid state of evolution, in order to keep track and maintain the medium's status, value and evolution within design practice (and it's education) *MWM* searches for a possible strategy to re-approach activities within exploring embryonic design through the medium of drawing in all it's forms.

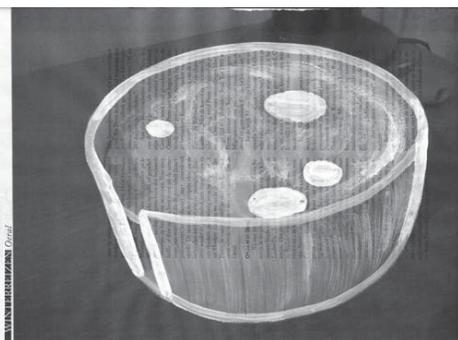


image 05

All images were generated during the course "analogue vs. digital" 2nd bachelor (interior) architecture. The course inquires exchanges between analogue and digital image editing techniques. The drawings combine freehand and/ or digital drawing, printing techniques, coloring techniques and graphics which alter the visual display of raw explorations. Based upon experiences within the course *MWM* now will inquire whether manipulating the drawing process is able to change or influence the way designers perceive the representation and, as such, change decisions within the designerly process. Images by: Daphne Janssens (image 01 and 04), Tim Bastien (image 02), Stijn Jonckheere (image 03), Katleen François (image 05), images courtesy of *MWM*, Sint-Lucas School of Architecture.

(1) The notion of extended drawing is based on the notion of extended techniques within the musical practice: extended techniques are performance techniques used in music to describe unconventional, unorthodox or “improper” techniques of singing or playing musical instruments. [source: [http://en.wikipedia.org/wiki/Extended\\_technique](http://en.wikipedia.org/wiki/Extended_technique)]. See also R. Schaeferbeke: *Extending Technique* (MWM-zine#02, 2009) for an exploration of the concept and further references.

(2) Alberto Pérez Gomez/ Louise Pelletier: *Architecture and the Perspective Hinge* [2000, MIT-press]; Bryan Lawson: *What Designers Know* [2004, Elsevier Ltd.], Dalibor Vasely: *Architecture in the Age of Divided Representation* [2004, MIT]

(3) Embryonic is used here as a metaphor to define the early stage of design where the (design) problem is stated and no explicit designerly actions have been undertaken. Within this stage everything is possible and ideas are built upon intuitive concepts. Extended drawing inquires varieties of graphical explorations of designerly ideas within this preliminary stage.

(4) see Bryan Lawson: *What Designers Know* [2004, Elsevier Ltd.]; Marc Treib (editor): *Drawing/Thinking* [2008, Routledge]: *there is a concern amongst researchers, practitioners and tutors within design that the devaluation of the act of thinking through drawing is changing the way designers think within design processes. While authors acknowledge the change, it seems uncertain as to what it implies for the future and the development of graphical thinking within the practice.*

(5) Marshall McLuhan: *Understanding Media/ Media Begrijpen* [1964-2002, Gingko press/Uitgeverij Nieuwezijds]

(6) Since these hybrid approaches are *in se* individual and dependant on different parameters such as: personal approaches within the act and towards design, collective attitudes within a designing team, embodied tools and approaches of the designer(s) involved in the process, possible launches of yet another interface to facilitate our activities amongst other things which may influence the graphical process. The difficulty to pin down an exemplary approach makes the process a complex one to study. Part of the *MWM* strategy is to reveal parameters in order to build a framework to deal with the complexity within teaching.

(7) The statement is based upon personal experiences within our department and several interviews and net searches revealing that introductions within drawing still are regarded as an isolated medium. See: *how to draw a cup of tea within the MWM-zine#02*. Publications such as Francis D.K. Ching: *Design Drawing* [1943-1998, Van Nostrand Reinhold], Koos Eijssen/Roselien Steur: *Sketching* [2007, BIS] also focus on the development drawing skills while other studies and publications are gradually exploring mixed uses. For approaches towards integrating media see: Marc Treib (editor): *Drawing/Thinking* [2008, Routledge], Bennett Neimann: *Be-Bop constructions* [2009, “Communicating (by) Design”]; Sint-Lucas/Chalmers; Brussels/Göteborg, 2009), M. Saleh Uddin: *Hybrid Drawing* (1999, John Wiley and Sons).

(8) Practices such as Greg Lynn’s *Form* or Kas Oosterhuis’s *ONL*

(amongst others) prove that one can generate fascinating architectures by using nothing more than computers and mathematics. Who are we to judge their lack of freehand skills, if any?

(9) Free improvisation or free music is improvised music without any rules beyond the taste or inclination of the musician(s) involved; in many cases the musicians make an active effort to avoid overt references to recognizable musical genres. The term is somewhat paradoxical, since it can be considered both as a technique (employed by any musician who wishes to disregard rigid genres and forms) and as a recognizable genre in its own right (source: [http://en.wikipedia.org/wiki/Free\\_improvisation](http://en.wikipedia.org/wiki/Free_improvisation)); Next to free improvisation the project also includes practical and theoretical developments within the practice. Some composers actively search for broader bases through adopting concepts such as game-theory, graphical scores and so on. Within these advanced improvisational concepts musicians and composers search for freedom within agreed boundaries in order to avoid genre-specific traps.

(10) Instant Composing is another way to define the act improvisation. See: Eddie Prevost: *No Sound Is Innocent* [1997, Small Press Distribution], Derek Bailey: *Improvisation (It’s nature and practice within music)* [1993, Da Capo Press]; George E. Lewis: *A Power Stronger Than Itself* [2009, University Of Chicago Press]; John Zorn (editor): *Arcana I, II, III, IV* (musicians on music) [2000, Hips Road/Granary Books, 2007, Hips Road/Tzadik, 2008, Hips Road/Tzadik, 2009, Hips Road/Tzadik]

(11) for instance concepts such as harmony, structure, instrumental techniques, instrumentation, scales, rhythm, pace, composition, style,...

(12) David P. Brown: *Noise Orders: Jazz, Improvisation, and Architecture* [2006 University of Minnesota Press]; our italics

(13) Bailey (1993), Prevost (1997), Zorn et al. (2000, 2007, 2008, 2009)

(14) The workshop will be located within the Brussels campus of Sint Lucas, school of architecture. The development of the workshop is supported by the department in order to inquire new strategies within representation and will be paralleled by a more digitally oriented lab within the Ghent department. The workshop and the lab will closely work together to exchange knowledge from the different media-related research projects within the department.

(15) A *zine* (an abbreviation of the word fanzine, or magazine; pronounced [zi:n], “zeen”) is most commonly a small circulation publication of original or appropriated texts and images. More broadly, the term encompasses any self-published work of minority interest usually reproduced via photocopier on a variety of colored paper stock. [source: <http://en.wikipedia.org/wiki/Zine>]

## PRESENTATION SESSIONS | **EDUCATION**

Session Three

Moderator: Michelle Rinehart, Ed.D



## **DESIGNhabitat: design/research + design/build:** Expanding the Design//Build Model

Justin Miller, Auburn University  
David Hinson, Auburn University

### **ABSTRACT**

This paper presents the evolving work of the DESIGNhabitat program over its past eight years. This program has been responsible for the research, design, and construction of several high quality energy efficient homes for Habitat for Humanity homeowners throughout the state of Alabama.

Over the past decade the design/build studio has moved from the fringes of design education to become a significant pedagogical tool utilized in the curriculum of architecture schools across the country<sup>1</sup>. As schools have become more experienced with this model of teaching, the goals pursued by some schools have expanded (beyond the enhanced learning experiences gained from hands-on experience and community service) to include specific design-based research objectives. These research goals have increasingly centered on improved building performance with (in the case of the DESIGNhabitat program) the inclusion of simulation as a critical component of the program design.

This integration of research into the design//build studio model is evidenced in the prototypes designed and constructed by university teams competing in the solar decathlon, as well as in design//build studios engaged in varying combinations of design/simulation/fabrication at a range of scales from the component scale to full working prototypes. These studios rely upon and simultaneously (through builds and fabrications) test the limits of current tools and technologies. Further, there are studios that have leveraged the predictive capacity of digital tools available to the profession to engage in design research. These studios use simple, yet powerful digital tools to simulate the performance of preliminary designs in order to test an array of potentials prior to any build phase - in

essence a design/simulate/build studio model. These studios often serve to test particular hypotheses, or demonstrate integrated design strategies to audiences beyond the discipline of architecture . and are frequently requiring a greater degree of inter and multi-disciplinary collaboration.

These research driven design//build studios also expand student learning experiences in practice environments that require varying degrees of collaboration and consultation, and introduce students to tools and technologies that are novel in architectural education. The work of these studios tests specific propositions, and/or demonstrates specific effects of a particular design process, and in doing so it often extends the research agenda beyond known capabilities and make requisite the ability to exchange information with a variety of collaborators and consulting specialists.

## INTRODUCTION

The DESIGNhabitat program is an ongoing collaboration between the School of Architecture and the Alabama Association of Habitat Affiliates. From its inception in 2001, the partnership has been a vehicle for applying the energy and talents of the School of Architecture to the challenge of designing and constructing high quality affordable housing.

In addition to exploring design options that Habitat could not pursue on its own, the School of Architecture utilized the DESIGNhabitat program as a methodology of teaching. The program has used the research focused design//build studio format to pursue answers to significant questions related to the development of prototype designs and the design and construction of high-quality, energy efficient, affordable housing in the state and across the southeast region.

This paradigm of “learning from doing” has long been an integral part of the School’s culture and is seen as a means to both train architects-to-be with the skills to succeed in practice and as a way to cultivate the values of community engagement, leadership, and service envisioned by the late Samuel Mockbee in his call for educators to prepare “citizen architects”.

Perhaps the most significant impact of the program has been on the students involved in the program over the last eight years. These future architects have gained significant insight and understanding into the challenges of creating high-quality affordable housing aimed at a specific place and region, the importance of research as a design tool, and have experienced, first hand, a powerful model for professional engagement and action in a field of practice where their talents and passion can have tremendous impact.

Through several rounds of the DESIGNhabitat program the research agenda has focused on regionally responsive design strategies, fabrication methods, and energy efficiency in the context of Habitat for Humanity’s cost structure and volunteer labor pool. These rounds have involved structured research and design phases preceding the construction of prototype homes as well as the structured research, design, and simulation of house prototypes.

The DESIGNhabitat program is now in its fourth round of

design-based research. **DESIGNhabitat 1** focused on development of a new prototype home aimed at improving the cultural and climatic “fit” relative to HFH homes built in the early-20<sup>th</sup> Century neighborhoods common to communities across Alabama. **DESIGNhabitat 2** and **DESIGNhabitat 2.1** centered on a study of the potentials and limitations of incorporating prefabricated construction strategies into the Habitat home-building process in the post-Katrina recovery process. **DESIGNhabitat 3** is currently underway, and is focused on incorporating the insights of the first two phases and an added emphasis on advanced energy conservation strategies. Each round of the DESIGNhabitat program has resulted in the unveiling of not only new questions related to the feasibility of the design proposals, but also questions related to the evolving pedagogy of research in design//build studios.

The DESIGNhabitat program began via a request that the School of Architecture help address the problem of community resistance to the construction of Habitat for Humanity homes in some older, early 20<sup>th</sup> Century neighborhoods in Alabama. Over the course of several months of planning, faculty of the school and HFH leadership established a set of design objectives for the DESIGNhabitat student team:

Design a “simple, decent home” and one that will “inspire the soul”, and be responsive to the cultural context of the Alabama communities where the home will be constructed.

Be responsive to the organizational culture of Habitat (“volunteer-builder friendly”) and to HFH’s budget of \$50,000 to \$60,000 (2009). The design must be replicable by Habitat affiliates.

Conserve energy via design strategies that are tailored to the climate of the region.

Incorporate building systems and materials strategies that lower the long-term maintenance costs associated with home ownership.

Incorporate appropriate sustainable design principles, including passive solar design strategies and lower the homeowner’s dependence on energy consuming heating and cooling appliances.

These initial objectives have provided a framework to guide

subsequent design research as well a means to open up new questions with regard to the program in terms of actual output and teaching methodologies.

## DESIGNhabitat 1



Fig. 1 DESIGNhabitat1, Opelika, AL, 2002.

The aims of the DESIGNhabitat 1 Studio (2002)<sup>3</sup>, as noted above, were to help Habitat understand how to build homes responsive to the region’s culture, architectural traditions, and climate as a means to improving both the contextual “fit” of these homes and their energy performance.

The DESIGNhabitat 1 Studio was structured as a two-semester effort: a semester of pre-design research (in a seminar format) followed by a semester-long design/build studio. In the first semester, sixteen 3<sup>rd</sup> and 4<sup>th</sup> year architecture students and four students from Auburn’s construction management program worked in teams to research Habitat’s process and culture, analyze the communities where the prototype home might be built, and identify the energy conservation and construction system options that would realize the established design objectives. The first semester was organized as a research seminar, the focus of this effort was to develop a clearer understanding of the project objectives and the means by which those objectives could be pursued.

The second semester of the project began with an intensive 5-week design charrette in which four student teams developed a 3-bedroom prototype home that responded to the goals for the project established in the research phase. Each proposal included an estimate of construction cost. The four proposals were presented to the Habitat advisory group in a “super jury” event and one of the schemes was selected for construction as the initial

“DESIGNhabitat House”. The students quickly shifted from design to construction teams and completed the construction of the home in eleven weeks. Following on the construction of the initial prototype house, the School has helped HFH affiliates build five “copies” of the DESIGNhabitat 1 house across the state. The DESIGNhabitat 1 Studio has influenced the construction practices of affiliates throughout the state. (See Figure 1.)

## DESIGNhabitat 2



Fig. 2 DESIGNhabitat2, Greensboro, AL, 2006.

The DESIGNhabitat 2 Studio (2006)<sup>4</sup> sought to extend the investigation of the questions that framed the 2002 studio and added the challenge of incorporating factory-produced modular approaches into the Habitat model. Originally envisioned a solution with narrow application, the prefabricated/modular construction approach of the DESIGNhabitat 2 project was dramatically re-framed by the Gulf Coast hurricanes of 2005. Facing a dramatic shortage of volunteer labor in the wake of these storms, modular construction became a significant element of Habitat’s response strategy in the region, and Habitat for Humanity International stepped forward as the main project sponsor of DESIGNhabitat 2.

The students and faculty of the DESIGNhabitat 2 team worked with advisors from the Alabama Association of Habitat Affiliates (AAHA), and a major modular housing manufacturer, Palm Harbor Homes to develop their proposals. The DESIGNhabitat 2 initiative had four objectives:

Capitalize on the systems-built industry's expertise re:

production process, resource efficiency/conservation, and quality control;

Integrate the energy performance research developed to date into the DESIGNhabitat 2 home;

Explore the benefits of this strategy for Habitat affiliates struggling to build homes with limited volunteer resources, and;

Immerse students in the challenges and opportunities of affordable housing design, and cultivate an ethic of service and community engagement as an integral part of their professional values.

The DESIGNhabitat 2 Studio was again structured as a two-semester effort: a semester of pre-design research (in a seminar format) followed by a semester-long design/build studio. In the first semester, students began the project with a semester-long pre-design research effort intended to immerse the team in the specific design opportunities and constraints associated with factory-based construction. The students also sought to identify the “leading edge” of design innovation (including energy-performance, materials and construction systems, and building configuration) relative to modular design and construction – both inside the industry and within the professional design community. The goal was to understand the potential of prefabrication and modular construction in rural areas, where volunteer labor is limited, in the aid of providing more affordable housing to these often poorest areas of the state. Again the effort of this research phase was to develop a clearer understanding of the project objectives and the means by which those objectives could be pursued.

The team began the next semester with a month-long charrette intended to generate alternative prototype home proposals incorporating the lessons of the fall research phase. In mid-February, five proposals were presented to a panel of project advisors (Habitat leadership, modular industry representatives, and faculty) who selected one of the schemes to advance to design development and construction.

Over the following 8 weeks the students worked closely with Palm Harbor to refine the design of the factory-built components and to develop the details and construction strategy associated with the site-built center section of the design. The modular sections of the design went into

production in mid-April at Palm Harbor Home's plant in Boaz, AL and were then shipped to the home site the following week. The student and faculty team then began a two-week "blitz build" to complete the site-built components of the home. (See Figure 2.)

## DESIGNhabitat 2.1



*Fig.3 DESIGNhabitat2.1, Greensboro, AL, 2008*

The DESIGNhabitat 2 House, completed in 2006, featured a hybrid approach of factory-produced components and site-built sections. As successful as that project was, many aspects of modular product remained to be studied. A team of 6 students and two faculty from the School of Architecture began planning a follow up semester long design/build modular research studio for the spring of 2008.

As the second in the series of modular home designs, the DESIGNhabitat 2.1 project was developed in response to the lessons gained from the first cycle of design, construction, and analysis of the DESIGNhabitat 2 house. More specifically, the 2.1 project team set out to explore a series of questions:

Could the on-site man hours be reduced even further if a higher proportion of the living space was factory built?

Would the cost premium for modular production rise proportionally, or would the logic of the factory-based economic model allow that extra area to be built at only slightly higher cost?

Can the production logic of the modular process generate its own unique set of design potentials –

potentials not inherent in the design/cost equation of site-built homes?

The 6-student team began the semester by re-visiting the un-built schemes developed in the 2.0 Studio (2006) to see if they could provide a viable starting point for the second house. Two of the schemes were determined to be good vehicles for pursuing the goals that framed this second round, and the students worked to incorporate the best features of each into a new design.

While the 2.0 house featured relatively simple factory-produced elements (and a more complex, site-built center bay); much more of the design features of the DESIGNhabitat 2.1 house rested on what the students could achieve via the factory-produced modules. Consequently, translating the DESIGNhabitat 2.1 scheme into units which could be factory-produced and transported to the site required a more complex level of pre-production coordination between the students and the modular manufacturer.

Working with the modular manufacturer to understand all the fabrication and assembly details - from the hinged roof and hinged attic walls to the eaves and marriage line details - became the focus of the team's efforts over the course of the spring of 2008. The modules went into production at the Nationwide Custom Homes plant in Arab, GA in early May, and the students utilized the summer of 2008 to complete the site-built components of the design. (See *Figure 3*.)

### **DESIGNhabitat 3**

The DESIGNhabitat 3 Studio was structured as a one semester design research effort. The studio worked within the program framework of a design build studio, however the studio leveraged predictive modeling and simulation software that had not been utilized in previous DESIGNhabitat programs in order to push further the research into energy conservation methods applicable to Alabama HFH Affiliates. The studio developed in response to a grant program designed to provide financial incentive for affiliates to construct more energy efficient homes (minimum standard of Energy Star certification). This incentive grant is funded by the Home Depot Foundation and administered through Habitat for Humanity International via its state support organizations. In collaboration with Alabama's state support organization

(the Alabama Association of Habitat Affiliates - AAHA) the DESIGNhabitat 3 studio developed a set of prototypes house designs aimed at providing affiliates with designs that would exceed the requirements of the incentive grant. Additionally the DESIGNhabitat 3 program sought to continue research into prefabrication strategies for Habitat homes, specifically focusing on issues questions posed by previous DESIGNhabitat programs.

The DESIGNhabitat 3 team was comprised of 15 (3<sup>rd</sup> + 4<sup>th</sup> year) architecture students and one faculty member, along with advisors from the Alabama Association of Habitat Affiliates (AAHA) including the AAHA Sustainable Building Specialist.

The DESIGNhabitat 3 initiative was designed with three primary objectives:

- Integrate energy performance expertise developed in prior phases of the DESIGNhabitat program into the DESIGNhabitat 3 prototypes;

- Exceed the energy efficiency requirements of the HFHI and HomeDepot Foundation incentive funding (Energy Star baseline);

- To expand upon prior research into the mix of site and prefabrication delivery methods that were viable Habitat affiliates in the state and region and provide strategies for their incorporation in the DESIGNhabitat 3 prototypes and test these against the parameters of HFH construction cost framework and energy performance.

The students began the semester with a four-week re-design of the DESIGNhabitat 1 prototype for a state affiliate and prospective homeowners. This applied design research immersed the team into the design strategies and solutions the prior DESIGNhabitat team had developed and served as an introduction to the DESIGNhabitat program. Following a five week design research phase, the modified DESIGNhabitat 1 schemes were presented to AAHA and the Gadsden affiliate and prospective homeowners. The presentation to prospective homeowners and supporting affiliate members was instructive and helped focus the research agenda upon energy performance and prototype development aimed at meeting the incentive grant requirements. (See *Figs. 4,5*.)

Following the presentation to HFH parties, students spent one week conducting research into the energy performance metrics and rating systems, which would be utilized in evaluating the prototype designs that the teams were gearing up to design. This one week intensive research phase was continued as the students, working in teams of 3, began to design prototypes for 2, 3, and 4 bedroom homes.



Fig. 4 DESIGNhabitat3, AL Prototype, 2009.

Recognizing that a design/build studio without a build phase does not quite measure up, the studio sought to utilize all means available to simulate the build phase. In doing so the students worked in close collaboration with the AAHA Sustainable Building Specialist. Students ran their designs through several design iterations informed by a series of simulation cycles. For the students this required both a degree of precision and depth of material and systems knowledge and (research into those systems) than had been required of them in their previous design studios. At the same time this modeling and simulation allowed the students' design work to be informed and reformed by predictive performance data. The students found and demonstrated to state affiliates, at the AAHA state conference, that achieving the energy rating required to receive incentive grant funding, was possible and practical within the constraints within which Habitat builds. While the simulations of the student work exceeded project goals, they maintain validity only if they can be tested. It is in this light that the design/build studio model's expansion is only valuable as a research venue if the work is built (tested) and subsequently verified. Currently in progress, the DESIGNhabitat 3 prototypes are being refined in anticipation of construction by HFH affiliates this year.<sup>5</sup>

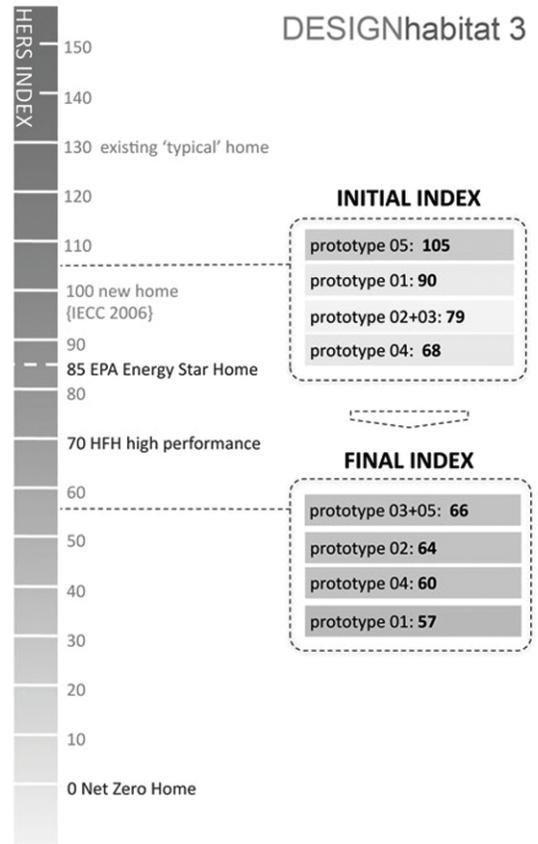


Fig. 5 DESIGNhabitat3 Prototype Designs. Energy Star Metrics, HERS INDEX, 2009.

## CONCLUSION

As the design/build studio has migrated from the margins of architectural education to become a significant fixture of many leading architecture schools, the goals of these programs have expanded beyond the enriched student learning experiences gained from hands-on learning and community service to include specific design research objectives. In this context, the design/build studio offers a venue for faculty and students to explore a specific question, or to provide a demonstration and evaluation of a design strategy to a broad audience. In these studios, research-driven design initiatives provide opportunities to

consider the place of research in studio, and in the context of a professional design education in general.

The DESIGNhabitat program, among other initiatives, illustrates the potentials for advancing academy-based design research via the vehicle of the design/build studio, and provides an illustration of what design-based research can mean. By foregrounding the questions found in research-driven design/build studios, the faculty and students involved are able to produce design insights that translate much more broadly than the lessons of a single structure. The key components of this version of design-based research include

- *The goals driving the design of these studios are organized around a clear set of questions – questions that while informed by the project and client attempt to look beyond the single project/client.*
- *The design/build stage of the projects are preceded by a significant amount of analysis of prior phases and pre-design research to frame the goals of the subsequent round of work.*
- *These initiatives are not “one and done” exercises. Rather they are designed as multi-year projects designed to allow the faculty and students involved to work through the full-cycle of researching, designing, building, evaluating the outcome of their work and – most significantly - responding to their findings with a new round of design explorations and research questions.*

While not all schools can make the long-term the commitments needed to support a research-driven design-build studio program, the DESIGNhabitat program provides an illustration of how a small but growing number of schools have begun to see the design/build studio as a means to pursuing a sustained design dialogue in important arenas of design research. As the model expands to include new studio tools and software the design-build studio can provide a fertile “testing ground” for pursuing answers and insights to questions of significance beyond the context, or the reach, of the traditional studio.

## NOTES

1. This assertion is evidenced by the dramatic increase in the number of faculty presentations devoted to design/build initiatives at academic conferences like the

ACSA Annual Meeting (RE building), the recent issue of the JAE focused on the topic, and the increasing (and varied) number of design/build initiatives launched by architecture colleges and schools throughout the United States. Auburn University’s School of Architecture is home of the Rural Studio, Urban Studio, and the DESIGNhabitat program; additionally schools from across the Southeast and US have participated in service learning design build studios across the areas of the gulf coast most impacted by hurricanes Katrina and Rita.

2. *Service learning*, as defined by M Duckenfield and L. Swanson in, *Service learning: Meeting the Needs of Youth at Risk*, National Dropout Prevention Center, 1992, is a teaching method, which connects meaningful community service experiences with academic learning, and has been championed by some as a model for education reform at both the K-12 and higher education levels.
3. The DESIGNhabitat 1 house has been replicated by 4 HFH affiliates across the state, and the construction strategies of the project have been adopted by many others. The DESIGNhabitat 1 project received a HUD Secretary’s Silver Award for Affordable Housing Design and an ACSA Collaborative Practice Award.
4. The DESIGNhabitat 2 project received an AIA Alabama Honor Award, an AIA Housing Award, an AIA Education Honor Award, and an ACSA Collaborative Practice Award.
5. The DESIGNhabitat program received the 2009 ACSA/AIA Housing Education Award.

In addition to bringing significant additional financial and human resources to Habitat, the collaboration has earned significant recognition for the School, including state and national AIA design awards, a HUD design award, two ACSA Collaborative Practice Awards, and an AIA Education Honor Award.

6. For an overview of the history of design/build hands-on learning in architectural education see “Community Centered Design/Build Studio: Connecting the Past & the Future of Architectural Education” by David Hinson, presented at the ACSA Technology Conference, March 2002.
7. [www.cadc.auburn.edu/soa/design-habitat/index](http://www.cadc.auburn.edu/soa/design-habitat/index)

# BASIC DESIGN STUDIO

AN ONGOING RESEARCH

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# **BASIC DESIGN STUDIO- AN ONGOING RESEARCH**

## **ABSTRACT**

**ABC** of any design means Aesthetics, Basic Design and Creativity. Basic Design- the basics of design and rightly called the “Mother of all Designs”. Its journey begins with basic elements and culminates in Spatial Perception.

Spatial perception can be perceived and experienced very interestingly by students in the first year of Architecture.

The eligibility criteria for Architecture in India being high school graduation in math, creativity and art remain in their infant state. This sometimes makes it difficult for students to understand art, architecture and art in architecture.

Basic design studio serves an important purpose of initiating creativity and thereby appreciation of art in many forms. The studio is continuous research which cuts a window in the mind of student and enables the teacher to evaluate as well facilitate the student for higher courses in succeeding years

This paper illustratively demonstrates successive observations regarding Basic Design studio and its influence on architectural design in the higher classes. The research is a longitudinal study of the studio output of a sample of students of BKPS College of Architecture, Pune, India. Results indicate that the students who excelled in Basic Design displayed better understanding of space and in the higher classes, but needed specialized input with regard to building construction.

KEYWORDS: Basic design, Art, Architecture, Construction, Evaluation research.

## **1.0 INTRODUCTION**

**“Design is an Expression of Feeling.....Any Creative Act is Design”.** (Emerson-1953).

A Creative act or Creativity is process when an original or a new theory, a postulate or a hypothesis, results in the permutation or combination of both are brought together to offer generative alternatives. This is the initiation of a Design process in a fresh and sensitive mind

**Design process is a thinking process and the process adopted must generate creative thinking. Creative thinking involves visualization which is the skill and ability to convert vision into visuals. The element of creativity can be nurtured if creative stimulus is introduced and the technique of problem solving is explained.**  
(MASA- 2010)

J Christopher Jones says **“the effect of design is to initiate change in man made things.”** Hence the design process is a systematic way of accomplishing something. (Jones- 1980)

The purpose of design education is to liberate the mind from the set pattern and tread on paths unknown. The objective is to tackle students from varied backgrounds to a highly focused training in analytical abilities, visualization, communication and representational skills.

Introduction to the creative method through design principles and taking the mind of the student from the “known to the unknown” is a continuous process. A creative stimulus is possible if the creative stimulus is first introduced and is preceded by design exercises.

## 2.0 APPROACHES TO BASIC DESIGN PEDAGOGY

**When a Creative spirit stirs, it animates a style of being a lifetime filled with desire to innovate, to explore new ways of doing things to bring dreams of reality.** (De Bono- 1982)

The body of knowledge associated with Basic Design may be regarded as a part of general theory of teaching and learning design as practiced in many design schools which has its origins in Bauhaus.

Geoffrey Broadbent in his book **Design in Architecture** elaborates that design can be taught as

**Iconic Design:** Where repetition of an icon is so adopted that the community accepts it.

**Ana logic Design:** When ancient buildings are used as an analogy to power preservation.

**Canonic Design:** When a geometric system is adopted such in the Greek Temples or as in Le Corbusier modular man.

The art of expression through visual grammar and aesthetics in architecture concerns with the philosophical difference between the two sentences: **“Spaces in architecture,” and “Architecture in Spaces”**.

**Every three dimensional composition has architectural Qualities, deals with the placement of objects in spaces, either outdoor or indoor or deals with the division of spaces. Architecture is actually a the art of space arrangement but any work of building construction which has live able space need not have architectural qualities, but knowledge of building construction is necessary to build all architectural spaces. ([www.artinarchi.com](http://www.artinarchi.com))**

It is to be impressed upon the students that the relation between subjects of Basic Design, Architectural Design and Building Technology, as an integrated trio with inputs from other subjects to enhance the understanding of space.

## 3.0 NEED FOR RESEARCH

The general perception and practice in teaching Basic Design is that it promotes a holistic, creative and experimental methodology that develops the learning style and the cognitive abilities of the student with respect to fundamental principles of design.

The Basic design Studio serves an important purpose of initiating creativity and hereby appreciation of visual language. The studio is a continuous research, which cuts a window in the minds of the students about spatial perception. It also exposes students to a plethora of possibilities that exists in the world of space. For a class of students coming from a traditional vertical school of thought this is a process of un-learning and re-learning.

As an educational program “Basic Design” can often be enhanced more by curiosity and experiences than, by the theoretical content of the subject. It is generally accepted that this form of teaching and learning develops the creative spirit of the student.

As the course structure for Basic Design as educated in schools of Architecture is different from other streams of design like graphic design or industrial design, it should be ascertained whether the Basic Design studio assignments help to unlock the students’ creativity and enhance the spatial perception. The tangible outcome of these extensive studio assignments is, to corroborate the perception of space in architectural design in the initial years, as well as, in the later years with support from adequate know-how in construction.

The need of this research is to validate these objectives and to verify a correlation between Basic Design, Architectural design and Building Technology and Materials.

## 4.0 RESEARCH OBJECTIVES

**“Nothing is taught, unless it is learnt”.** (De Bono, 1984)

Design pedagogy in these courses is the sole determinant of the most significant opportunities for students to acquire skills and knowledge that constitute the foundation for continuous growth in later years. Experiences acquired in the beginning design courses constituted a vectorial beginning in the design profession. Learning theory, explicitly or implicitly has always been fundamental to a design studio at any institute.

The objectives of this research were:

- To study the students' outcome in Basic Design with respect to pedagogic objectives and creativity in design in our school.
- To correlate Basic Design and Architectural Design conducted in the Second Year with Architectural Design and Building Technology in the Fourth Year, involving the same sample of students.

## 5.0 RESEARCH PARADIGM

The qualitative paradigm was adopted to explore and understand students' outcome using basic design curriculum in conjunction with lecturers' feedback about the studios of basic design.

Along with this qualitative exploration, quantitative analysis of marks in the subjects of Basic Design and Architectural Design of a second year student and Architectural Design, Building technology and Materials of the same student when in fourth year, was made. Statistical test was conducted using Pearson test to understand the same.

## 6.0 RESEARCH METHOD

### 6.1 Qualitative Study

**Creativity is the process by which imagination exists in the world. As a process it is indeed ultimate, it is universal of universals, characterizing with ultimate matter and fact. In a sense, creativity is synonymous with Aristotle's prime matter, except that creativity is neither passive nor receptive. But, may be seen as the absolute active ground of all that comes into being in itself indescribable. Creativity can be ever present to include that ultimate notion of all activities of man be scientific, cultural or artistic.** (Anthony- 1992)

### Basic design Curriculum of the University of Pune

The course structure for basic design has to be different from any other art form such as graphic design, industrial design or fine arts. The syllabus of basic design cannot be covered only in one year. In the first year, the design elements and principles are introduced with its grammar developing concurrently. In second year, the students understand basic design through various tangible and intangible channels of creativity. The aim of the curriculum is to make students sensitive to the quality of space.

### 6.1.1 First Year Basic Design

#### **Objective:**

The first year is a period of transition for students who come from a tradition of vertical thinking fostered by the education, hence it needs to be dismantled and a comprehensive thought process should be triggered.

The syllabus of the First Year aims to introduce a creative stimulus and provide a starting point towards Visual design and Basic elements in design i.e. Points, lines, planes and solids along with their application. The creative exercises are designed with these elements in conjunction with the design principles. These ordering principles help to convert the vision into visuals.

#### **Pedagogic Strategy:**

The studio assignments focus on basic elements and the theory associated with design principles.

Axis -as a line about which, forms and spaces are arranged. Symmetry- a balanced distribution of equivalent forms around a central axis. Rhythm -use of recurring and their resultant rhythm. Datum -a line, plane or volume which by its continuity serves to gather and organize. Transformation-the principle that an architectural concept or organization can be retained and strengthened, through a series of discrete manipulations and transformation. (Ching- 1979)

The exercises in the design studio focus on these principles as an ordering system. During the process the relationship between form and space, forms an integral part of the study. Form as a positive element and the space surrounding it as a negative space. This enforces the relation between positive and negative as an inseparable element of basic design and subsequently architectural design.

### 6.1.2 Second Year Basic Design

De Bono observes that:

**“Teaching thinking is not easy because Thinking is intangible. Education teaches knowledge because there is nothing else to teach. But Knowledge is more a substitute for thinking than thinking is a substitute for Knowledge. (De Bono-1982)**

The syllabus of Basic design in the second year of the five year course in architecture is designed exactly to widen and explore the Channels of Creativity. These Channels of Creativity help to stimulate one's mind and create design. These are developed by breaking out of 'concept prisons' of old ideas and introducing the students to **LATERAL THINKING**. It is quite distinct from Vertical thinking. Lateral thinking generates more alternatives that are capable of culminating in design. DESIGN PROCESS AS A THINKING PROCESS makes the students more proactive and analytical.

#### **Objective**

The Process of Creativity is initiated either through brainstorming sessions or through a design exercise. It helps find and unlock one's own brand of Creativity and hereby practice it at a later stage. These assignments help to stimulate one's imagination and resort to "in the box," out of the box," and "new box" thinking. Creative ability awakens the psychological qualities, builds up the skills and adds a new dimension to the intellect of the student.

## Pedagogic Strategy

To elaborate and enhance the process of Creativity, project based studio experience is essential. To achieve this, a "Design Parameter Approach," focusing on the simplification and systematic organization of the programmatic input, is required. This optimizes the manageability and applicability of the project.

The assignments to augment creativity are as under:

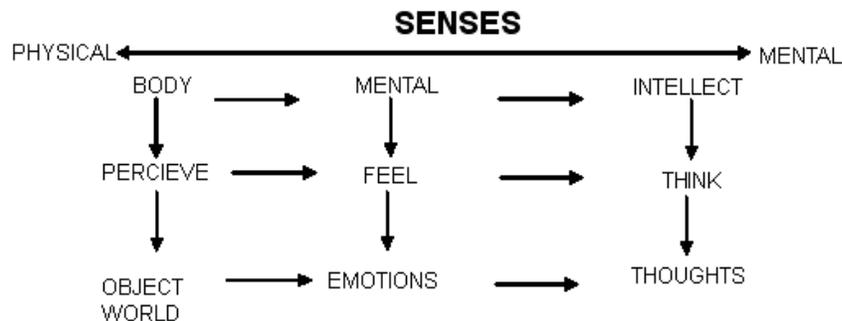
01. Creation, Creativity and Motivation
02. Psychological qualities, skills and behavior for creativity
03. Role of experience and memory in design
04. Role of Fantasy, imagination and reality in design
05. Blocks to Creativity: Mental and Physical

To exemplify the outcome of these exercises, one assignment to ascertain the role of fantasy, imagination and reality in design has been demonstrated.

- 1) ***Fantasy, Imagination & Reality:*** Author, actor and director Stanislavski wrote, **"Imagination creates things that can be or that can happen, whereas fantasy invents things that are not in existence, which never have been or will be."**(S. Constantine. - 1984)

The study would include, fantasizing a concept that is in, the clouds. Imagining it- that is in, an unfertilized state of a thought and changing it into the fertilized state that is- reality

Design thinking, involving the physical and mental senses, includes the body and the intellect. It can well be demonstrated graphically as:



**Design Assignment:** The said channel is formulated into an assignment for the studio class in following ways; Witches Den, Fantasy Land, An Astronauts' Workstation on the moon. It triggers the fantasy, and changes the unfertilized state into a fertilized state of thought.



The design brief specified that an astronaut's workstation was to be designed on the moon complete with working and living conveniences. This implicated comprehensive study of environmental conditions on the moon. Imagination and fantasy explore the possibility of such a development in the near future. These visuals exemplify the astronaut's workstation. As the

endeavor was to fantasize, emphasis on the validity of structure was reduced.

Along with the Process of Creativity, studio assignments are conducted as Techniques to improve Creativity. These short assignments under the following subjects add a new dimension to ingenuity of a student.

Techniques to improve creativity are:

- |                               |                           |                                 |
|-------------------------------|---------------------------|---------------------------------|
| 01. Brainstorming             | 02. Lateral thinking      | 03. List of Mental Associations |
| 04. Random Combinations       | 05. Matrix of Ideas       | 06. Random Combinations         |
| 07. Use of Manipulative Verbs | 08. Tree of Possibilities | 09. Abstraction                 |
| 10. Transformation            | 11. Use of the Ridiculous |                                 |

To exemplify the outcome of these techniques, assignments on Transformation and Use of Manipulative Verbs, have been demonstrated.

**Transformation: “Form follows function”** was the major theme of modern movement in architecture. The critics of the modern movement in the mid 1970s dismissed the whole modern movement. Today practicing design instructors and students are seriously involved with this channel of creativity. J. Silvetti has described transformation with regard to architecture as **“an operation performed on an element of a given existent code which departs from the original, normal, or canonical usage of code by distorting, regrouping, reassembling or in general altering it in a way that it maintains its reference to the original while tending to produce a new meaning.”** (Jorge- 1977)

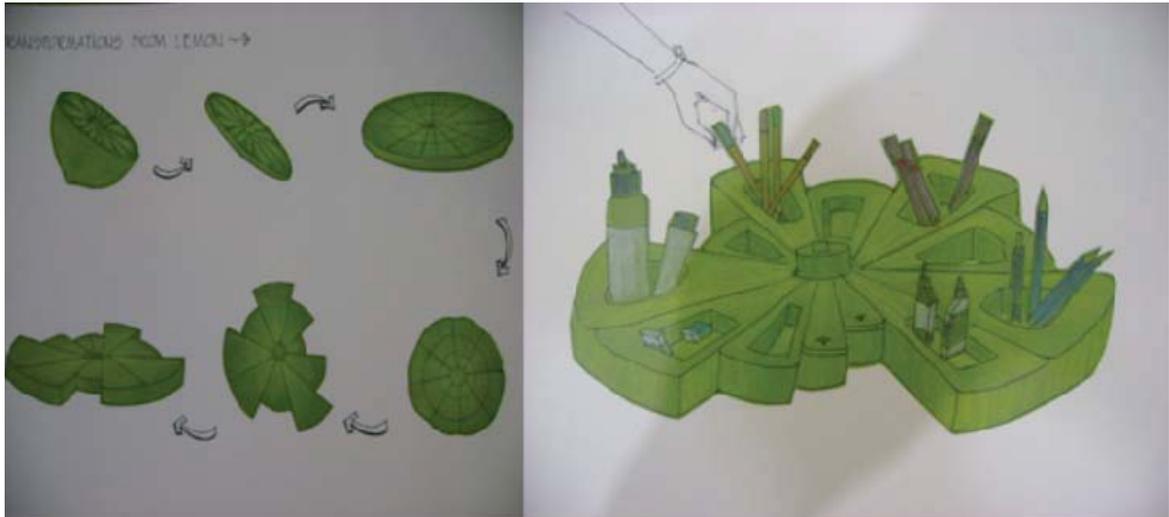
Broadly it can be distinguished into 3 major categories

- 1) The traditional strategy - progressive evolution of form
- 2) Borrowing – license of borrowings from paintings, sculpture and other artifacts.
- 3) Deconstruction or decomposition - process in which one takes a given whole apart and finds new ways to combine the parts.

D’Arcy Thompson a biologist in his major work “On Growth and Form” used mathematical and analytical forms and compared them through scientific methodology. According to him, **“Transformation is a process and phenomenon of the change of form under altering conditions”**. (Thompson- )

**Design Assignment:** An insect or vegetable was studied with respect to form, colors, texture sense of arrangement of different parts of the body and characteristic features if any. It was deconstructed, constructed and transformed into objects of everyday use. The process of progressive evolution and the method, in which body parts can be assembled, and the original specimen is transformed into an entirely new object, is the intention of the exercise. Hence according to Thompson we obtain a new figure which represents the old figure under a more or less homogenous strain, (Thompson- .)

The assignments exemplified, qualify to become the Intangible Channels of Creativity in Design.



These visuals illustrate the process of deconstructing, constructing and transforming a lemon into a multi-utility table top item.

**Manipulative Verbs:** Biologist Thompson believed that there is a dual possibility of describing any form at any given time.

01. **Descriptive-** Through the use of words.

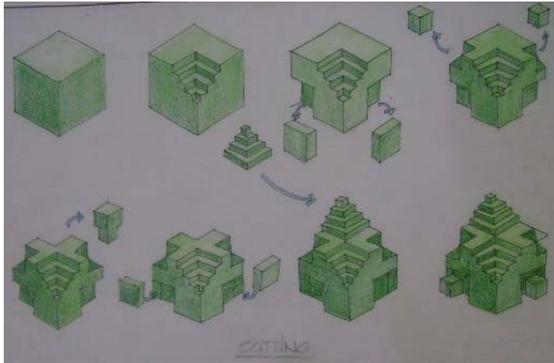
02. **Analytical-** Through use of numbers, mathematics, and the Cartesian Coordinates.

Common words and verbs mean different things and can be applied differently especially where built forms are concerned. Interestingly various expressions can be applied to buildings- eg. Zaha Hadid's buildings challenge the notions of tranquility and gravity. Zaha Hadid's philosophy of fluidity, fragmented geometry makes her buildings startling and distinct. Alex Wall wrote about Hadid's studio,

**"The goal of transforming architecture requires literacy and analytical skills that is rarely found in fourth and fifth year students and it only through suggestive power of drawings that these aims can be approached". The danger is that the drawings can become so fluent, skating over the real issues and, in a breathless whirl of brush and pen, create startling images which have no authority.** (Wall – 1986)

**Design Assignment:** Suggestive of the name, this channel of Creativity explores the possibility of forms derived by applying basic verbs to a cube, resulting in plethora of possibilities. The assignment on whole v/s part can be understood as;

- A basic shape is chosen
- A list of action words or manipulative verbs is explored to manipulate the basic form.
- A pyramid of unique shapes or ideas is formed and a building typology using these forms is explored.



The cube is 10x10x10cm the manipulative verbs applied are cut, slice, pierce etc. are applied to manipulate into a totally new form. The derived form is researched to resemble an existing built form. This is a unique experience to understand Deconstructing & Constructing of a platonic solid.

Channels of Creativity can be furthered with Sources of Inspiration for Architectural Creativity. The study undertaken relates more toward the design of elements in Architecture.

**“Drawing in a sketchbook, teaches, first to look, and then to observe and finally perhaps to discover .... And it is then that the inspiration might come”.** (Le Corbusier)

The sources of Inspiration for Architectural Creativity include the subsequent subjects:

- |                            |                              |                                 |
|----------------------------|------------------------------|---------------------------------|
| 01. History                | 02. Nature and Climate       | 03. Architectural Biographies   |
| 04. Material               | 05. Geometry                 | 06. Mimesis                     |
| 07. Paradox and Anticlimax | 08. Exotic and Multicultural | 09. Association with Other Arts |

To exemplify this channel of Creativity, two studio assignments on Sources of Inspiration are demonstrated.

**01) History:** Architectural education today emphasizes a path to creativity through history and a specialized research on precedents. Leading institutes as well as publications like “The Journal of Architectural Education” have played a pioneering role in the study of history in design education. Historicism looks only at form whereas history examines the cultural, technological and philosophical parameters that have shaped the architecture in a particular period. The most important aspect of learning from history is the difference between copy, pastiche and imitation. Innovation begins with an individual, is imitated by an elite group, is accepted and assimilated by the masses, which then becomes a part of culture and later history.

The correct use of history for a creative designer would include the following concerns

- Reference to the local historical prototype
- Reference to global prototype
- Reference to “remote” as well as “closer” historic types
- Rounded exploration of historic precedent
- Critical judgment in the selection and kind of precedent.

Some historical precedents, useful for researchers are: the Palace of Knossos, Alhambra and Generalife of Granada. Architect Michael Graves who depended on the use of history and precedents wrote that, **“There is a bias or a point of view through which an architect looks at his precedents”**. According to

Antoniades Anthony the best architects of this century were highly versed in classical Greece and Renaissance, and Alvar Alto is a premier example of this. (Antoniades – 1979)

**Design Assignment:** The studio assignment is premeditated in conjunction with the history syllabus for the first two years, planned by the University of Pune. Diverse civilizations, in terms of, their culture, technology and philosophical elements, which evolved, are studied by the students.

Based on this study, the students are asked to design a gateway to a historical site of a chosen civilization, and a memento, both having their design roots in the preferred precedent. A critical judgment of culture, technology and philosophy, forms the reference to the design.

The design assignment has its rudiments in the Pre-Columbian Civilization. The student has designed, a gateway, influenced by the Mayan Pyramid and the astronomical calendar for the memento. Adequate know how on the form, construction techniques and the philosophy, has been explored through such historical precedents. It demonstrates, that History can be a Source of Inspiration for Architectural Creativity.

**02) Architectural Biographies:** The study of biographies can be combined with design exercises, which are completed after the study of the master architect. The student immerses himself in the persona and the design vocabulary of the architect to produce a building, or an element, as if he were the master. Architect Charles Moore once suggested, that he would not be able to design a building like Kahn even when he was under him. Some great architects like Frank Lloyd Wright, Louis Kahn, and Alvar Alto changed their beliefs and styles, as they advanced in life. In Alto's biography, Schildt establishes that Alto constantly sought kindred people like Gropius, Laszlo, and Moholy-Nagy, from whom he gained. (Schildt–1984)

It is interesting, to note here, that every student is at a nascent stage and their design skills are largely influenced by an idol master architect. This assists the student, to finally find a voice of his own, enriched with an accumulation of experience. The study of the architect's own house would be a paradigm of "biographic spatial "equation. This Channel of Creativity can be rightly called, "In his Master's Shoes".

**Design assignments:** This assignment can be tackled, as a small element, like a stabile designed in the premises of the building, designed by the master architect. Respect towards the built form of master architect, during the process of design or addressing one's design relating to a context, becomes the keynote of this assignment. The completed design projects of the students can be redesigned, in the light of, the study of design philosophy of any of master architect.

This illustration exhibits, the study of the design philosophy, involving deconstruction and construction, by master architect Daniel Libeskind. This has been furthered, into the design of a stabile, in the same building complex.



The above channels become the **Tangible Channels of Creativity**, with emphasis on structure; focus on materials. It has preference for geometry, that is, a distinct articulation of volume. It also incorporates, study of precedents, in remote and recent past, including modern and post modern movements.

Hence Basic Design, which is the grammar of visual language, has certain rules, regulations and a very significant structure. The exercises are designed for students to understand the principles of visual language and its grammar. These principles are incorporated in architecture and also in building construction.

### **6.1.2 Faculty Feed back**

The Basic design studio serves an important purpose of initiating creativity and thereby appreciation of visual language. The studio is a continuous research, which cuts a window in the mind of the student and enables the teacher to evaluate as well as facilitate the student for higher courses in the succeeding years. Sketching and working with design brief, support visual thinking that is vital to the creative process, during the synthesis phase.

The Qualitative Study includes, the opinions of teachers, with significant teaching experience, in Basic Design, Architectural Design and Building Technology.

The research was undertaken to address the following issues:

- 1) The content of the syllabus of University of Pune.
- 2) Relevance of Basic Design in the syllabus of Architecture.
- 3) Its contribution in enhancing the understanding of Architectural Design and Building Technology.

A Senior Architect and Urban Planner opined that, the content of the syllabus is adequate and also believes that it helps the student, to augment his creative ability. It prompts the process of observation and visual thinking. It also assists, in understanding the language, for describing a form and its relation with space. It plays a significant role in developing a sense of arrangement through 2D and 3D exercises. Such exercises influence architectural projects, like housing complexes, undertaken in future. As the issues involved in complex architectural projects, are multifold, it is possible that, the skills in visual grammar acquired in earlier years, may reduce in substance.

Another two teachers' commented that, the content of syllabus in basic design is adequate. It has been designed, taking into account that, the students come from a predominantly vertical school of thought. Both the teachers have experienced conspicuous influence of 2D-3D extrusion assignment, in Architectural Design especially, improving their spatial perception. They suggested that, assignments on color, light, texture do play a vital role in enhancing the visual quality of an indoor or outdoor space. Assignments based on positive and negative spaces offer the student a better platform in layout of buildings. Product design coursework facilitates comprehending the visual and graphic language, but the visual grammar gets diluted when architectural projects gets complex.

## **6.2 Quantitative Study**

The research is a longitudinal study of the students from BKPS College Of Architecture Pune, India. The statement of marks declared by the University of Pune for three successive batches of students for academic years (2006-07, 2007-08, 2008-2009) in the subjects of Basic Design (BD –II) and Architectural Design (AD-

II) of the Second Year students and Architectural Design (AD-IV) and Building Technology and Materials (BTM-IV) of the same student, when in fourth Year, were used as a base to establish a correlation.

### Correlation between Basic Design, Architectural Design and Building Technology

**Correlations**

		ADII	BDII	ADIVS	ADIVP	BTIVP	BTIVS
ADII	Pearson Correlation	1	0.736 ***	0.143 ***	0.376 ***	0.163 ***	0.297 ***
	Sig. (2-tailed)		0.000	0.254	0.002	0.194	0.016
	N	66	66	65	65	65	65
BDII	Pearson Correlation	0.736 ***	1	0.221	0.376 ***	0.059	0.267 ***
	Sig. (2-tailed)	0.000		0.077	0.002	0.643	0.031
	N	66	66	65	65	65	65
ADIVS	Pearson Correlation	0.143	0.221	1	0.284 ***	0.038	0.319 ***
	Sig. (2-tailed)	0.254	0.077		0.022	0.763	0.010
	N	65	65	65	65	65	65
ADIVP	Pearson Correlation	0.376 ***	0.376 ***	0.284 ***	1	0.383 ***	0.52 ***
	Sig. (2-tailed)	0.002	0.002	0.022		0.002	0.000
	N	65	65	65	65	65	65
BTIVP	Pearson Correlation	0.163	0.059	0.038	0.383 ***	1	0.268 *
	Sig. (2-tailed)	0.194	0.643	0.763	0.022		0.031
	N	65	65	65	65	65	65
BTIVS	Pearson Correlation	0.297 *	0.267 *	0.319 **	0.520 **	0.268 *	1 *
	Sig. (2-tailed)	0.016	0.031	0.010	0.000	0.031	
	N	65	65	65	65	65	65

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

## 7.0 FINDINGS

From the longitudinal study of the above research sample and the dialogue with senior faculty members, the following findings are arrived at.

- 7.1 A very strong relationship between the Second Year Basic Design and Architectural Design was reported. This has been ascertained using Pearson test where a coefficient of 0.736 was achieved. It proves that, students with good understanding of Basic Design are better slated, in their Architectural Design Projects also.
- 7.2 It was observed that, the complexities like services and structural issues of Design program during the fourth year, weakens the principles and elements of visual language. A coefficient of 0.02 was achieved in the Pearson test reinforces the statement. It was observed that students, who were adept with good understanding in construction and materials, excelled in their architectural design. The coefficient of 0.319 achieved using Pearson test establishes the fact.

## 8.0 CONCLUSION & DISCUSSION

- 8.1 In accordance with acknowledged faculty members, the contents of the syllabus, is substantial. In order to appreciate and apply the visual grammar, it is essential to impart, two years of training in Basic Design. The elements and principles, in design, are required to be introduced, in the first year of Architecture. This experience is elemental for project based assignments conducted in second year, and in the succeeding years.
- 8.2 From the above findings, it is recognized that, the students in the initial years of architecture, are benefitted because Basic design is a part of the syllabi. The assignments developed in Basic design, enable visual thinking and spatial perception in the students. Hence, it is imperative to extend, a comprehensive training in basic design, to equip the student for the further years.

- 8.3 However, in the senior years of Architecture the grammar of visual elements and their principles gets overlooked due to complex structural considerations of the architectural program. This can be overcome by introducing Visual/Graphical Language at the Fourth Year level in the form of an Elective. It would tender a renewed insight into the subject. It is recommended that such an Elective should be made a part of the Architectural design curriculum at the fourth year level too. This would help enhance their spatial perception further.
- 8.4 It can be inferred from the above statistical data, that students with good structural know how, are well-equipped to handle spaces in Architectural Design at the senior level.

Finally, the journey in Basic Design originates with the basic elements and transforms into spatial perception. Everything living perceives space. So,

***Everything Living needs Space and Space is Architecture***

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# THE OTHER HALF OF THE PROJECT: The need for labor research in architectural theory and pedagogy

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## **Abstract**

The basic constituents of every building project—material and labor—are clearly mutually critical. However, architectural theory and pedagogy are currently strongly focused on the material disposition of projects, placing far less emphasis on the labor processes that give them shape. This paper will first review architectural theories of construction labor in architecture. Next, a case study will be discussed to illustrate that labor research is a meaningful basis for design decision-making, and can help the architect perceive connections between her work and its social context. The paper concludes by recommending integration of labor research into school pedagogy.

The case study describes an architectural design thesis in the eastern Canadian arctic. In these communities, construction involves enormous costs, arising from the scarcity of material and human resources, and the need to import both. Of these two, the lack of building skills among the local workforce causes the greater expense, which could be minimized if architects designed buildings more appropriate to local skill levels. In doing so, architects can become advocates for the development of labor skills and the improvement of economic conditions in these remote settlements.

An understanding of labor conditions clearly allows an architect to better address the project constraints. But equally critical is the enrichment of architectural thinking by the consideration of labor issues. Understanding the local workforce requires that the architect evaluate the smallest details of her work, at the same time as it forces her to think broadly about the social conditions of the community.

## **Introduction**

Of the two inputs to all buildings, materials and labor, the former has been the more consistently central to architectural interests, while the latter remains peripheral. This is particularly conspicuous in theory and in school curriculum, where the inputs and outputs of architecture are examined and reevaluated. The current prioritization of

construction materials over construction labor in both theory and education is likely explained by numerous factors. Materials can be experimented with first-hand, can be studied independent of the larger structure, and can produce tectonic innovation and iconic identity. Labor, on the other hand, often appears to be beyond the scope of the architect: in school, labor issues are the domain of the economist and the sociologist, and in professional practice, labor decisions are made almost exclusively by the contractor. But at 55% of typical construction costs, labor represents the more substantial component of the building process. More importantly, labor ties the architectural process to broader social themes: economic development, political stability, cultural heritage, and environmental efficiency. From this perspective, architects are disadvantaged by the marginalization of labor at the periphery of their purview, as are the communities they build for.

Despite the potential for labor issues to add depth to architectural work, there is a dearth in architectural theory locating construction labor in the architectural process, and considering reciprocities between architect and laborer. Further research on this topic would help ground the changing relationships between architect and construction laborer as the profession contemplates digital design and its consequences. This paper will first briefly survey the existing architectural theory on labor, starting with the utopian thinking of the 19<sup>th</sup> century, and leading to the confrontation of BIM in contemporary practice. The survey examines changing perceptions of the laborer's role in architecture, and the evolving relationship between architect and laborer. The survey also makes clear that labor has only sporadically been a major topic for architectural theory.

Following the survey, a case study describes a design project in the eastern Canadian arctic, and illustrates that thinking about the labor process can transform and deepen architectural decision-making. Equally important, the case study suggests labor as a lens which helps the architect to

see her impact on political, economic, and cultural conditions. These are critical lessons, especially in the formative experience of the architecture student. The paper concludes by recommending curricular integration of labor issues in schools, where the values of future professionals are influenced and their interests take form.

## **Survey**

### ***Architectural Theory examining the Role of the Laborer in Architecture***

The history of construction labor as a topic for architectural theory conventionally begins with John Ruskin and his idealization of the Gothic builder, whose “ugly goblins, and formless monsters, and stern statues...are signs of the life and liberty of every workman who struck the stone” (Ruskin 163). His 1853 essay, *The Nature of the Gothic*, is a treatise on the role of the construction worker in the production of architecture, reifying manual work when it is spontaneous, expressive, and unimpeded by expectations of accuracy and order. Work produced under these conditions would draw the worker closer to their own best nature and to God, realizing the vision of a moral society. The architect is less present in this narrative, but still implicitly central. The mechanism required by Ruskin to create the ideal conditions for work requires that the architect understand the following:

“In the make and nature of every man, however rude or simple, whom we employ in manual labour, there are powers for better things: some tardy imagination, torpid capacity for emotion, tottering steps of thought...But they cannot be strengthened, unless we are content to take them in their feebleness, and unless we prize and honour them in their imperfection above the best and most perfect manual skill. And that is what we have to do with all our labourers; to look for the *thoughtful* part of them, and get that out of them.” (Ruskin 161)

This position recommends that the best architectural outcomes occur when the architect assumes the role of the manager, and establishes a framework within which laborers can innovate and deviate. In Ruskin’s view, it becomes the duty of the architect to unlock the expressive potential of the laborer, and the duty of the public to appreciate its uneven results.

The romantic picture of construction work and labor was transferred from master to student, from John Ruskin to William Morris. The Arts and Crafts movement borrowed the social rhetoric of the Gothic Revival, and its proponents also explored connections between building construction and social transformation. In the Arts and Crafts movement, the Ruskinian aesthetic value system is superimposed with Marxist ideology, where labor is the common denominator for all members of all society. In his 1888 essay, *Useful Work Versus Useless Toil*, Morris extolled the continuous expression of some inherited human urge to create and build. “A man at work,” he claimed, is guided by the “thoughts of the men of past ages,” and he creates because it is in all men to create (4).

Where Ruskin may have struggled to differentiate good work from bad work based on aesthetic preference, Morris made the distinctions clear by drawing on the commercialization of skill, and the conscription of laboring classes to produce objects of little value for the consuming class (4-9) Concomitant with the class-based analysis of labor is the observation that all skills and services are for sale, regardless of whether they belong to an educated architect or an unskilled laborer. In conceding that the “education of the master is more ornamental than that of the workmen [but]... it is commercial still,” Morris predates the well-known Philip Johnson quote which describes the ultimate need of architects, like laborers, to sell their skills.

The 19<sup>th</sup> century marks the end of a period of rhetorical, personal essays examining the place of labor in architecture, and the relationship between the designer, master-craftsman, and the unskilled worker. However, the ideas of the Gothic Revival and the Arts and Crafts movement were given new life in the architectural manifestos of the early 20<sup>th</sup> century, and the curriculum of the Bauhaus, which revived the tradition of utopian European thinking on this topic. In his Bauhaus Manifesto, which established the ideological pedagogy of the first Bauhaus at Weimar in 1919, Gropius exhorts students and faculty to “...create a new guild of craftsmen without the class-distinctions that raise an arrogant barrier between craftsmen and artists! Let us desire, conceive, and create the new building of the future together” (Gropius 49). The rift to be mended between the craftsman and the artist was layered over other, related dichotomies: between craft and machine, between fine art and handicraft, between artistic and technical production. The pedagogical panacea for

these tensions was the development of a cooperative teaching system, with each workshop co-taught by a "technical master," who taught "practical" skills, and a "form master," who provided "artistic" guidance. Unfortunately for architecture students, though, the school offered no architectural courses until 1924, coinciding with the demise of the co-teaching model, the move to Dessau, and the shift to a work-study curriculum.

This shift signaled an end to Gropius' idealized vision of close collaboration between artist and craftsman, and the beginning of a long hiatus during which the place of labor in architecture has been little discussed. It seems that without a socialist theory of the role of labor in architecture, there was no theory at all. It's not clear why mainstream architectural movements and theory lost interest in the role of labor. It may be that—despite the commodification of architectural services as above, and even despite earlier socialist agendas—the profession is accustomed to its "confirmed detachment from the labor of fabrication...The gentlemanly ideal of distance from the business of production—an essential component of the architectural profession's self-image—has persisted against all the odds" (Ross 11).

One reason explaining the disengagement of architectural theory from labor may reflect the related disconnect between architects and construction laborers reinforced by contracts over the last century of professional practice. Standard design/construction contracts expressly *limit* the involvement of the architect in labor and construction issues. These disconnects are formalized in the parallel contracts of the architect and the contractor, which refer to each other but are both with the owner; and in the exclusion of construction strategies from architectural documents. AIA Document Contract B10, the Standard Form of Agreement between Owner and Architect, states explicitly in Section 3.6.4.2 that "the Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures" (Demkin 968). The legal obligations of standard contracts between client, architect, and contractors are intended to triangulate liability, but they also keep architects legally disconnected from construction labor.

Not only are they disconnected, but architect and labor are also increasingly remote from one another. The availability of product systems and assemblies avoids what architect / craftsman Darren Pye called "the workmanship of risk": the likelihood that the job could be ruined at any time by the vagaries of performance (Pye 20). The prefabrication and unitization of whole assemblies off-site, by industrial specialists, is meant to assure better quality on-site and reduce the occurrence of unexpected results. In doing so, it ostensibly diminishes the need for job-site vigilance, and changes the reliance of the architect on the laborer to execute their design intent.

Oddly, during the same timeframe that interest in labor issues appears to have decreased among architects, it evolved into a deep field of academic inquiry sustaining multidisciplinary work across the social sciences; from political economy to managerial methods to operations research. Harry Braverman's 1974 *Labor and Monopoly Capitalism* laid the groundwork for examining the role of labor in shaping the power structures in industrial society. The mechanism by which this happens, in Braverman's analysis, is that in humans, "the unity between the motive force of labor and the labor itself is not inviolable... the idea as conceived by one may be executed by another" (35). The separation between an idea and its execution sets up the necessary conditions for a labor market and for a management system, and, in turn, for managerial decision-making focused on the efficient use of purchased labor power. Braverman concludes that the corollary of improved efficiency is the "de-skilling" of workers, and their loss of personal investment and interest in the labor process (39). In this way, tension is established between managers who have everything to gain from improved efficiency, and workers who have little to gain from the same.

About construction in specific, Braverman had this to say in the mid-70s:

"This industry...favors new materials, especially plastics, painting, and plastering with spray guns...and the preassembly of as many elements as possible on a factory basis (a carpenter can install six to ten prefabricated door assemblies, pre-hung in the frames with hardware already in place, in the time it takes to hang a single door by conventional methods; and in the process becomes a door-hanger and ceases to be a carpenter)" (143).

This short commentary about de-skilling in the construction industry echoes earlier thoughts by Ruskin, Morris, and Pye, and seems to be the conceptual link upon which there is the most agreement in architectural theories of labor. All perceived a connection between rote work, quality control, and a corresponding loss of meaning in the work. However, in disciplines outside of architecture, the de-skilling charge of *Labor and Monopoly Capitalism* has been one of the most criticized. Challengers have contended that Braverman's model of a steady and inevitable degradation in skills was too deterministic, not taking into account work environments which challenged workers to expand their skills and the potential for labor processes to move toward a "recoupling of conception and execution" (Wardell 6).

Digital design is being positioned to do just that: to recouple conception and execution, but for the architect, not the laborer. As Robert Stern describes it, new technologies "make it possible for architects to regain their proper and responsible role not only with regard to design but also in the generation of construction documents and fabrication of the finished product" (15). The reciprocal question is whether digital processes will at the same time recouple conception and execution for construction laborers, and whether they will also regain the design role perceived for them by Ruskin.

For architectural theory, BIM is the chapter that seems to follow *The Nature of the Gothic* as a major conceptual framework, 150 years later, for relating architecture and labor. A provocative new book, *Building (in) the Future: Recasting Labor in Architecture* (co-edited by practitioner-academics Peggy Deamer and Phillip G. Bernstein) appears to be the only collection of contemporary thought on the topic of labor in architecture. The book examines the triad of client/designer/constructor, and the shifting relationships between them in the era of parametric modeling and digital fabrication. Co-editor Peggy Deamer notes that, around 2000, when architectural discourse shifted from formal investigations to digital production issues, "architectural theory quickly became post-critical: an opportunity to stop critical thought" (21). She questions why the topic of digital production seemed originally to hold little interest for theorists. This is after all a topic that potentially draws together relationships between capital, authority, and technology—relationships that seem inherently important, but overlooked in contemporary

architectural theory, understudied in school curricula, and easily overlooked in practice.

Digital design stands to benefit from this theoretical reinvigoration of labor issues. But the more conventional, analogue design process would be equally strengthened by the discussion. Understanding the political, economic, and cultural dimensions of labor can be critical to solving many architectural problems. Not only can labor transform an architect's understanding of the social context of the project, but it can also transform her understanding of design issues and material opportunities. In this sense, thinking about labor as part of the design process can suggest ways of designing, building, and even advocating for good social outcomes. The case study which follows describes how thinking about labor issues changed one student's perception of a complex architectural problem and its solutions. It illustrates that through labor, architectural proposals at the scale of the detail can have large-scale consequences at the scale of the economy. The case study is followed by a recommendation for increased discussion of labor issues in architectural pedagogy.

### **Case Study**

#### ***How Labor Issues can transform the Response to an Architectural Design Problem***

The case study describes a graduate M.Arch thesis (mine), which lasted 1.5 years between 2003 and 2005, and which began with a simple observation about housing delivery in the eastern Canadian arctic: it wasn't working. Housing was very expensive to build, but the territory needed a lot more of it, quickly.

The creation of the territory of Nunavut on April 1, 1999, gave Inuit—a northern aboriginal people—sovereignty over an immense swath of tundra, formerly the far northern and eastern reaches of the Northwest Territories. Nunavut makes up one-fifth of the Canadian landmass, but its population of 30,000 people accounts for only 0.1% of the national population. The population does however account for 50% of the national Inuit population (Aboriginal Peoples in Canada in 2006: Inuit). The overarching objective of the creation of Nunavut was to restore the self-determinacy,

self-sufficiency, and self-confidence of Inuit living in the Eastern arctic, whose social structures had been eroded since forced settlement in communities from the 1950s onwards. The creation of the territory was an event on which “Inuit hopes and aspirations hinge[d]” (Nunavut Implementation Committee).

By 2005, Nunavut had a 54% rate of residential overcrowding, and a rate of tuberculosis due to overcrowding 25 times higher than the national average (“Nunavut’s housing crisis by the numbers”). In this remote part of Canada, most housing is publicly provided: 45% of 8,200 homes (Bell). The need for more public housing is dire. In 2005, it was anticipated that the number of additional public housing units needed across the territory would be 4000 in 2010, representing a doubling in the public housing stock (“Nunavut’s housing crisis by the numbers”). The Nunavut Housing Corporation or NHC (the territorial housing authority) estimated at the time that in order to meet needs, it would have to achieve a pace of 350 new units per year for the next 10 years. Between 2000 and 2005, however, the NHC had provided just 50 to 75 units per year. With the elevated cost of construction in the arctic, \$750 million would have been required at the time to satisfy public housing demand. However, at that time, the operating budget of the entire Government of Nunavut was less than \$80 million per year (D’Arcy).

The high cost of building was clearly due to the cost of its inputs—materials, labor, or some combination of both. Of these two inputs to construction, I hoped to find that materials were responsible for the high cost and inefficiency of territorial housing delivery. Like most architects and design students, we hope that the solution to a design problem will be spatial, formal, and physical, in other words, a solution which draws on our typical scope of knowledge. With this premature direction, I began meeting with local entrepreneurs and material distributors to discuss how material costs could be driven down.

There is no doubt that the cost of importing all construction materials is a financial burden. Many factors contribute to elevated cost. All building materials have to be shipped or air-lifted to even the most southern parts of Nunavut. Materials arriving one summer usually have to be stored until the next summer. The risk of having to get the order right further drives up the price. Local manufacturing is impractical, because it is less expensive to import finished

stone from halfway around the world than to quarry and finish arctic rock in the territory (Hine). Even if local products could be manufactured, there is not enough local demand to result in reasonable prices. Finally, because of the small market, the building supply industry tends towards the monopolistic. Bulk ordering of materials also favors the development of monopolies.

In short, it seemed increasingly unlikely as the research progressed that materials could be provided at much less expense. Although I felt best equipped to solve problems about materials and how they go together, this problem, as it turned out, lay in *who* put materials together. The real challenge to the arctic construction process was the inefficient use of construction labor. This was an inefficiency that could be lessened if architects designed buildings differently and also became advocates for the development of local labor skills.

As most of the construction in the arctic is for public authorities, the Government of Nunavut (GN) determines procurement rules for the majority of building projects. This includes rules about hiring, which are dictated by Nunavummi Nangminiqagtunik Ikajuuti (NNI) Policy. The NNI Policy was established to incentivize the hiring and training of Inuit. It requires that each community in the territory establish a minimum quota for local labor on each public job. This quota is meant to be based on an assessment of local skill, and represents the proportion of total project wages paid to local laborers (Nunavummi Nangminiqagtunik Ikajuuti Policy). According to the Nunavut Land Claims Agreement—the 1993 federal legislation outlining the rights and responsibilities of Inuit in Nunavut—the GN has the mandate to achieve 85% Inuit employment in the labor force by 2010, reflecting the percentage of Inuit in the population of the territory (Government of Nunavut Department of Education). In most communities, reaching a local labor quota of 85% is a challenge. Table 1 shows the percentages required by Nunavut communities in 2003-2004, and the percentages achieved under labor contracts awarded the same year. Requirements were revised for 2004-2005 in response to achievement the previous year. Table 1 shows that eight of the 22 communities with complete data lowered their requirement for local labor inputs between the two years, while five increased their requirements. In both years, only two communities expected to be close to the territorial 85% target for Inuit labor on building projects.

Community	2003-2004 Inuit Labor %		2004-2005 Inuit Labor %	2003-2004 to 2004-2005 Change in Requirement, as %
	Required	Achieved	Required	
1	45	42	45	0
2	40	41	40	0
3	80	n/a	80	0
4	45	39	45	0
5	n/a	n/a	40	
6	85	100	85	0
7	75	n/a	60	-20
8	60	53	55	-8
9	75	55	60	-20
10	60	44	50	-17
11	60	71	60	0
12	60	53	50	-17
13	30	75	50	67
14	35	43	60	71
15	60	60	65	8
16	30	n/a	30	0
17	30	31	30	0
18	40	35	35	-13
19	0	n/a	40	
20	35	32	30	-14

21	55	86	60	9
22	40	36	35	-13
23	45	n/a	40	-11
24	0	n/a	30	
25	60	65	65	8

*Table 1: Inuit Labor Percentages in NHC Construction Contracts 0304-0405 (Nunavut Housing Corporation)*

High labor costs result when a contractor bidding on a labor tender anticipates that locally available workers will not be able satisfy the local labor quota, because the quota does not accurately reflect either the range or level of skill that actually exists within the community. Of the two, low level of skill—lack of trade certification—is especially difficult for contractors to negotiate, because basic laborers on site cannot earn as much per hour as apprentices or journeymen, which makes the wage-based quota even harder to meet.

The contractor in this position has few choices. One option is to pay a penalty established under the NNI policy for insufficient Inuit involvement. Another is to “accept anyone from the community who comes onto the jobsite,” even if they are under-skilled, in order to meet the quota (Jacques). But this choice also penalizes the project, as buildings built by under-skilled workers run late and miss the mid-December deadlines required for close-in on government projects. Yet another option is to fortify the local work force with expensive, experienced laborers brought in from outside the territory, and to meet the local quota by paying local laborers to perform menial tasks, or worse, to stay home. (Bertol; D’Arcy). But when there is

little hope to advance beyond basic labor, attrition rates rise (Belleau). This deeply compromises the intention shared by public and private sectors to demonstrate that “work in the construction trades can be a decent living and an honorable profession” (Nimchuk).

Faced with the added costs required to compensate for insufficient local skill, the contractor places high bids for labor contracts. The result is that the public sector is further constrained in the services that it can deliver. Table 2 compiles information on the material and labor bids for new construction in one of Nunavut’s three regions during 2004-2005. (This region comprises communities labeled in Table 1 as numbers 6-12.) Costs listed represent the lowest bids submitted. The NHC rule of thumb is that the cost of labor in Nunavut should approximate the cost of materials (D’Arcy). According to this criterion, Table 2 indicates that only two communities (numbers 6 and 7) would be allowed to proceed. In both of these communities, labor accounted for between 50-60% of the combined costs of material and labor inputs. In the other five communities, labor costs accounted for 60% or more of combined costs. Those bids were rejected, and the projects did not proceed that year.

Community	Building Type	Material (M)	Labor (L)	Total M+L	%M	%L	Proceeding
6	4plex	403,300	386,105	789,405			
	per unit	100,825	96,526	197,351	51	49	Yes
7	3plex	276,450	362,500	638,950			
	per unit	92,150	120,833	212,983	43	57	Yes
8	3plex	276,450	429,500	705,950			
	per unit	92,150	143,167	235,317	39	61	No
9	3plex	246,450	482,325	728,775			
	per unit	82,150	160,775	242,925	34	66	No
10	3plex	312,625	474,400	787,025			
	per unit	104,208	158,133	262,341	40	60	No
11	4plex	345,675	563,400	909,075			
	per unit	86,419	140,850	227,269	38	62	No
12	3plex	276,450	424,500	700,950			
	per unit	92,150	141,500	233,650	39	61	No
	detached dwelling	108,521	212,700	321,221	34	66	No

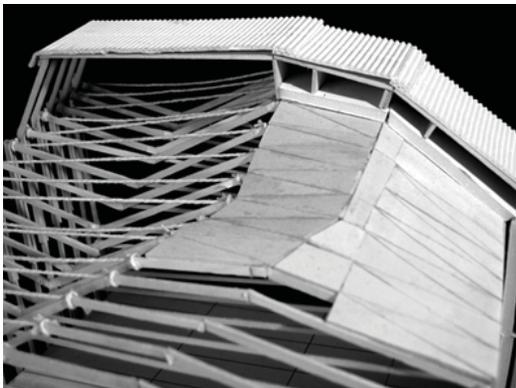
Table 2: 2004-2005 Public Housing Program (Nunavut Housing Corporation)

The only way to mitigate the high labor bids is to assure that local construction workers are capable of the job. Trades-training is part of this, but so is appropriate architectural design. The understanding of labor as the cause of construction inefficiencies suggested architectural ideas about details better suited to execution by less-skilled laborers or laborers-in-training, and materials that are likely to be in stock, locally salvageable, and easily replaced in the event of error. The thesis went on to study a flexible construction system (Fig. 1-4) using inexpensive materials such as dimensional lumber and sheet wood which could be used in both residential and civic buildings, and provide “reasonable hope for a cheaper solution” (Ward 7). The generative detail involved short, slim, scarf-jointed

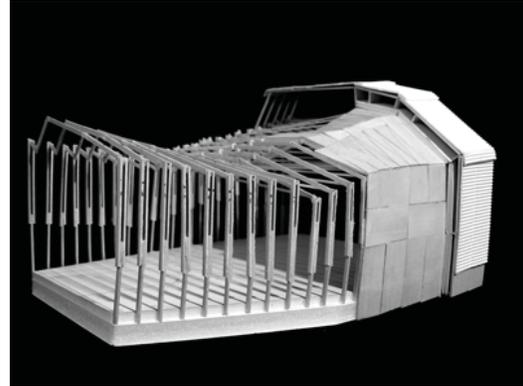
members lashed together with straps. As a system, it proposed ribbed double-skinned walls which can be shaped to avoid high wind loads. The tectonic that emerged was irregular and spiny. The architectural approach did, in the end, embody David Pye’s concept of a “workmanship of risk.”



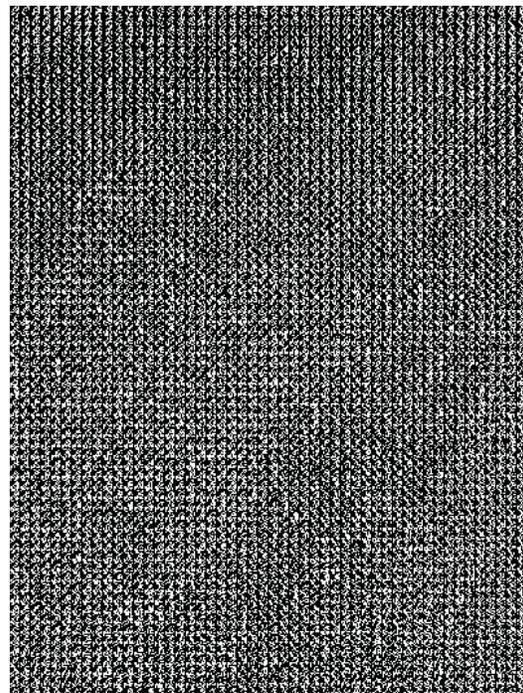
*Figure 1: Architectural system driven by local labor conditions: Model of building (Roszler)*



*Figure 2: Architectural system driven by local labor conditions: Model of assembly (Roszler)*



*Figure 3: Architectural system driven by local labor conditions: Model of assembly (Roszler)*



*Figure 4: Architectural system driven by local labor conditions: Model of detail (Roszler)*

Whether this architectural system is likely to be implemented is beyond the scope of this paper, but also somewhat beside the point. The most formative experience of the thesis was to understand the connection between building systems and social systems—a link which is directly made by labor. The research and design process illustrated the possibility that the social context can meaningfully shape architectural solutions, and that architecture, in turn, can do its part to nurture the goals of a community.

That architecture and society can mutually shape each other through the work of construction labor seems an indispensable lesson to students. The awareness of labor issues in schools of architecture is peripheral. Typical architectural history surveys focus on buildings as symbols in their physical and social contexts, but with little focus on the ways that human resources have been marshaled to execute those buildings. Typical tectonics courses have the potential to deal with the interface between technology and labor, but tend instead to be focused on material, formal, and textural issues. Design-build courses, which are increasingly common in architecture curricula, also have potential to introduce students to labor issues, but seem chiefly motivated by tectonic explorations. Design-build pedagogy might also offer students more exposure to labor inputs if, instead of building the project themselves, the students had to engage, manage, and coordinate with subcontractors. In this way, the design-build pedagogy would encourage students to go beyond the development of details, and to develop a process of interacting with builders that allows those details to be realized.

## **Conclusion**

Architects would benefit in many ways from knowing more about the construction labor conditions that are the context for their work. As the case study shows, an understanding of labor clearly allows an architect to better address the project constraints. Equally critical is the enrichment of architectural thinking by the consideration of labor issues. The tectonics of a project are more deeply grasped as inextricable from the labor that executes it, and, conversely, the details we design can be enhanced by an understanding of what builders can do.

The awareness of labor issues in architecture could be deepened by researching perceptions of construction work in the architectural theory of pre-industrial, industrial, and digital timeframes. It would be equally interesting to study those periods when the architectural literature has had conspicuously less to say about labor, and to understand why interest in this topic waned when it did. Labor issues would also be usefully explored in school, and easily integrated into history and theory courses, tectonics studios, and design-build programs. As demonstrated by the case study presented here, ideas about labor and material can reciprocally strengthen one another in an architecture project, and provide connections between the physical and social motivations of the project. Most importantly, an understanding of labor can help the student form values about the meaning of their work as they enter professional practice: in asking for a building built by laborers to our specifications, we are also asking for a society built to our specifications.

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## PRESENTATION SESSIONS | **EDUCATION**

### Session Four

Moderator: Nancy Hadley, Assoc. AIA, CA



# **Breaking the Hermeneutic Circle: Architectural Conservation as Normative Interpretation.**

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## **Abstract**

Hermeneutic reasoning has been employed quite extensively as methodology in the fields of architecture and archaeology. Surprisingly, it is rarely used in the field of architectural conservation, a fact that is especially striking in light of the many commonalities in method between the interpretive process of the hermeneutic circle as expounded on by Gadamer, Ricoeur and Bontekoe and conservation theory as defined in the international charters of Athens, Venice, Washington and Nara.

The process of understanding a historical building through understanding its parts (brick, stone, plaster), situating those within the whole (building) then within a bigger whole (urban context, architectural canon) and thereby arriving at a better interpretation of the building is a version of the back and forth process of the hermeneutic circle. More importantly, the question of when to stop the enquiry and break the hermeneutic circle, gains an immediacy and multi-valence when it is rooted in the normative aim of actual physical intervention (the preservation project). This immediacy can add richness to the already vibrant discussion on hermeneutics. Furthermore, the hermeneutic belief that experience, and consequently interpretation, is never fixed but always shifting according to horizons is a perfect justification for the concepts of minimal intervention and reversibility that are at the root of modern conservation thought. Preserving the many layers of a building and keeping the manifestations of its many lives after construction respects it as a manifestation of a past that is handed down through a complex and ever-changing fabric of interpretation. It preserves it for future generations allowing them to fuse it in their own way with their own horizon.

This paper attempts to address the relevance of hermeneutics to the methodology of architectural conservation through re-visiting a conservation project of a 14<sup>th</sup> century building directed by the author in Cairo in 1997. It will hermeneutically reread the problem of dating the building and thereby deciding on the intervention strategy. In doing so, it will argue that the exercise of correlating conservation theory with hermeneutics is enriching for both disciplines, endowing the former with more insight into the act of interpretation and the latter with a normative perspective.

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## **Introduction**

### ***Conservation and Interpretation***

The discipline of architectural conservation is based on three guiding axioms, minimal intervention, reversibility or re-treatability and authenticity or true nature. These guidelines prescribe taking the least possible actions that ensure conservation, making sure that they are reversible (or at least re-treatable) and that they conserve what is most authentic or true to the essential nature of the historical building.

The foundation of these three axioms, in turn, is a process of interpretation of value, whereby the decision concerning what to conserve and how to conserve is based on an assessment of the different values of a building, whether historical, artistic, political, functional, social, structural, urban, and so forth. Historical knowledge is therefore related to value judgments through which one determines conservation priorities. It involves questions such as: Why is this building valuable? What does it mean and to whom? What part of its history/meanings should be preserved/highlighted? Would that be to the detriment of other historical meanings? These values are, of course, not absolute values, and may differ in weight from one person to another (Torre 2002; D'Ossat 1982). A politician will not value a modest neighbourhood mosque as much as a member of the community who prays in it five times a day. Our understanding of them also changes through time. A new discovery about the history of the building or the artistic significance of its architectural fabric may alter our own assessment of its worth, as may cultural or social shifts in perspective that could start to give more

weight to the history of minority or fringe communities, for instance. Munoz Vinaz in his re-assessment of the term minimal intervention states that "Conservation should enhance the preferred meanings of the object while impairing as little as possible its ability to convey other meanings" (Vinas 2009, p.56). Interpretation is therefore a process of identifying and evaluating meanings. It becomes concrete through physical intervention.

Most of the writings on conservation theory have recognized the pivotal role that interpretation plays in architectural conservation and have consequently concentrated on analyzing it as a process. It is therefore surprising that none of these writings have dealt with this issue from the perspective of hermeneutics.

This study addresses the relevance of hermeneutics to the methodology of architectural conservation. It re-visits a conservation project of a 14<sup>th</sup> century building directed by the author in Cairo in 1997 and details the process of re-dating the building in light of new archaeological and textual findings and its effect on intervention strategy. It will then reread this problem using hermeneutics. In doing so, it will argue that the exercise of correlating conservation theory with hermeneutics is enriching for both disciplines, endowing the former with more insight into the act of interpretation and adding to the latter a normative perspective that it tends to overlook.

## **Hermeneutics and Conservation**

### ***Hermeneutics as epistemology and ontology***

Hermeneutics is concerned with the process of interpretation or understanding. Through the centuries, this concern has widened its focus from text, through all forms of linguistic, then non-linguistic expression, to the ontological approach of Heidegger and Gadamer for whom understanding is a mode of being. The term, "hermeneutic circle" is used to express the dynamics of this process of understanding with its constant shift back and forth from part to whole; the part ranging from sections of the text to historical events to our own selves, and the whole ranging from full text, to historical context, to our own historical rootedness in the world. In short, the hermeneutic circle is a constant reminder that interpretation is not just about what is being understood,

but also about who is doing the understanding. It is also a reminder that the act of interpretation in itself is a historical act with historical consequences. It too is part of the epistemological or ontological whole. Of particular relevance is the work of Schleiermacher, Dilthey and Ranke. Dilthey was concerned with developing a philosophy for the humanities in general and history in particular. Dilthey urged us to acknowledge that in understanding history we rely on both lived experience (self understanding) and understanding of others. We therefore should not lose sight of the "I in the thou" as according to Ranke "doing historical work means actively participating in the cultural tradition that is being investigated" (Metaphysics Research Lab 2005).

Gadamer then takes these ideas a step further and points out that this process of interpretation is truly existential in the sense that one will never know the historical work as it originally appeared to its contemporaries. Being aware of our rootedness will not, as the earlier philosophers argued, help us attain a higher level of objectivity, rather, it should bring us closer to understanding who we are, our own horizon, our own world view and consequently the other world view we are trying to interpret.

"Trying, as the earlier hermeneuticians did, to locate the (scientific) value of the humanities in their capacity for objective reconstruction is bound to be a wasted effort. The past is handed over to us through the complex and ever-changing fabric of interpretations, which gets richer and more complex as decades and centuries pass. This, however, is not a deficiency. It is, rather, a unique possibility, a possibility that involves the particular kind of truth-claim that Gadamer ascribes to the human sciences: the truth of self-understanding" (Metaphysics Research Lab 2005).

### ***Hermeneutics to Conservation***

The range of meanings addressed by hermeneutic reasoning has rendered it a useful methodology for a number of disciplines. For example, it was used by Hodder to develop theories of contextual archaeology, and by Schön, Snodgrass, Coyne, Jones and Perez-Gomez to rethink the process of architectural history and design (Snodgrass and Coyne 1990; Hodder 1991; Kosso 1991; Snodgrass and Coyne 1992; Johnsen and

Olsen 1992; Perez-Gomez 1999). It is surprising, especially in light of conservation's obviously strong ties with archaeology and architecture and the previously stated concern with interpretation as a process, that the discipline of conservation has not seriously considered hermeneutics as a methodology. What Giddens has to say about the relevance of hermeneutics to archaeology can equally apply to conservation;

"If there are two disciplines, then, whose intersection concerns the limits of presence, they are surely those of archaeology and hermeneutics: archaeology because this is the subject par excellence which is concerned with relics or remains, the bric-a-brac washed up on the shore of modern times and left there as the social currents within which it was created have drained away; hermeneutics, because all survivals of "a conserved past" have to be interpreted, regardless of whether they are pots or texts, and because this task of discovering is conceptually and methodologically indistinguishable from mediating the frames of meaning found in co-existing cultures" (Qtd. in Johnsen and Olsen 1992, p. 423).

Architectural conservation is by nature interdisciplinary, combining architectural knowledge and conservation science with archaeology and history of architecture. Its reliance on historical knowledge and understanding for the interpretation of the building is with a very 'real' normative aim in mind. Interpretation is carried out with "Application" in mind. Application, as Gadamer puts it, is understanding in terms of the projection of possibilities (Gadamer 1977).

The termination of the hermeneutic circle, or the end of inquiry and the beginning of application, is therefore not to be taken lightly. According to Bontekoe, "The process of comprehension always terminates in something like a vicious circle for the simple reason that, once we are satisfied that we understand what is at issue, or have lost interest in pursuing the issue any further, we rely upon and apply the measure of understanding that we have already reached, with the result that, this measure of understanding - which may of course be a misunderstanding - becomes at least temporarily entrenched." (Bontekoe 2000, p. 6) Of course, with the specter of actual physical intervention based on interpretation, in the case of conservation "this measure

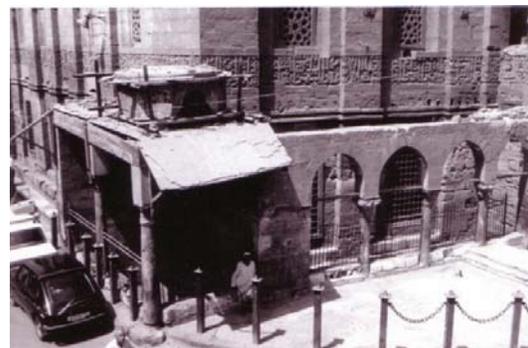
of understanding - which may of course be a misunderstanding" is permanently entrenched. And as the decision to terminate interpretation is often overshadowed by practical considerations of time and money, the conservator's excitement at the beginning of a new project goes hand-in-hand with a good deal of apprehension.

Conservation's way of dealing with this dilemma has taken the form of guidelines, charters, conventions and recommendations, usually under the auspices of international organizations such as UNESCO, ICOMOS, ICCROM and OWHC (Getty Conservation Institute 2009).<sup>1</sup> I would like to combine this perspective with that of hermeneutics and discuss it within the context of work I have done before; a small Islamic monument dating from the 14<sup>th</sup> century whose conservation project I directed in 1997.

### **Case Study: Sabil al-Nasir Muhammad Conservation Project**

#### ***Historical interpretation as a basis for value judgment***

Sabil al-Nasir Muhammad ibn Qalawun is a small structure meant for the charitable dispensation of water located in the heart of Islamic Cairo. Between June and December 1997, the German Institute of Archaeology co-operated with the Supreme Council of Antiquities on a project for the restoration of this *sabil*. The project was funded by the Barakat Trust. (Al-Ibrashy 2007)



Sabil before (above) and after (overleaf) conservation



At first sight, the structure itself was not very impressive, especially when compared to the towering masterpieces of carved stone and marble that line the street in this section of the city, the most impressive of which is the backdrop to the *sabīl*, al-Mansuriyya Complex, a mausoleum, religious college and hospital built by the father of its namesake, al-Nasir. Its claim to fame was the fact that it was the oldest *sabīl* extant in Egypt today and as far as we knew, one of the oldest built in Cairo. It was no longer functioning, its decorative and architectural features were interesting but not unique or exceptionally beautiful and it was not intact. It could therefore safely be argued that its historical value, as Cairo's oldest extant *sabīl*, was the most significant of values and that the guiding principle of the conservation strategy should be to preserve and highlight this value as much as possible (Creswell 1978).

As a listed building, its vital historical data was recorded in the official register Islamic buildings of Cairo, the 1:5000 Islamic Monument Map of Cairo, issued by the Survey Department in 1948 and the accompanying Monument List;

- Name: Sabīl al-Nasir Muhammad ibn Qalawun
- Date: 1324

- Period: Mamluk (1250-1517)
- Location: Bayn al-Qasrayn, the central zone of Al-Mu'izz li-Din Allah Street, formerly al-Qasaba (the spine), the main street of the walled Fatimid city of al-Qahira, the centre of rule of the capital of Cairo from the 10<sup>th</sup> to the 12<sup>th</sup> century, then its commercial, social and cultural hub until the mid 19<sup>th</sup> century.
- Function: A structure for the charitable dispensation of water (*sabīl*)
- Description: An L-shaped one storey structure adjacent to the entrance of the funerary complex of al-Mansuriyya. A roofless oblong space opening onto the street via an arcade ends in a doorway that leads to a rectangular spaced roofed by a wooden ceiling carrying a small central drum coated with faience.

Yet in the course of the restoration we found that even with a building this small, defining it by these 'vital statistics' was not a straightforward affair, especially when it came to dating. The answer to the query; what is it exactly that we aim to conserve, and to what period do we wish to restore the building to, was multi-faceted to say the least.

#### ***The many dates and names of the sabīl***

While the date of foundation is not written on the building, the 1324 dating mentioned above follows a passage in a 15<sup>th</sup> century topographical account of Cairo, which mentions that a drinking trough for animals, built on this spot in 1285 as part of the Mansuriyya Complex, was replaced by a *sabīl* by its overseer in 1324 (Al-Maqrizi nd).

This dating was amended by later scholars to 1345, after a passage from a 15<sup>th</sup> century historical chronicle that describes a later *sabīl* being built on the same spot by Arghun al-'Ala'i, another Mansuriyya overseer (Ebeid 1976).

In order to reach a more complete picture of the date of the building one need not cancel one dating theory in favor of another, but combine them to create the rich mosaic which is more indicative of the building history of this *sabīl*. Thus, the more viable conclusion is that the current building incorporates remains of the 1285 *hawd* (drinking trough) within its walls and the 1324 *sabīl* which was renovated in 1345 by Arghun al-'Ala'i who added a

\maktab (Quran school for orphans) and dedicated the structure not only to the late al-Malik al-Nasir Muhammad, the son of al-Mansur Qalawun, but also to his sons.

We have managed to decipher an extra part of the inscription frieze which mentions the names of at least two of al-Nasir's sons, both sultans. So it is not only the issue of date that is constantly being redefined, the founder is also debatable. Should it be named after al-Nasir and his sons to whom it is dedicated, or the official who ordered it built, or the sultan in whose reign it was built?

### ***Life after birth – The consequent history of the building***

Interest in al-Mansuriyya Complex and thus in the *sabil* structure continued with the later Mamluk sultans, two of whom, Barsbay and Qaytbay, were careful to have their names inscribed on it. A later restoration of the ceiling can be assigned to either one of these two sultans.

By the second half of the 19<sup>th</sup> century, and according to the drawings of Georg Ebers and David Roberts, (Ebers 1878, p.247; Roberts 1999, p.246) the building was no longer recognizable as a *sabil-kuttab* or even as a 14<sup>th</sup> century structure. In fact, the *kuttab* had been remodeled, probably sometime in the 17<sup>th</sup> century and was being used as a residence and the ground floor was used for commercial activities. The 1904 bulletin of the *Comité de Conservation des Monuments d'Art Arabe*, the first modern governmental body in charge of the conservation of Islamic monuments in Egypt, described it as a residential building with shops below. (*Comité* 1904, p.91)

The inscription frieze naming the building as a *sabil* and associating it with al-Malik al-Nasir was discovered by the *Comité* during the demolition of the two top floors of the *sabil* structure in 1909 to remove all encroachments from the facade of the Mansuriyya Complex during its conservation. The *sabil* was then listed and included in the conservation project. (*Comité* 1909, p.49-50; 1913, p.60)



The superstructure before it was torn down by the Comité (courtesy - photographic records of the SCA)

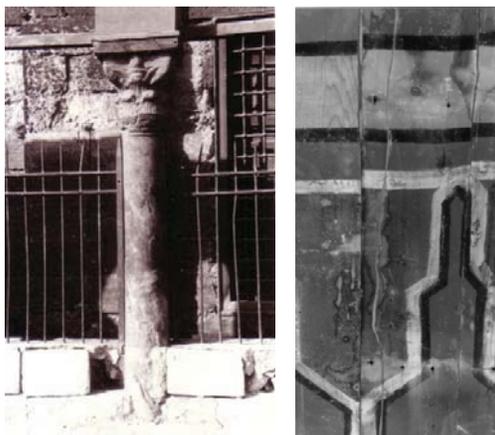
In the course of conservation, the *Comité* too put its stamp on the building. It has already been mentioned that it demolished the two top floors. It then proceeded to try and amend the damage that time had started and the *Comité* itself had accelerated. In doing so, it also altered the appearance of the building. For example, the reconstruction of the mosaic faience gypsum drum plates of the wooden dome is pure *Comité*, and on two sides, it is simply a haphazard arrangement of fragments of faience found during restoration and embedded in the restored gypsum drum for safekeeping.



The faience drum

On removing the top layers of the roof for examination, a secondary layer of reused decorated roof boards was found to have been put by the *Comité*, with the decorated side hidden from view. These could be dated to the 19<sup>th</sup> century and may have come from the structure topping the arcade.

The *Comité* also excavated the original ground level of the *sabil* and built a retaining wall between the columns of the arcade facing the street to transition between the level of the column bases and the street level which was more than 1 meter higher.



Left: Column base embedded in retaining wall  
Right: Detail of reused decorated roof tiles

If we add to that the fact that some of the elements of the building are reused materials taken from Ancient Egyptian and Roman buildings, we come up with datings ranging from Antiquity to the 20<sup>th</sup> century (Jakeman 1993, p. 143). It was therefore determined that the historical value was not in the original state at inception (which in truth cannot be determined or pinpointed) but in its evolution and metamorphosis through time.

#### **Minimal intervention and re-treatability as conservation policy**

It thus followed that the restoration of each element had to be looked into separately due to the wide range in date and importance.

Decisions varied. In certain cases, such as the decorated ceiling, it was important to keep the layers of painted decoration because they were an indication of a high level of interest in the *sabil* which reflects interest in the

Mansuriyya complex as the most important funerary/religious and health complex in the city at the time. Thus the three layers were kept and while it would have been possible to reconstruct the middle layer, this was only done theoretically on paper so as to preserve the other two decorative phases.

In the case of the gypsum drum, while positive that the present arrangement was thought up by the *Comité*, and that the drum was originally topped by a dome, we did not discover enough information concerning the original design. We simply did not intervene because we did not know.

In the case of the re-used roof boards installed by the *Comité* as a secondary roof, they were, to put it simply, too new to go to the museum and too old to throw away. They were documented, conserved, and returned to their place.

In cases where long-term damage was caused by certain conservation decisions or techniques, action was taken to remove the cause of damage. The bases of the arcade columns and almost half of the shafts were buried underground and severe damage had been incurred due to salt migration and bad aeration. The columns were freed, waterproofed using molten lead, and the retaining wall was moved forward. This also helped give a better idea about the original proportions of the arcade.

#### **Conservation to Hermeneutics**

The above account illustrates how historical interpretation lies at the core of conservation policy. It will now be shown that hermeneutic reasoning is an underlying principle of this process of 'normative interpretation'. This case study brings forth five points in which analogies between hermeneutics and conservation theory can be pinpointed; the hermeneutic nature of the process of interpretation of historical structures, the situatedness of the process of conservation within its own world view, the layered quality of living architecture, conservation as a historical act and finally, the axioms of conservation as tools for breaking the hermeneutic circle.

### ***The Hermeneutic Circle of Conservation***

Conservation is the result of a process of interpretation that continuously zooms in and out – between the details of a building and its whole, between the building and its urban setting, between the building and its historical horizon, between the building and the corpus of extant architecture contemporary to it, between what we have today and what we know existed in the time when it was constructed, and so forth. In the conservation process, research and conceptualization could go on indefinitely – one never really *knows* the building. Yet a cut-off point has to be determined, and it is always overshadowed by financial and political constraints.

The problem with the *Comité* was that it based the conservation policy for the Mansuriyya Complex on a unilateral approach that aimed only at uncovering the façade and restoring it to its “original” condition. It did not attempt to understand the building as part of the urban fabric or to reference the textual sources to better understand the history of the area as an ensemble. Even after the *sabil* was acknowledged as a monument and listed, only one of its many construction dates was acknowledged. In our case we moved back and forth between the textual and architectural evidence to arrive at a more nuanced dating and identification of the building. This interpretation, in turn, influenced conservation policy.

### ***The situated nature of conservation***

Conservation decisions – even with the best intentions and the most rigorous process – are situated within a theoretical horizon that mirrors their own time and world view (Clavir 2009). The *Comité*'s decision to demolish the *sabil* was part of a general strategy that came in response to a situation where the monuments of Cairo were being eaten up by the urban fabric. It was a necessity at a time when, to project Barthes's description of Rome on Cairo, the permanent conflict between the functional necessities of modern life and the semantic charge given to the city by its history was the despair of the *Comité* (Barthes 1997, 167)<sup>2</sup>. The historical fabric around the older monuments had to be sacrificed for the monument to regain its rightful value. This was analogous to the changes taking place in Europe's major cities whereby buildings around important monuments –

cathedrals for example – were removed to uncover the monuments from all sides.

This absolutist approach was later to be addressed in the 1964 Venice Charter which states that, “The concept of the historic monument embraces not only the single architectural work but also the urban and rural setting in which is found the evidence of a particular civilization, a significant development in an historic event”. These ideas were further elaborated in the Washington Charter of 1987 (Feilden and Jokilehto 1998; Getty Conservation Institute 2009). With the development of these ideas, conservation practitioners gradually acquired a more inclusive approach to conservation that took the urban context into account. Cairo itself is now considered a historical ensemble, and as a World Heritage Site, specific laws were formulated to deal with it in a holistic manner.

### ***Conservation and values***

At the heart of the conservation concept is an assessment of values, and the relative importance of each. The result should, as much as possible accentuate the true authentic nature of the building.

The idea that the historical value of a building lies in all it has lived through and not simply its meaning or appearance at the moment of inception is hermeneutic to the core. To quote Bernard Tschumi, “Architecture resembles a masked figure. It cannot be easily unveiled. It is always hiding ... Once you uncover that which lies behind the mask, it is only to discover another mask .. Masks hide other masks, and each successive level of meaning confirms the impossibility of grasping reality.” (Tschumi 1996, p.90-94). In other words, to borrow from Heidegger's ontology, the true meaning of architecture, like any ‘truth’ is ultimately never disclosed. As one opens a clearing, a certain *dasein*, makes itself manifest. It is not the first and will not be the last (Heidegger 1962). This is what the *Comité* came to realize after it discovered that the structure encroaching in al-Mansuriyya Complex was a historical *sabil* in its own right. Had the *Comité* considered the living history of al-Mansuriyya, it would have discovered that the *sabil*, built as it was by the overseers of al-Mansuriyya and located where it was to bask in its reflected glory, was an integral part of its history.

Yet even within this inclusive approach, sacrifices have to be made and some meanings take precedence over others. While the crew was at pains to preserve the layers of ceiling decoration, we removed the *Comité* fence (dating from the early 20<sup>th</sup> century, i.e. about 100 years old) without qualms. The justification for our decision, to prevent further damage to the re-used marble columns through water seepage, was a value judgment; Reused pre-Islamic is better than early 20<sup>th</sup> century as historical layers go.

### ***Conservation as part of the historical process***

Conservation interventions physically alter the state of the building, and as such, they too are part of the multi-tiered history of the building. We become part of the tradition as our intervention to conserve architectural heritage becomes part of the building. As Gadamer rightly put it, “even a restorer or a preserver of ancient monuments remains an artist of his own time” (Gadamer 2004, p.150).

In maintaining as much as possible of the building, we are not just giving future conservators the chance to re-interpret or re-understand. We are also giving them the chance to implement certain conservation techniques that are not known to us today. This positivist faith in the advancement of knowledge and technology was what propelled the *Comité* to preserve the painted ceiling boards from the superstructure it had torn down. In a way, the ceiling boards were a message to future conservators – a consolation prize or apology for the destruction it had inadvertently caused. We too continued the tradition and kept the ceiling boards in place. Our aim was to provide the next ‘preserver’ of the building (both in the Heideggerian sense; i.e., *an audience of an artwork who gives it life through re-interpretation and new experience of it* and in the sense of a person whose profession is conservation), with as ‘authentic’ (also in the Heideggerian sense, i.e. *lending itself as much as possible to new world views untainted by previous fallenness*, and in the conservational sense of the word discussed above) an object as possible (Heidegger 1962).

### ***The three axioms of conservation as tools for breaking the hermeneutic circle***

The Gadamerian principle of situatedness argued above - that we are rooted within who we are and within our own horizon - leads to the realization that we close the hermeneutic circle at our own risk and only with the expectation that it will be opened again. When it will, our contribution becomes part of the problem. In the step from interpretation to application, the Nasir Project crew was aware of the fact that, “the whole truth would be too much; it is too vast, variable and clogged with trivia” (Goodman 1978, p.19) Our strategy was to try and render the meanings of the building less unwieldy to its visitor, while being true to its most significant values.

The lesson learnt from the *Comité*’s interpretation of the building and its subsequent intervention is invaluable. The hermeneutic circle of enquiry and interpretation was broken off and action followed. In the process, historical fabric that, even according to their view of historicity, was of value was lost. This is a risk that any hermeneutic enquiry acknowledges, founded as it is on the idea that interpretation is always unfinished business.

Rejecting idealism and realising that our intervention is never fully reversible, but can be retreatable, that it is never minimal, but can be balanced, forces us to adopt a more nuanced and thoughtful, less formulaic approach to conservation. This realisation of the futility of a perfectly reversible or minimal intervention or of the possibility of arriving at the “authentic” core of a building is analogous to the Gadamerian realisation that while Cartesian objectivity is an impossibility, the fusion of our horizons with those of the past, or at least a dialectic interplay, is a viable goal. In the same way that Gadamer urges us to accept prejudice as a positive concept, as “biases to our openness to the world” (Gadamer, *Philosophical Hermeneutics* 1977, p.5), we should accept the changes that come with intervention as a necessary link in the history of the building. And with this acceptance, comes a more feasible and applicable form of responsibility for interpreting value and accountability for conserving it. We accept that as conservators, we are a Gadamerian “authority” and rather than be ashamed of our position, we try and democratize this authority by involving as many stakeholders as possible in the interpretation (determination of value) and decision-making. We, as

“advocate(s) for the preservation of cultural property” aim for the “careful management of change” (Clavir 2009, p.141).<sup>3</sup>

## Conclusion

The process of interpretation of historical architectural and archaeological fabric, and intervention as the consequence of interpretation, has been thought and rethought hermeneutically for years, without it being a formal part of the hermeneutic tradition. The time for situating it within that tradition has come. This paper argues that doing so will be useful both for the fields of hermeneutics and conservation. For conservation, they ground concepts such as reversibility, minimal intervention and authenticity in a wider epistemological and ontological debate that adds depth and context. When viewed within the context of developments in hermeneutics, the current switch from reversibility to retreatability, minimal intervention to meaning balance, and widening the scope of authenticity from fabric to meaning acquire a resonance that is multi-valent. It resonates with the post-romantic questioning of the claims of Schleiermacher and Dilthey that the hermeneutic circle from part to whole will achieve objectivity. On the other hand, the normative side to conservation and the real consequences of breaking the hermeneutic circle is an interesting twist that can inform the hermeneutic tradition. Because the questions it asks have a normative purpose (intervention) in mind, it provides much-needed methods for understanding the process of breaking the hermeneutic circle and its consequences.

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its history and this conflict between signification and function is the despair of planners."

<sup>3</sup> AIC code of ethics and Staniforth speaking for the National Trust in the UK respectively, quoted in Clavir 2009.

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<sup>1</sup> See especially the ICOMOS Charter on the Interpretation and Presentation of Cultural Heritage Sites (2007).

<sup>2</sup> The original text by Barthes reads, "Rome involves a permanent conflict between the functional necessities of modern life and the semantic charge given to the city by

# Those Wicked Dead White Men: Using “Countercontexts” in Architectural History Courses to Help Students Meet the Goals of General Education

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Educational constructs today demand that architectural history courses no longer be mere chronological expositions of styles, architects, and their masterpieces. As studio courses move to expropriate tools of historical inquiry, history courses – at risk of losing their identity – must reassert their intrinsically liberalizing disposition within a professionally circumscribed curriculum. This pedagogical critique converts “service” course into “general education” experience. Devised to bolster cultural and educational breadth, history courses so reconceived would challenge the canon of “dead white men” through the employment of those “countercontexts” that can cultivate a more comprehensive appreciation of alternative worldviews while sharpening students’ critical thinking skills.

*Water, water, everywhere,  
And all the boards did shrink;  
Water, water, everywhere,  
Nor any drop to drink.*

Samuel Taylor Coleridge  
*The Rime of the Ancient Mariner*<sup>1</sup>

## Troubles Beset Architectural History

Abu al-Muhajir Dinar, the last conquering commander of Islamic armies to have swept across the North African littoral in the seventh and eighth centuries, arrived at the shores of the Atlantic, dipped his toe into its vast stretches of water, and declared that there was nothing left to conquer. He had reached the limits of what was conceivable to him. The unconquerable ocean was, from his vantage point, a barrier. It delimited his world and tethered his cosmopolitan reach. This story, recounted twice by Marq de Villiers and Sheila Hirtle in their book *Timbuktu: The Sahara’s Fabled City of Gold*, stands as a fitting metaphor for the current disposition of architectural

history courses, especially those introductory surveys that “serve” professional architecture programs and thus hardly ever sail out onto the choppy worldwide seas of general cultural awareness and knowledge.<sup>2</sup>

For too long now architectural history courses and their expositors have drawn sharp boundaries around content. Slow to change, history courses have partitioned a realm of inquiry with neatly defined territories that only just recently have begun to encroach upon the unfamiliar, littoral edges of other traditions tangential to Western building customs.<sup>3</sup>

Other constraints on teaching history have been driven by the pressures exerted from studio-oriented curricula that regard history to be that perfect niche within which matters of precedent are best accommodated.

More fundamentally, historians’ acquiescence to these historical and conventional limitations on the instruction of history have helped to magnify the pervasive perception that the entire discipline of professional building arts is such a distinct field of study unto itself in the academy that it is justifiably cloistered from more comprehensive and liberalizing educational objectives. The “service” nature of history has obscured its potentially much more meaningful educational role by over-emphasizing its skill at being a mere depository of historical minutiae. Unfortunately, this much-too-narrowly conceived appropriation of history’s role has an inexorability to it that dismisses the discipline’s inherent ability to sharpen students’ critical thinking skills.

## Daring to Venture to Timbuktu

Rather than look inward and become subservient to architecture curricula, history courses and their chroniclers need to look outward from other vantage points that present differently enriching perspectives to students of architecture in order to connect them to new panoramas of their world. In short, architectural history courses need to become unabashedly general (liberal) education courses within professional architecture curricula.

The brilliance of the de Villiers and Hirtle book is that, in a single evocative passage employing water as an analog for obstructions to further conquest and expanded knowledge, it nevertheless alerts us to those other vibrant worlds that co-existed alongside Western civilization with all its admirable accomplishments. While those other “exotic” worlds were once regarded as robust expressions of the

human will but only up to a certain point of confrontation with an irresistible force, they nevertheless are now proving more and more to have equaled and even outshone what we have routinely extolled about Western civilization. In *Timbuktu*, the authors demonstrate that the city had been a preeminent cultural epicenter of Islamic learning in the same manner and at about the same time that Trecento Italy had begun to nurture a rebirth of learning.<sup>4</sup> Awareness of the importance of Timbuktu in the Islamic world stands as an instructive countercontext to our canonical texts about the rise of a presumptively singular Renaissance in Europe. Timbuktu is not some fabled city. Its culture and the buildings that housed its culture of learning demand our attention, especially in a post-9/11 world.

Admittedly, *Timbuktu* is not an easy read. It requires hard mental labor to wade through a deluge of historical facts in order to access its larger message – not the sort of text one would want to impose on students enrolled in introductory courses. Nevertheless, the purveyors of those history courses should not merely dip a toe into that unfathomable ocean and then turn away. They should take the plunge, explore its vast reaches, and then bring back their discoveries and fresh insights to their students in order to expand and redirect those students' parochial vistas of world culture.<sup>5</sup> With this perspective, the Italian Renaissance becomes one of any number of revivals of learning worldwide. In fact, it pales somewhat in comparison to the vigor of the scholars and the architects associated with the mosques and universities in Timbuktu.

### **Dealing with Dead White Men**

Scholarly dissertations, like *Timbuktu*, are educationally transformative in that they exorcise old and persistent Eurocentric ghosts. The wholesale condemnation of Eurocentric cultural studies is best polemicized in the hackneyed expression “dead white men” – an epithet applied pejoratively to both the men (think “Columbus”) who are supposed to have precipitated the world's watershed events and the historians (think “Gibbon”) who later gave disproportionate preeminence to those high water mark events in the global narratives they chronicled.

Now, imagine an even more heightened intellectual richness produced by the introduction into an architectural history course of yet another maritime-themed narrative that sits in counterpoise to the historic journey's ending of Abu al-Muhajir Dinar. The end of the road for Romulus

Augustulus, the last emperor of the Western Roman Empire, was Campania. (His name alludes to both the origins of the Romans and the birth of their later imperial system of government.) After having been deposed by a “barbarian” and exiled from Ravenna in 476 CE to live in a villa on the Bay of Naples, the teenage Romulus Augustulus passed his last days in relative royal comfort, always visually cognizant of the sea.

In his book *Are We Rome?*, Cullen Murphy constructs an alternative, melancholic evocation of the ending of majesty with a countercontext of serenity posited as a complement to the musty chronicles of cataclysmic eruptions, barbarous murders, and other depravities that have long been reputed to have precipitated the fall of the Roman Empire:

But the breeze off the bay is fresh and constant. Even without vendors selling *granita al limone* it would have been a congenial spot in which to endure your exile, especially on 6,000 *soldi* a year and with Vesuvius quiet. For many Roman emperors, the end had been far less kind, and the breeze far more fleeting, and felt only on the back of the neck.<sup>6</sup>

If ancient accounts are more accurate than apocryphal, then Romulus Augustulus likely spent his idle hours on that headland gazing at the waters of the Mediterranean. The boy emperor never had constructed a single piece of architecture; but did he sit in his seaside villa contemplating the course of the great empire he had lost? Did it dawn on him that the edifying strength of that empire had been founded on and around navigable waterways? Rome was, after all, the only historic entity to control the entire Mediterranean coastline. From the perspective of Augustulus, water then would have been regarded not as a barrier to conquest or to the acquisition of knowledge. To the contrary, Murphy's musings resonate all the more profoundly because, when set against de Villiers and Hirtle's anecdote, they are the complement to Abu al-Muhajir Dinar's perception of water as an inscrutable and insurmountable natural force. On the other hand, Abu al-Muhajir Dinar's had the Sahara as his sea – an ocean of sand that his tribes had learned to navigate, guided by stars like a ship's pilot, from the backs of “ships of the desert” – camels. For the Romans, deserts and mountains were the more formidable barriers; it was the mighty sea that fortified a united “Romanized” citizenry.

Together these two counterbalancing tales, both set against the backdrop of water, conspire to plot a new course for the purveyors of history courses. They speak tellingly, through the metaphor of water seen alternately as impossibility or potentiality, of the diverse cultural modalities that inherently govern our worldviews.<sup>7</sup> That is, so often the basic framework upon which we hang the facts of architectural history is constructed out of a kit of parts that presumes the only historic events of any real relevance are those based on *terra firma* because that is where the foundations of structures must necessarily come to rest – on solid ground.

### **Why Not Study the Greeks?**

Michael Shenefelt had taken just exactly that mariner's stance when he wrote "Why Study the Greeks? Check the Map." The various Greek tribes, Shenefelt observed, were divided by mountains and islands, "yet the exceptional smoothness of the Mediterranean sea connected them by an easy means of transportation."<sup>8</sup>

Now, this variation of a maritime-based precept, which Shenefelt effectively employed to bolster traditional Eurocentric curricular biases, argues that "in most historical periods, land transport was largely irrelevant."<sup>9</sup> Shenefelt effectively wielded a seafaring proposition to explain why the ancient Greeks dominated their world and why they continue to deserve to predominate in the "present state of the college curriculum."<sup>10</sup> That curriculum, for all the talk about diversity and multiculturalism, has been and still largely exists as a Eurocentric curriculum. Shenefelt's freshly conceived importance of the free exercise of seafaring skills was a new take on an old proposition – that transportation technologies were crucial mechanisms for cultural dissemination and exchange. It seemingly defended and reinforced the "Dead White Men" models of higher education. In truth, Shenefelt charted two new courses for higher education: first, the intellectual necessity for reversing one's perspective of standard interpretations and, second, the pedagogical mechanisms by which to introduce those reversed perspectives.

### **Plotting the First New Course**

Shenefelt's article establishes a precedent for alternative, non-canonical interpretations of history – in essence, countertexts. His work on the ancient Greeks' maritime prowess anticipated a uniquely maritime history of the Greeks authored by John R. Hale. In *Lords of the Sea*,

Hale argues that it was not their artistry or their great philosophical belief systems that established their cultural superiority. It was their mastery of the sea. In Hale's view, the Parthenon, although elevated on the Acropolis, stood in the shadows of the greater (but now little referenced) naval arsenal of Philo. "Philo himself ... felt so proud of his naval arsenal that he wrote a book about it. No such sign of respect or public interest had been accorded the more prestigious Parthenon on the Acropolis."<sup>11</sup> The arsenal, properly called the Skeuothekē, was designed in the Doric style like the Parthenon, but it far surpassed it or any other temple in Greece in size. Ought not it also be covered in a history course as a complement to – not necessarily a substitute for – the more aesthetically "prestigious" Parthenon? After all, the arsenal stood at the true epicenter of Athenian power – Athens's port at Piraeus.

When Hale does first focus our attention on the Parthenon, it is from a vantage point that is disconcertingly detached from our usual conception of the temple's importance:

The glories of the Acropolis dominate our modern view of Athens. Ancient Athenians saw their city differently. In terms of civic pride, the temples of the gods were eclipsed by the vast complex of installations for the navy. ... Only one contemporary literary reference to the Parthenon has survived to our time, in fragments of an anonymous comedy. Even here the Parthenon takes second place to [the mention of] nautical monuments.<sup>12</sup>

What if a history course were to devote as much time to the lively, daily functioning of Philo's Arsenal as to the shell of the Parthenon? Would not our perception of the ancient Greek culture and their traditional touchstone of matchless poise and grandeur be tempered by the admiration the Greeks themselves paid to the Skeuothekē? There are authentic liberalizing advantages to looking at the Parthenon sometimes but distantly within a panoramic vista from Zea Harbor at Piraeus rather than from the framing portal of the Propylaea.<sup>13</sup>

### **Water, Water, Everywhere**

In *The Middle Sea: A History of the Mediterranean*, John Julius Norwich affirms that the waters of the Mediterranean were the principle catalytic agent of historical events in ancient times – not cultural barrier but cross-cultural

facilitator as the region's principal means of communication. He is jubilant as he extols the power of the sea in the opening line of his text: "The Mediterranean is a miracle. Seeing it on the map for the millionth time, we tend to take it for granted." He waxes lyrical about its providential existence when he describes it as "a body of water that might have been deliberately designed ... ." Although the "Middle Sea" is almost totally encircled by land, "it is saved from stagnation by ... those ancient Pillars of Hercules which protect it from the worst of Atlantic storms and keep its waters fresh ... . It links three of the world's six continents." During the infancy of navigation, "it was possible to sail from port to port without ever losing sight of land ... ."14 Indeed, in its larger thesis as well as in its particular rhetorical flourishes, Norwich's introduction is perfectly emblematic of countertextual reformulations of history – that is, mitigating the effects of stagnant viewpoints, seeing things afresh, venturing into new territories, but never losing sight of traditional landmarks.15

### **Barbarians at the Gate**

Murphy's previously referenced book *Are We Rome?* is quite adept, too, at guiding readers to vantage points that cut new channels by which to explore the grandest of all time-tested and time-honored intellectual constructs – empire. Murphy sets the stage for a new viewing platform of the ancient imperial Romans when he writes:

Think less about threats from unwelcome barbarians, and more about the healthy functioning of a multi-ethnic society. Think less about the ability of a superpower to influence everything on earth, and more about how everything on earth affects a superpower.16

What an entirely different perspective – to see the Roman Empire more as the pawn than as the provocateur!17

As Murphy recasts Rome in a reactionary rather than a proactive role, he quite clearly engages in the practice of juxtaposing text to countertext – to paraphrase, "think less virulent xenophobia, think more healthy multiculturalism." The text in this case is, of course, Edward Gibbon's classic 18th-century, literary behemoth *The Decline and Fall of the Roman Empire*. The contrast between Murphy's anecdotal evocations versus Gibbon's ponderous judgments of failure could not be more sharply drawn than when Murphy quotes Gibbon directly: "... the causes of destruction multiplied

with the extent of conquest; and, as soon as time or accident had removed the artificial supports, the stupendous fabric yielded to the pressure of its own weight."18 Murphy counters with an intellectually more buoyant analysis of the legendary assaults on Rome's inviolate borders and institutionalized cultural homogeneity:

... Hadrian's Wall has the appearance of something built to repel barbarian hordes. ... but it was ... meant to be penetrated. ... [T]he milecastles had fortified gateways expressly to make the wall permeable – to regulate traffic cross-border traffic rather than to prevent it. ... [T]hose *Brittunculi* [or border towns populated with both Roman settlers and indigenous Britons] – grew up symbiotically outside the military installations.19

As an adage, "barbarians at the (proverbial) gate" takes on an entirely different tone depending on which side of the wall one stands – Gibbon's or Murphy's. The two alternative interpretations do not cancel each other out; they mutually enrich. Each text is dependent on its countertext to claim relevancy and validity.20

Thus, the fresh perspectives of Shenefelt's scholarship – as well as those of Hale and Norwich and Murphy, interpreters all of ancient Greek and Roman domination – have unburdened other intellectual explorers – us – from the weight of old authoritative texts by positing points of view that create, in essence, countertexts or antidotes to the stultifying humors of tomes from bygone days.

### **Plotting the Second New Course**

A second course charted by Shenefelt's piquant article issues forth from his advice on the manner for handling all these additional countertexts in history courses already overflowing with content. Shenefelt advises: "No new course is required to do this. All it takes is a little more attention . . . [a]nd one way to make the central point [supported by observable parallels in other cultures] is simply to list them."21 Whereupon Shenefelt dutifully lists a myriad of other instances of seafaring's impact on both the dissemination of cultural watersheds and the germination of intellectual high water marks.

While his "listing" methodology is subject to those same critiques of superficiality that historians currently confront

from design studio teaching colleagues who regard history lectures to be nothing more than inventories of precedent studies, Shenefelt nevertheless makes it a point not to exclude non-Western examples from his list, thereby neatly running the gauntlet between “dead white men” on one side and under-represented populations on the other side. His qualified allegiance to the principles of diversity is a genuine effort to balance Eurocentric texts with multicultural countertexts. As a result, the picture that Shenefelt draws possesses a universality to it notwithstanding his primary motivation to employ such a list as proof that his larger thesis championing Western hegemony is entirely valid. Shenefelt’s approach is a little wicked in motivation but not wholly irredeemable in intent.<sup>22</sup>

### **General Education Criteria**

General education – “the public face of a liberal education” – strives to create an astute citizenry that is willing to absorb and capable of filtering cross-cultural currents and global contacts throughout their lives.<sup>23</sup> General education was devised, in part, to counter a long-lived Eurocentrism in the American academy, not to “... [instill] confidence in students by flattering the presumption that the world they are familiar with is the only one that matters.”<sup>24</sup> As the flagship of American educational reform, Harvard University recently reaffirmed general education as its preferred educational blueprint by which, “... without concern for topical relevance or vocational utility,” students are made “more reflective ... , more self-conscious and critical ... , more creative ... , [and] more perceptive of the world around them, ... in an environment free from most of the constraints on time and energy that operate in the rest of life.”<sup>25</sup>

As part of the academy, architecture curricula are (thankfully) required to accommodate liberalizing experiences as stipulated by various national accrediting agencies. For instance, in espousing the importance of breadth as well as depth of study, the Higher Learning Commission of the North Central Association of Colleges and Schools defines general education as “[u]nderstanding and appreciating diverse cultures, mastering multiple modes of inquiry, effectively analyzing and communicating information, and recognizing the importance of creativity and values to the human spirit ... .”<sup>26</sup>

The National Architectural Accrediting Board validates the necessity for architecture students to be broadly and

liberally educated as well. It has recently modified its conditions for accreditation so that the artifice within the performance criteria that previously divided an understanding of “traditions” (not “histories” – one should note) into separate Western versus non-Western categories was erased in favor of a rubric that now blends the perspectives of “parallel and divergent canons and traditions” all into a single great “historical traditions and global culture” criterion.<sup>27</sup>

### **Architectural History as “Gen Ed”**

Much of the current pedagogical discourse on the appropriate role of history classes often pulls professional historians in oppositional directions – history or theory, sovereign discipline or service course, integral contributor to the curriculum or intellectual construct subsumed by the *atelier*. Historians need not always succumb to the particularized demands and domineering weight given over to design studio education. There is another option.

History courses can rightly be that place where architecture students connect themselves and their chosen field to the world at large – past and present, Western and non-Western, canonical and dissident, conventional and unorthodox. In accord with new educational paradigms and national accreditation standards, history courses no longer need be mere chronological expositions of styles, architects, and their masterpieces. They can be that one most apropos place within the curriculum where, to paraphrase English professor Wayne Booth, design students learn how to interrogate the tyranny of their own cultural canon.<sup>28</sup>

### **Countertexts**

Interrogation of the canon, or critical thinking exercises, must become part and parcel of this new pedagogical model for architectural history class reconceived as general education course; and, to be successful, those exercises should be culturally broad-based and would doubtlessly include what has herein been termed “countertexts.” The word “countertext” was coined to refer to those other accounts of the world that complement – not banish – existing texts in order to render a more comprehensive picture of diverse cultural streams. “Countertext” should not be interpreted to connote a counter argument or an antithetical discourse that is intended to oppose and ultimately demolish the more predominant, governing thesis. A countertext is meant to be constructive in building

oceanic-scaled cultural awareness, not deconstructivist in terms of generating great upwelling currents that replace authoritative centers with deeply submerged marginal trends or tribal traditions.

The term “countertext” apparently originated in philological studies of the Bible. The clearest definition of its intent and use can be found in the essay “Methods in Old Testament Study” by David J. Clines. “[T]here is a type of knowledge,” he opines, “that can be very valuable even though it may not exist. Every text has a countertext – something that could have been articulated but was not.”<sup>29</sup> Once the countertext is articulated “the substantiality, singularity, and inevitability of the text can be challenged through the deliberate act of redirecting our attention to something else that differently enriches and deepens our understanding of the text.”<sup>30</sup>

One question that surfaces here is how the newly realized countertext acquires its own legitimacy, for it must be able to withstand the imperative of demonstrable historical evidence on its own. In short, how does the countertext, which complements the canon, become canonical itself? One very good example can be found in the discipline of Biblical studies.

The only thing that official Christian dogma teaches about the childhood of Jesus Christ appears in the Gospel of Mark, 2:46:

And it came to pass, that after three days they found him in the temple, sitting in the midst of doctors, *both* [emphasis added] hearing them, and asking them questions.

Yet apocryphal texts give us another glimpse of a mischievous boy who had yet to learn how to use his divine powers. In the Gospel of the Infancy of Christ, 19:16-21, we read:

But when the Lord Jesus clapped his hands over the [clay] sparrows he had made, they fled away chirping. At length the son of Hanani coming to the fish-pool of Jesus to destroy it, the water vanished away, and the Lord Jesus said to him, In like manner as this water has vanished, so shall thy life vanish; and presently the boy died.

This “gospel” is not included in Christian canon for all-too-obvious reasons. Nonetheless, it challenges the “substantiality, singularity, and inevitability” of the canonical text. Why and how then might we want to validate the apocryphal narrative, unnerving though it may be, as a genuine countertext that complements the duly sanctioned canonical writings? The authenticity we seek comes from this passage:

I have come to you, with a sign from your Lord, in that I make for you out of clay, as it were, the figure of a bird, and breathe into it, and it becomes a bird by God’s leave.

This verse is found in the Qur’an (Sūra 3:49), obviously the canonical text of Islam.

The same clay birds crafted by Jesus in suppressed Christian writings emerge as part of the fundamental tenets of Islam. Next to Mohammed, there is no more important prophet of Islam than Christ. When the close connection between Christianity and Islam – one of many that can be referenced – is revealed to students prior to a discussion of Islamic architecture, the students will tend to view Islam, Muslims, and their cultural artifacts in a different light than that which the singularity of a Christian viewpoint derived from the Bible would have dictated. The countertext from the Qur’an, substantiated as an authentic countervailing viewpoint through its canonical acceptance by one-fifth of the world’s population, enriches the understanding of other worldviews amongst our American (mostly Christian) students. They are allowed through a countertext to plumb the depths of a religion intimately linked to their own. They are granted permission to penetrate one of those walls that has customarily – because of ignorance and prejudice – separated two great cultures born of the same ancient, venerable religious tradition.

### **The Globe Is Not Just a Theater**

There are teachable moments, too, when the countertext follows directly on the heels of the text in the same passage of a lone manuscript penned in one moment in time by a single author.

*Will all great Neptune’s ocean wash this blood  
Clean from my hand? No; this my hand will rather  
The multitudinous seas incarnadine,  
Making the green one red.*<sup>31</sup>

Those familiar lines epitomize the genius that was William Shakespeare. They spotlight his fullest mastery of the English language. *Macbeth* became the coda for six centuries of English language development. Shakespearean English, fully distilled from its Latin, French, and Anglo-Saxon roots, flourished, in large part, because the talented playwright coined so many new words himself. In *Globish: How the English Language Became the World's Language*, Robert McCrum writes:

[Macbeth's] famous speech is the work of a writer with an eye for an audience that is simultaneously after both high and low culture. Having flattered the classically educated men of substance sitting at the side of the stage [of the Globe Theater], or in the two-penny seats, with a scintillating Latinate phrase ('The multitudinous seas incarnadine'), Shakespeare repeats it in good, plain old English ('Making the green one red') for the benefit of the groundlings crammed into the pit.<sup>32</sup>

Because the Globe Theater was a vessel filled to overflowing with the bard's playful use of text-and-countertext, a now-respectable but once-aberrant language still preserves glimpses running backward in time into the wellsprings of two divergent but purer linguistic traditions that had fully merged by Shakespeare's day to form modern English. Within English today, we still sense the faint burbling of distinctly different streams of cultural expression – one polished and one unvarnished – that act to commemorate ancient peoples whom we have never heard speak ourselves.

### **Countertexts Before History**

The only men more dead than “dead white men” are prehistoric humankind because, by definition, they left no written language behind. Yet they, too, used countertexts to comprehend the entirety of the world as they knew it.

Standard textbooks conjecture about images of animals painted haphazardly on the walls of Paleolithic caves as having been employed as talismans individually in superstitious rituals to insure success in the hunt; but a pointed discussion of the alternative Leroi-Gourhan Theory adds an enriching interpretation that challenges old perceptions. Exhaustively scrutinized in Amir D. Aczel's book *The Cave and the Cathedral*, the Leroi-Gourhan

Theory convincingly argues that the decorated cave possessed a “coherent, uniform structure that [did] not vary across the broad European landscape ... or across the vast span of [20,000 years].”<sup>33</sup> That structure was based on observations of oppositional cosmic energies as embodied in the bison (female) and the horse (male). Furthermore, André Leroi-Gourhan's four-decades-old theory, long neglected but now revived, acknowledges the total cohesiveness of all images within any one cave in which images of the bison and the horse were almost always paired and were generally more numerous than any other species depicted therein.

Leroi-Gourhan's theory has the ability to engage students because, without being entirely dismissive of any ritualistic nature involving just one cave painting, it posits a sophisticated artistic sensibility quite at odds with modern conceptions of art as individual works. In Leroi-Gourhan's mind, an individual cave painting acquired its ultimate validity only as part of the total assemblage of all other paintings in the cave – a situation more akin to the entirety of the sculptural program of Chartres cathedral than to the Solomon Guggenheim collection of modern art. The formulation of the Leroi-Gourhan Theory by itself is an analog for the text-and-countertext proposition. The appreciation of any one astounding image is rendered more complete by the fresh recognition that it exists within a larger tide of images that intrinsically talk to each other. Before Leroi-Gourhan, it was inconceivable to look for those complementary countertexts because, Aczel argues, the modern artistic mindset functions so cognitively unlike that of the supposedly baser instincts of prehistoric humankind.

### **History Refuses to be Contained**

Although humans make history, they do so under conditions rooted in nature's geographical and ecological variability over time. Anthropologist Brian Fagan deliberately avoids endorsing environmental determinism as a primary mechanism of historical change. However, he does maintain that we “delude ourselves if we do not assume” that climatic oscillations, like war or disease, are “among the most important” catalysts of cultural change.<sup>34</sup> He counters his own early exposition on the “Little Ice Age” (1300-1850) with his subsequent text on the “Medieval Great Warming” (800-1300).<sup>35</sup> Thus, in two mutually validating texts, he addresses changes in culture worldwide cumulatively over a period of approximately 1000 years.

Naturally, his work impinges upon scholarship in the history of the built environment – whether it be Benedictine monasteries, the Eddystone Lighthouse, Chaco pueblos, or the Erie Canal. His work can better inform our understanding of the history of architecture – and art.<sup>36</sup>

Every dedicated scholar, writes historian Robert Darnton, understands the frustration associated with the inability to convey to others the true “bottomlessness” of archived knowledge and the “fathomlessness” of the past.<sup>37</sup> Historiography “refuses to be contained within the confines of a single discipline.”<sup>38</sup> In charting new routes for architectural history, the best of its critical thinkers will find “themselves crossing paths in a no-man’s land located at the intersection of [dozens of] fields of study.”<sup>39</sup> The interdisciplinary use of countertexts can suddenly plopp familiar phenomena into unfamiliar waters. The resultant, ever-outward expanding ripples eventually envelop the world. It becomes a phenomenon so sweeping in scope that, as Darnton says, it can “defy conclusive [canonical] interpretations ... .”<sup>40</sup>

Then again, Darnton also admonishes us about “interdisciplinarity run riot.”<sup>41</sup> Historians in architecture programs need to assume the role once held by the “barbarians at the gate” – neither wholly the belligerent outsiders nor entirely the assimilated hordes. They, more than any others, can transit with relative ease from one side of the imperial wall to the other. Rather than drop anchor in the familiar calm harbors of home, they can become mariners aboard well-trimmed ships on an odyssey, sailing out onto the rolling seas of cultural literacy, tacking back and forth across that bar that has for too long separated their scholarly passions and didactic objectives too sharply from the rest of the interdisciplinary, liberalizing, and “international republic of letters.”<sup>42</sup>

*He went like one that hath been stunned,  
And is of sense forlorn;  
A sadder and a wiser man,  
He rose the morrow morn.*

Samuel Taylor Coleridge  
*The Rime of the Ancient Mariner*<sup>43</sup>

## Notes

<sup>1</sup> Samuel Taylor Coleridge, “The Rime of the Ancient Mariner,” *Adventures in English Literature*, eds. J. B.

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Priestley and Josephine Spear (New York: Harcourt, Brace & World, Inc., 1963) 401 [lines 119-122].

<sup>2</sup> Marq de Villiers and Sheila Hirtle, *Timbuktu: The Sahara’s Fabled City of Gold* (Toronto: McClelland & Stewart Ltd., 2007) 9, 63.

<sup>3</sup> It has been the standard schema in history courses to relegate non-Western styles to secondary or trivialized roles, if they are espied at all. As a corollary, rare has been the general architectural history textbook that does *not* follow the distorted convention of coalescing thousands of years of all non-Western architecture into a single chapter, dropped somewhere between chapters on the Byzantine and Medieval styles, instead of dispersing its contents throughout the sweep of the annals of history. Architectural history is ossifying from within.

<sup>4</sup> de Villiers and Hirtle (242) write that it was, ironically, a Genoese, a Venetian, and finally a Florentine merchant – Benedetto Dei – who were among the first four Europeans to try, in the Quattrocento, to reach Timbuktu. Of the three, Dei is commonly held to have been the first to make it all the way to Timbuktu and back in 1469.

<sup>5</sup> In 1492, the Songhai Empire, centered at the bend of the Niger river in western Africa, was ruled by Sonni Ali Ber, whose repressive policies were most directly felt by the scholars in Timbuktu. The tyrannical ruler boasted a fleet of 400 war barges. Yet, astonishingly, on November 6, 1492, he died accidentally by drowning in a flash flood while encamped in a desert wadi (de Villiers and Hirtle 108). That very same day, Columbus was exploring the northeast coast of Cuba near the mouth of the Rio de Mares; see Zvi Dorn, *Columbus and the Age of Discovery* (New York: William Morrow and Company, Inc., 1991) 165. In 1493, the usurper Askia Mohamed I seized the Songhai throne and, to legitimize his power, allied himself with the scholars of Timbuktu, thus ushering in the second and greatest golden age in the city’s history that coincided with the High Renaissance in Italy (de Villiers and Hirtle 109).

<sup>6</sup> Cullen Murphy, *Are We Rome? The Fall of an Empire and the Fate of America* (New York: Houghton Mifflin Company, 2007) 189.

<sup>7</sup> Parenthetically, if it seems as though I have permitted (albeit subliminally at first) the metaphor of “water” to permeate this essay so insistently, perhaps it is because I live at the bottom of an ocean – or, more accurately, what was once an ocean over 65 million years ago. Lying near the geodetic center of a great land mass, largely treeless, and virtually semi-arid in the last weeks of summer, the Flint Hills of Kansas convey such an incontrovertible image of “earth” that it strains credibility when encountering indisputable evidence to the contrary. Kansas was once inundated by a great inland sea. Nonetheless, to accede to the essential truth of alternative propositions is to challenge one’s own deeply embedded and presumptive perceptions of the world. The reconciliation of these two equally valid viewpoints offers a more complete conceptualization which, in this case, means that I can never again roll through the undulating

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terrain of the Flint Hills without simultaneously envisioning the floor of that prehistoric ocean. It is natural, then, that allusions to water should resonate so deeply within me. See the work of Michael J. Everhart, *Oceans of Kansas: A Natural History of the Western Interior Sea* (Bloomington: Indiana University Press, 2005).

<sup>8</sup> Michael Shenefelt, "Why Study the Greeks? Check the Map," *The Chronicle of Higher Education* (7 March 2003) B11.

<sup>9</sup> Shenefelt.

<sup>10</sup> Shenefelt.

<sup>11</sup> John R. Hale, *Lords of the Sea: The Epic Story of the Athenian Navy and the Birth of Democracy* (New York: Viking Penguin, 2009) xxx.

<sup>12</sup> Hale xxx. It is not only the Parthenon, of all things quintessentially Greek, that takes second place to the sea in Hale's nautical history; the legendary prowess of Greece's hoplite (citizen-soldier) land forces is also downplayed in contrast to Hale's emphasis on naval campaigns. For instance, when first beheld by Hale, the epic Battle of Thermopylae (480 BCE), so utterly synonymous with courage against overwhelming odds, is seen but distantly, as if from sea through a spyglass. His countertext concentrates, instead, on the sometimes neglected naval battle at Artemisium that raged on simultaneously with the defeat of the 300 Spartans at the "gate of hot [water] springs." Rather than recount the land battle from a vantage point *in situ*, Hale presents it as a second-hand narrative reported to a squadron of Greek ships, or triremes.

<sup>13</sup> Yet another book that looks at a great (long-presumed exclusively) landed civilization through the countertextual prism of its singular nautical accomplishments is: Louise Levathes, *When China Ruled the Seas: The Treasure Fleet of the Dragon Throne, 1405-1433* (Oxford: Oxford University Press, 1994). Largely neglected in standard histories, the odyssey of China's treasure ships presents at least three surprising countertexts about the inscrutable Ming dynasty. First, the stereotypically isolationist Chinese were, at least briefly, a sublimely impressive naval power that plied the waters out over nearly half the world. Second, not only did these inconceivably gigantic Oriental junks dwarf anything in Columbus's modest Western exploratory fleet (400 feet in length *versus* 85 feet respectively) but they antedated Columbus's voyages by nearly one hundred years. Third, these early 15th-century titanic Chinese treasure ships were such marvels of wooden structural engineering that they more than equaled Brunelleschi's structural acumen in building the masonry dome of Florence's cathedral. Thus, like the discussions about Timbuktu earlier in this essay (see footnotes 4 and 5 above), revelations about the Ming dynasty challenge the canon of a hegemonic, Western-only "renaissance."

<sup>14</sup> John Julius Norwich, *The Middle Sea: A History of the Mediterranean* (New York: Doubleday, 2006) 1.

<sup>15</sup> One recent architectural counterpart to Norwich's general history of the Mediterranean is a series of essays

edited by Jean-Francois Lejeune and Michelangelo Sabatino, *Modern Architecture and the Mediterranean: Vernacular Dialogues and Contested Identities* (New York: Routledge, 2010). Its contributors propose an alternative history of modern architecture that takes into account the "waves of Mediterraneanism" that have endlessly "ebbed and flowed" all along shores that are home to both canonical styles possessive of "historical primacy" and other styles informed by the "everyday vernacular[s]." Essay by essay, this volume investigates the tendency of each wave "to wipe away traces of preceding ones" (xv, xviii).

<sup>16</sup> Murphy 12.

<sup>17</sup> In some ways, Murphy's proposition is the rhetorical counterpart to that wonderful panoramic vista in the painting *The Battle of Issus* (1529) by Albrecht Altdorfer in which the heady march of classical Western culture confronts the sobering enormity of countervailing Oriental forces marshaled from around the rest of the world. As we scrutinize the mass of humanity engaged in an intense battle between Alexander the Great and Darius III, king of Persia, we realize that the Mediterranean basin and its European boundaries are barely identifiable, for Altdorfer has chosen to reverse the vantage point from which we might normally expect to witness the *melée*. We are forced to look across the Mediterranean *from* the north *to* the south because, in this instance, "north" uncustomarily coincides with the *bottom* edge of his canvas. If only architectural history courses had the same freedom to roam – even upside down.

<sup>18</sup> Murphy 34, quoting: Edward Gibbon, *The Decline and Fall of the Roman Empire* (New York: Modern Library, 1932) vol. 2, 438.

<sup>19</sup> Murphy 155.

<sup>20</sup> Let us go further. Suppose that an architectural history class were to reverse the preeminence given to imperial Roman construction in stone and concrete in favor of the alternative "barbarian" tradition of building with heavy wooden timbers. Certainly the longevity of timber building techniques, stretching back over millennia to Neolithic longhouses, positions it to be the one true architectural canon. Roman construction would then become the aberration and no longer the norm – a mere blip of just a few hundred years on a timeline of thousands of years of architectural history.

<sup>21</sup> Shenefelt.

<sup>22</sup> Following Shenefelt's lead, architectural historians need only pay a little more attention to countertextual lists. The very title of Amy Chua's book *Day of Empire: How Hyperpowers Rise to Global Dominance – and Why They Fall* (New York: Doubleday, 2007) is overtly contrived to function as much as homage as it is countertext to Gibbon's scholarship. Chua's protracted discussion of what is essentially a "list" has one aim: to recast the notion of "empire building." It is not the imposition of brute power upon the unwilling and the indefensible that creates an empire. Empire building is the result of a deliberate (though sometimes implicit) governmental policy to embrace

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multicultural communities so as to derive benefit from a diversity of skills and expertise that, in turn, will then help the empire to grow even more powerful. When tolerance fades, the empire falters and disintegrates. To support her thesis, Chua lists the greatest of these empires – the hyperpowers – that rose and fell directly in relationship to their vacillating acceptance or rejection of cultural tolerance: the Persians, the Romans, the Tang Dynasty Chinese, the Mongols, the 17th-century Dutch, and the British. Chua's work achieves a nice balance between Eurocentric bravura and Oriental discretion while all the time demonstrating that we need to rethink the polemically negative connotations inherent to buzz words such as "imperialists."

<sup>23</sup> Harvard University Faculty of Arts and Sciences, *Report of the Task Force on General Education* (February 2007) 3 <<http://www.fas.harvard.edu>>. Accessed 17 September 2008.

<sup>24</sup> Harvard 1.

<sup>25</sup> Harvard 1. Harvard's general education program is cited here because, as with so many other issues in higher education, it is Harvard University that often sets the tone and defines the parameters for pedagogical discourse nationwide. Harvard's 2007 proposal for revising their general education program was their first such revision in about three decades.

<sup>26</sup> North Central Association Higher Learning Commission, "Commission Statement on General Education" (February 2003) <<http://www.ncahlc.org>>. Accessed 15 September 2008. The NCAHLC accredits institutions in 19 states; but, in one way or another, all six regional higher education accrediting agencies attest to the importance of general education and define it as a breadth of knowledge accompanied by critical thinking skills.

<sup>27</sup> National Architectural Accreditation Board, *2009 NAAB Conditions for Accreditation – Final Edition: Comparison to 2004 NAAB Conditions for Accreditation* (4 August 2009) 20. <<http://www.naab.org/documents>>. Accessed 15 October 2009.

<sup>28</sup> John Peradotto, "Interrogating the Canon, Depositing the Tyrannus," *Annals of Scholarship: Art Practices and the Human Sciences in a Global Culture* 10.1 (1993; published 1994) 85-109. Peradotto quotes an earlier essay by Wayne Booth, "Is There Any Knowledge That a Man Must Have?" *The Knowledge Most Worth Having*, ed. Wayne Booth (Chicago: University of Chicago Press, 1967) 1-28.

<sup>29</sup> David J. Clines, "Methods in Old Testament Study," *On the Way to the Postmodern: Old Testament Essays, 1967-1998, Volume 1* (JSOTSup, 292; Sheffield: Sheffield Academic Press, 1998) 23-45 <<http://www.shef.ac.uk/bibs/DJACurrres/Postmodern1/Methods.html>>. Accessed 29 January 2009.

<sup>30</sup> Clines.

<sup>31</sup> William Shakespeare, "Macbeth," *Adventures in English Literature*, eds. J. B. Priestley and Josephine Spear

(New York: Harcourt, Brace & World, Inc., 1963) 147 [Act II, Scene II, lines 61-64].

<sup>32</sup> Robert McCrum, *Globish: How the English Language Became the World's Language* (New York: W. W. Norton & Company, Inc., 2010) 86.

<sup>33</sup> Amir D. Aczel, *The Cave and the Cathedral: How a Real-Life Indiana Jones and a Renegade Scholar Decoded the Ancient Art of Man* (Hoboken: John Wiley & Sons, Inc., 2009) 184.

<sup>34</sup> Brian Fagan, *The Little Ice Age: How Climate Made History, 1300-1850* (New York: Basic Books Perseus Books Group, 2000) 103.

<sup>35</sup> Fagan, *Little Ice Age*; Brian Fagan, *The Great Warming: Climate Change and the Rise and Fall of Civilizations* (New York: Bloomsbury Press, 2008).

<sup>36</sup> It seems that Fagan, an amateur art historian, can no longer look at paintings without considering climate. Beyond each painting's central theme, there are esoteric clues that appear to corroborate his scientific hypotheses about the impact of climate on the arts – household arts and ladies' fashions (as portrayed in painted scenes of interiors) and the kaleidoscope of changing cloud patterns (in the painted skies of landscapes) spanning half a millennium. Fagan, *Little Ice Age* 201. Fagan's perspective on art was informed by Hans Neuberger, "Climate in Art," *Weather* 25.2 (1970) 46-56. Neuberger was a meteorologist who studied the depictions of clouds in 6,500 paintings completed between 1400 and 1967. His analysis demonstrated a sharp increase in cloud cover from 1550 to 1850 which may have been a reflection of the actual prolonged climatic oscillation that Fagan has dubbed the "Little Ice Age" rather than a response to shifting artistic fashion.

<sup>37</sup> Robert Darnton, *The Case for Books: Past, Present and Future* (New York: PublicAffairs Perseus Books Group, 2009) 75.

<sup>38</sup> Darnton 206.

<sup>39</sup> Darnton 176.

<sup>40</sup> Darnton 86.

<sup>41</sup> Darnton 178-179.

<sup>42</sup> Darnton 205.

<sup>43</sup> Coleridge, *Adventures* 414 [lines 622-625].

# Critical and hermeneutic inquiry: A feminist approach to architectural discourse

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## Abstract

We have noted that first-year architecture students arrive as products of a positivist/absolutist education system. As a result, student work seems to be driven by a procedural approach to knowledge; one opposed to the pedagogical intent of our design curriculum. Previously, we have addressed this opposition by encouraging a critical regionalist approach (Cline and Person 2010); however, this paper seeks to (re)vision our previous understandings through the lens of a contemporary feminist methodology. We are developing a curriculum that helps students engage in meaningful architectural discourse—a discourse grounded in a feminist understanding of how phenomenological characteristics function as constituent elements of design.

Architectural discourse grounded in feminist critique fosters the development of students' critical engagement, while problematizing their existing positivist backgrounds. This approach encourages student work that represents each student's unique understanding of the world he or she inhabits. These worlds, the places of their daily lives, are complex assemblages of ideas, experiences, and associations that do not readily conform to order, to categorization, or to the rational output necessitated by their positivist/absolutist backgrounds. Students soon begin to understand that the messy complexities of their lives do not have to be defined by procedural approaches to knowledge but, rather, can be understood as the

necessarily "impure" products of individual experiences, personal narratives, and muddled interpretations. Encouraging students to critically explore their particular identities, their growing awareness of empathetic knowing, and their existential modes of participating in the world is integral to developing architects who can fully engage the discipline.

## Introduction: Critical engagement

Enough will have been gained if dwelling and building have become *worthy of questioning* and thus have remained *worthy of thought*.

Martin Heidegger (2001, p. 158)

The worthiness of architectural questioning and thought is one of the primary concerns of a contemporary architectural education. Acts of questioning and thought imply a critical engagement with particular identities, with multiple forms of knowing, and with existential modes of participating in the world. These non-categorical means of being, these messy complexities, engage and sustain an architectural discourse that relates to the fullness of life from multiple perspectives. The beginning design studio at the University of Oklahoma (OU) is structured to engage students in these messy complexities in order to problematize categorical frameworks while grounding students in methodologies that are both material and phenomenal.

As a result of classroom interactions with first-year architecture students, we have constructed the hypothesis that these students arrive in the beginning design studio as products of a positivist/absolutist education system. As a result of the organizational methodologies inherent to that system, student work seems to be driven by a procedural approach to knowledge; one that is diametrically opposed to the pedagogical intent of our beginning design curriculum. Previously, we have addressed this opposition by encouraging a critical regionalist approach (Cline and Person 2010); however, we now seek to (re)vision our previous pedagogical strategies through the lens of a contemporary feminist methodology. This (re)visioning has been compelled by our observations that in previous beginning design studio courses grounded in critical regionalism, students gained an understanding of what critical regionalist architecture might entail in an imagematic or categorical sense; however, the study of critical regionalism did not seem to encourage students to

take an engaged approach to understanding why and how they and others encounter and respond to the environments they inhabit. This lack of engagement implies that student's perceived critical regionalism as an "end," but not as a "means to an end;" that is to say, critical regionalism became a categorical framework to organize encounters within, rather than a methodological framework of exploration. As a result of these realizations, we felt that a feminist methodology, one that could not be conceived of as categorical, would allow for the establishment of a hermeneutic, or interpretive, framework for exploration and knowing, and thus, lead to an architectural discourse that is worthy of sustained questioning and thought.

Because feminist methodology stands in opposition to the "hard, logical, quantitative," or positivist, approaches to which students are accustomed, it encourages "qualitative, unstructured methods that lead to empathetic[ic]" responses (McDowell 1992, p. 411). This "empathy" allows for more complex understandings of personal, cultural, historical, and geographical identities, as well as awareness of place, and myriad forms of knowing. These complex understandings allow for a methodology that (re)focuses the procedural approaches to knowledge that we have observed. Enabling each student to problematize his or her own complex understandings, at multiple scales, coheres to the pedagogical intent of our beginning design studio, which is to prioritize critical engagement over the categorical boundaries of absolutism. By calling upon a feminist framework to address the conflict between incoming students' procedural approaches and our pedagogical intent, we are developing a beginning design curriculum that helps students engage in meaningful architectural discourse—discourse grounded in a feminist understanding of how phenomenological characteristics function as constituent elements of design.

## **Students' Expectations**

The beginning design program at OU functions in support a professional degree program in architecture that is accredited by the National Architectural Accrediting Board. This support, as articulated by the particular needs of the OU architectural curriculum, generally consists of the teaching of meta-architectural design principles such as organizational strategies, formal manipulations, and proportioning systems. In addition, students are expected to become proficient in manual skills appropriate to architectural studies—for example, mechanical drafting, modeling, craft, and representation. While these particular

skill sets are traditional to architectural education, we have observed that they do not meet the expectations of beginning design students (Cline and Person 2010). We have noted, and Prof. Gregory Palermo's 2008 study reinforces our findings, that first-year architecture students have an expectation of "doing" without the requisite expectation of "learning" or discovering. When Palermo asked his first-year students the question, "Why do you want to study architecture?", their responses typically centered on the act of doing architecture, rather than expressing the desire to learn or engage in architectural discourse (Palermo 2009). More often than not, when students at OU introduce themselves on the first day of class, they convey the idea that they have come to architecture school to design "beautiful houses" or "imagematic buildings." Consistently, students express surprise at the abstract nature, time commitment required, and high level of craft associated with architectural education. Additionally, students have been unaware of the complexity of architectural discourse; generally they anticipate being taught a quantifiable, formulaic process that leads to "architecture." It appears that they desire to *be* architects without learning *how to be* architects; they expect to begin designing without realizing the necessity for theoretical or methodological rigor (Cline and Person 2010).

Many students arrive in the beginning design studio as products of a decidedly positivist/absolutist culture; a culture in which education is driven by procedural approaches to knowledge that are informed by the focused methodologies of scientific inquiry (Goode 2005). One telling example of the shortcomings of this methodology is the teaching of a scientific method which has been reduced to an instructional series of steps whose end goal is only positive outcomes. The "threat" of failure or possibility for exploration are, in many ways, excluded from this linear framework. As a result, students believe that there are only two possible answers: affirmation or negation. This straight-forward, yet deeply ingrained, learning approach under-emphasizes both critical and hermeneutic exploration; acts of imagination and discovery seem foreign to students given their previous educational experiences. There is widespread agreement that United States' high schools are not currently preparing students for the rigors of a collegiate education (Olson 2005) that requires critical engagement. As a result, many beginning design students experience difficulty when presented with questions intended to elicit phenomenal discourse.

Because they are unacquainted with these complex modes of inquiry, many beginning design students appear to ignore stimuli that might solicit critical engagement with particular identities, multiple forms of knowing, and their physical and cultural environments. Having been taught that the most-valid forms of knowledge are scientific, hierarchical, and linear, students appear to easily dismiss contemplation of particular identities as being sentimental and, as such, not worth exploring within a professional degree program. This situating of identity within the realm of the trivial, combined with students' lacking exposure to critical and hermeneutic inquiry, has led to a lessened awareness of, and engagement with, the complexities of their "physio-cultural environments." This lack of critical engagement with one's environments appears to correspond to an inability to articulate more than a simplified understanding of personal identity. Without a critically engaged understanding of personal, historical, geographical, and cultural identities, students' articulations of design solutions lack relevance within the context of their newly problematized knowledge frameworks.

## **Pedagogical Intent**

bell hooks argues that "we must decolonize our minds and construct new alternative[s]" ways of knowing (1992, p. 411). This "decolonization" can be initiated through post-positivist approaches, such as feminism. These alternative ways of knowing acknowledge that each person "construct[s]" his or her own "world[s]," rather than merely "find[ing]" them (Lather 1992, p. 89). The constructions of these worlds are informed by what Dr. Lynn Staeheli and Dr. Eleonore Kofman (2004) refer to as our unique "positioning[s]" that ultimately govern our ability to "see" or gain perspective" (p. 11). It can be understood that, while worlds are constructed by individuals, individuals can choose to (re)build new "worlds" by exploring, through acts of problematization, why and how their knowledge is produced. Architects are actively involved not only in the intrapersonal construction of their own unique worlds, but also in the literal construction of the physical environments we all inhabit. Because architects have such a tangible impact on the "user-experience" and, by extension, "world" construction of other people, it is important for them to understand how their "worldviews" impact the worlds inhabited by others.

More than thirty years ago, Prof. Kent Bloomer and Dr. Charles Moore raised the concern that, as a field of study, architecture "seldom [makes] reference to the unique

perceptual and emotional capacities of the human being" (1977, p. ix). More recently, Dr. Robert Imrie (2003) produced a study that found that many architecture curricula in the United Kingdom fail to discuss human aspects of architecture at the intimate scale of the embodied individual. More often, "[a]s one architect said, 'the human subject is rarely made explicit, it's assumed that we're all the same,'" (p. 59). Concerns like those of Bloomer and Moore and Imrie, can be addressed through the feminist "decolonization" to which hooks (1992) refers.

While difficult to define in any unambiguous manner, "feminism" holds that each person's perspectives are "inherently culture bound," and that each person's own values will always frame his or her inquiry (p. 91). Feminist pedagogical principles are not new to the realm of architectural education. For example, Professor Leslie Kanes Weisman (1999, p. 160) writes that:

Feminist pedagogy can be especially useful in constructing a new model of architectural education. Its attention to collective processes, to redefining power relationships, to deconstructing false dichotomies (theory/practice, client/professional), and to eliminating inequalities of gender, race, class, disability status, and sexual orientation produces teaching and learning approaches that can help to build in students the skills and capacities they will need to be effective practitioners, problem solvers, and leaders.

As Weisman indicates, a feminist approach to architectural education encourages students to be cognizant of and (re)position their design strategies with respect to a wide spectrum of significant social factors.

The "positioning" required to enrich students' abilities to critically explore the messy complexities associated with particular identity, empathetic knowing, and individual modes of participating in the world is central to our pedagogical intent, but contrary to incoming students' expectations. Incoming students' educational backgrounds seem to encourage mindsets that are more accustomed to categorically specific, expected responses, as opposed to critical exploration of a variety of hermeneutic responses. For example, during critiques, students often ask if they are "doing this the right way," rather than taking the initiative to independently explore and assess multiple solutions. When exploring the relationships in proportioning systems, they are uncomfortable performing exegetical analyses of these systems; students ask to be shown the relationships, rather than discovering them on their own. Simply put, students'

heretofore-unquestioned cultural and educational experiences seem to limit a critical engagement that encourages acts of imagination and discovery.

This critical engagement with the messy complexities of experience, generally perceived of as unknowable because they are not readily categorical, does not seem to fall within the domain of typical American primary education. As one beginning design educator wrote, "Education's current shortcomings are held fast in notions that knowledge is primarily hierarchical, logical, and memorize-able, which contributes to an inability to address the relations *between* things and the complex causality that follows" (Teal 2010, p. 753). Any pedagogical framework that allows for easy categorization and encourages expected responses furthers the hierarchical, logical, and memorize-able ways of knowing that students are accustomed to. Problematically, this framework leaves students unprepared for engaging in an architectural discourse that explores the complexities of particular, or individual, identities.

Having been introduced to a positivist knowledge system prior to coming to university, one that encourages the polarized responses of affirmation or negation, incoming design students at OU do not arrive well-equipped to address the messy complexities of personal identity, notions pertaining to place, and the possibility of myriad outcomes. We hypothesize that these two responses are informed by a cultural predilection for scientific knowing and moral absolutism. In response to the strictures of this binary system, we employ a feminist methodological approach to beginning design pedagogy that fosters critical engagement and hermeneutic forms of knowing. This critical means to knowing, coupled with intra- and interpersonal awareness, will later serve as the foundation for architectural exploration in which students examine, acknowledge, and assess numerous avenues of understanding. To establish this foundation, the beginning design studio curriculum does not address architecture *per se*, but rather basic precepts of design and what it means to be designing within social and environmental contexts of varying scales. In choosing not to focus on conventional architectural issues initially, this studio sequence allows students to develop unfettered design processes, while also introducing them to new ways of exploring which are grounded in feminist modes of inquiry.

Through in-class discussions framed as dialectic critiques informed by feminist methodologies, students are

introduced to a methodological framework for interpolating their evolving ideas in relation to their particular understandings of the messy complexities allowed by the problematization of their positivist/absolutist backgrounds. A feminist methodology was introduced, because principles of feminist inquiry encourage the development of relationships between critical engagement, hermeneutic inquiry, and existential participation in the world—all as components of an architectural discourse. Students begin to critically engage their environments; an engagement that evolves throughout the academic year, and produces more thoroughly considered responses to each successive project. Students begin to understand the muddled connections of particular experience and develop the ability to articulate those experiences. This ability to articulate complex experiences allows students to establish a narrative synthesis which coheres to an evolving feminist methodology. This synthesis acts to incorporate both their particular identities and their multiple forms of knowing and participating in the world into what Prof. Kenneth Frampton calls "a process of cross-fertilization and reinterpretation [that] is impure by definition" (Frampton 1983, p. 148). An awareness of this *a priori* "impurity" stands in opposition to the "purity" expected by a positivist education system. Ultimately, the principle challenge of our pedagogy is to introduce the idea that there are messy complexities that inform our knowledge frameworks and that exploration of the complexities within each of our frameworks can be prioritized over the categorical boundaries established by the positivist/absolutist scenarios that have informed students' previous educational experiences.

In developing this feminist methodology we encourage each student to generate work that represents his or her unique understanding of the world he or she inhabits. These worlds, the places of their daily lives, are complex assemblages of ideas, experiences, and associations that do not readily conform to order, to classification, or to the rational output necessitated by their positivist/absolutist backgrounds (Cline and Person 2010). Students soon begin to understand that the messy complexities of their lives do not have to be defined by procedural approaches to knowledge but, rather, can be understood as the necessarily "impure" products of particular identities grounded in individual experiences, personal narratives, and muddled interpretations. Enabling students to critically explore their particular identities and individual modes of participating in the world is integral to developing architects who can fully engage the discipline. This feminist methodology toward architectural engagement becomes

the vehicle for uniting our pedagogical intent with the students' expectations of an explicitly "architectural" architectural education.

## **Pedagogical Framework**

In an effort to mediate between the pedagogical intent of our design curriculum and incoming students' expectations, the beginning design sequence is structured to ensure that students develop an understanding of meta-architectural design principles and technical craft. Additionally, students are exposed to a feminist methodology that problematizes positivist means of knowing and engaging the world. This year-long pedagogical sequence is fostered through a series of projects, across both semesters, whose outcomes are designed to illustrate students' developing understandings of both technical and theoretical frameworks of design. The first semester encourages each student to (re)situate, through problematization, his or her understanding of personal experiences and means to knowledge construction. By extension, the second semester encourages each student to (re)contextualize, through reconciliation, his or her understanding of a variety of environments, based upon previous explorations of personal identity and knowledge constructs.

During fall semester, the first day of class begins with a panel discussion; the panel consists of senior faculty members, recent graduates, and current design students. The discussion initially addresses such administrative details as the resources available to incoming students and the diverse career opportunities an education in architecture affords. The practical nature of these discussions serves as a prelude to more conceptual discussions and, by extension, suggestions, including how and why students may benefit personally, academically, and professionally from challenging their conventions, their notions of "self," and their fears of failure. As students leave the studio following this introductory discussion, they are each handed a small card encased in a 3 5/8" by 2 1/8" envelope. The card simply reads, "*on 27 august provide your identity / it should be exquisitely crafted / and fit in this envelope / ask [the instructors] no questions.*" This initial assignment acts as a radical means to situate our pedagogical intent and stimulate discussions regarding perceptions of "self" and "identity." That is to say, the assignment problematizes how students choose to present and, thus, define themselves in relation to or opposition to their peers and their lived experiences.

From these discussions problematizing individual identity construction and representation, we transition into discussions of identity at the scale of the community. Students are asked to explore Norman, Oklahoma by roaming local yard sales in order to engage with residents and the detrital objects of their evolving lives. This localized engagement with the yard sales of Norman acts as a means for students to curate a collection of five objects that each feels characterize his or her unique understanding of this particular community. Following these weekend curatorial expeditions, the class discusses each student's unique collection and how each collection can be viewed as self-referential. Discussions emphasize that the past experiences of each particular individual and his or her accompanying assumptions regarding both "community" and Norman's "sense of place" have a direct influence on the content of each curated collection. At the conclusion of these discussions, one object from each student's collection is chosen for further hermeneutic analysis and graphic documentation. Among the eighty-seven objects chosen for further documentation were a child's roller skate, a 1970s era ash tray, "shutter shades" sunglasses, an expanding plastic sphere, a 1950s Singer sewing machine, a vintage hand mixer, an in-wall volume control knob, a hand-formed candlestick, an oil-field rock drill, a faux 1950s handheld radio, and a large fishing lure.

The graphic documentation of the curated objects allows students to develop an understanding of drafting techniques, architectural terminology, and the rigorous necessity of craftsmanship, all-the-while engaging in analytic conversations about the cultural context(s) from which these objects originated and were gathered. Focusing on the delineation of line-weight, the clarity of drawings, and the representation of assemblies, students are asked to produce a series of two-dimensional drawings in various tri-view orthographic formats. Each student then produces a series of ten successive section drawings, representing his or her object, for the purpose of understanding the spatial relationships of the constituent elements of each object and how these elements unite to form the object itself.

After several weeks of honing technical skills and discussing ideas of craft and critical engagement, students are introduced to rendering as one means of three-dimensionally representing the documented objects. At this point, our conversation regarding the identity of the objects evolves into a discussion of the abstract nature of graphic representation. These discussions illuminate the notion that

constructed drawings and rendering techniques are, inevitably, representational abstractions of physical objects. To further explore the notion of abstraction, students are asked to create figure-ground representations of their objects, while simultaneously exploring issues of the abstract nature of scale. The formalized shapes that result from these figure-ground exercises become the primary elements used in a series of patternmaking exercises. The first of these exercises introduces the use of ordering principles as being generative of pattern. This introduction is accomplished by illustrating and discussing the graphic ordering principles developed in *Architecture: Form, Space, & Order* (Ching 2007), and asking that students create hand-bound sampler booklets, reminiscent of stitching samplers, which convey an understanding of ten different ordering principles.

These first explorations of patternmaking lead to further expressions of pattern and craft through the development of wallpaper systems that represent each student's abstraction of their documented object. Students are encouraged to explore their objects not only in a formal manner, but also through hermeneutic means that examine each objects' unique cultural and intended contexts. Some contextual themes explored among student wallpaper projects included the stresses of chronological time, mechanistic production values as opposed to organic form, the juxtaposition of counterculture urban youth movements in relation to suburban domesticity, and representations of carcinogenic substances reinterpreted as exemplars of domestic beauty. The final (re)situating of their object-generated patternmaking allowed students to explore their wallpaper in relation to one notion of domestic scale. After providing both basic instruction in Photoshop and a template representing a contemporary domestic setting, students were asked to apply their wallpaper to the walls of this constructed domesticity. This (re)situating, or returning, of the objects to a domestic setting—in abstracted form—provided a segueway into discussions of the cultural significance of each object, no matter how detrital, or trivial, each object might have initially seemed.

These discussions regarding cultural significance, in turn, informed the beginnings of our final project for the semester, which situated the curated object in relation to cultural contexts and particular meanings as understood by each student. At the outset of this project, each student completed additional research regarding his or her object. This research was presented in the form of a written narrative that documented the history of the object,

situating it as a meaningful cultural artifact. This final project, a reliquary, was derived from the notion that reverence toward an object of meaning—the curated object of each student's research—leads to a desire to both display and protect that object. The primary expectation of the project is for each student to create a reliquary that protects and displays his or her cultural artifact; the reliquary also being a means of disseminating each student's particular understanding of the artifact enshrined. One representational outcome of the project was articulated by the reliquary for the 1950s Singer sewing machine. The sewing machine was form-fitted within a matte black crate lined with fabric-covered foam; the formal (re)presentation of a standard gun case. Upon opening the case, one is presented with the compartmentalized sewing machine, its cord and pedal, and a tidy row of metallic gold thread, mimetic of ammunition. By assuming this (re)presentation, this student (re)situates the sewing machine as an object that embodies the conflicting values he perceived to have existed among housewives in the 1950s as they struggled for recognition beyond domesticated gender roles.

While the second semester of the (re)visioning of the beginning design curriculum at OU is currently underway, and, as such, not yet situated for sustained analysis, it is pertinent to outline the framework of the semester in relation to our pedagogy. Spring semester began with a (re)contextualizing of the abstractions inherent to three-dimensional representation by exploring notions of perspectival space as related to Piranesi's *Carceri* (Piranesi and Ficacci 2000). Students pursued sketch techniques to spatially expand the sixteen plates of the *Carceri*, while considering how perspective methodologies can be a medium for the exploration of ideas and a process capable of generating place. After this exploration of the abstraction associated with articulating places that do not physically exist, students were asked to create constructed perspectives of several significant works of architecture, again discussed as abstractions of the phenomenal worlds we inhabit. Upon completion of these studies, both theoretical and technical, the studio has shifted to exploring individual responses to particular architectural situations. The first of these explorations has been the mediating condition described by a wall system. Students have been asked to construct wall systems that are indicative of their particular relationships with a series of photographic images that represent the messy complexities of participation in the world. The second series of exercises asks that students create threshold conditions that can

describe the decidedly human interactions resultant of moving between spaces at varying scales. Both of these exercise sets prepare students for the final project of the semester, a community bus stop that serves to unite conceptions of the multitude of ways one can mediate between the individual and the community, at various scales in relation to spatial interaction.

## Conclusions

Having only begun to explore and refine the framework of the beginning design curriculum at OU, we have not yet determined how to evaluate our successes or failures in any quantitative sense, and, as such, are unable to make any significant statements about the potential of our pedagogical methods. That said, based upon qualitative feedback from upper-division studio instructors, noticeable changes have been observed. Most of these observations have been couched in terms of current students' engagement in critical dialog, as compared to student engagements prior to curricular changes. Second-year instructors have remarked that students now appear prepared to immediately explore and engage with the intricacies of each project, rather than "waiting to be told what the first step should entail." For the time being, we'll take that as a sign that we are moving in the right direction.

The implementation of a methodological framework grounded in the feminist notion of situating oneself with respect to the entangled contexts in which we live and participate appears to support our curricular directive. By implementing this methodological framework, rather than a categorical framework, we have begun to mitigate the categorical initiatives of positivist/absolutist linearity, initiatives which can prevent meaningful engagement with particular identities, with multiple forms of knowing, and with existential modes of participating in the world. We feel that we are moving in an appropriate direction; however, there are a number of issues that must be addressed as this feminist methodological framework evolves. First, we have struggled to integrate critical readings into the curriculum; we will have to continually refine how we present conceptual arguments in order to insure that they can be made accessible to beginning design students. Second, as OU's student body becomes more internationalized, we must remain aware of and work to engage the particular perspectives of non-western students. Finally, and most importantly, we feel that it is necessary to provide students with more clearly articulated explanations of why attempts should be made to

problematize the positivist/absolutist view of the world. These explanations should become more explicit during the panel discussion on the first day of class and should be included in the syllabus alongside other course objectives and the NAAB Student Performance Criteria.

As our students (re)colonize their methodological approaches, it is imperative that the beginning design curriculum temper their predilection toward positivist methodology by emphasizing the necessity of personal meaning, hermeneutic thought, and critical engagement. It is their "impure" synthesis of experience, their emerging awareness of messy complexity, that calls into question the privilege granted students' positivist/absolutist cultural and educational backgrounds. While these backgrounds attempt to create rational and categorical order in response to the confusing intricacy of existence, when employed as methodologies of design, they cannot communicate the messy complexity of experience—a robust complexity that enriches our lives, allowing us to find meaning in that lived experience. In response to the positivist exclusion of unquantifiable complexity, the integration of a feminist critique into the beginning design studio encourages students to problematize the categorical standardization and order requisite to the narrowly focused approach to knowledge afforded them through positivist inquiry alone. This feminist framework allows students to search for multiple solutions based upon their personal experiences and the unique anthropological, geographical, and philosophical circumstances surrounding their individual existences and the particulars of any given design scenario. By accepting the messy complexity afforded by feminist critique—the critique of geo-historical context and the employment of imaginative interpretations of said context—students are permitted to explore a knowledge framework that operates outside, and can be privileged over, the rational world of positivism. This process represents each student's particular identity as a designer, and the synthesis of his or her distinct experiences, allowing for an architectural discourse that is worthy of sustained questioning and thought.

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# Aesthetics, Information and Architecture

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## Abstract

Aesthetics has been defined relative to objective and subjective values; its historical and cultural world views are referenced. The author's view of beauty as communication is also introduced, where chance and necessity, the two antithetical realities produce the information processes of modern time. That is, "difference" is associated with chance, the irrational, the spontaneous and the individual aspect of reality as opposed to necessity, the rational, the formal, and the universal aspects of things. Information is introduced as, the origin, as well as essence, of life. It is what produces information and is the only agent which produces both matter and psyche. Order and disorder, and the laws of "opposites" are considered building blocks of identity and difference and information. Information and communication as an interconnecting agent are also considered a bridge between eastern and western philosophy, i.e., in its deconstruction of the particular into a web or field of energies in the West, and in eastern thought in its becoming one with Nirvana or Brahman, the Sufi or the Tao, the ultimate one and all. Because goodness and truth under the influence of reason and science had failed, eastern philosophy as an alternative to western models is recommended. It is suggested that all that is left objectively is beauty, thus reason as basic is giving way to rules of beauty. And its principles are capable of describing man's evolution and his culture, as well as his aesthetic experience, which is nothing but information processes and communication. In conclusion, design as aesthetic communication is introduced as a model to reflect the above principles.

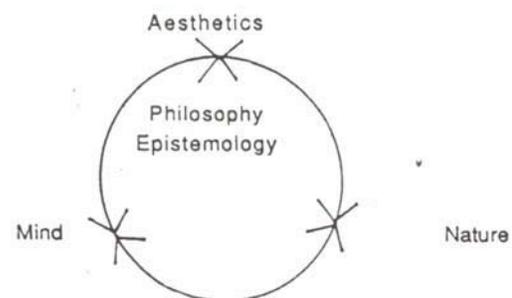
KEYWORDS: aesthetics, information, communication, philosophy, meaning.

## Aesthetics, Mind, and Nature

Throughout the history of the western world aesthetics have received a diversity of definitions, each representing an orientation or school of thought, that being naturalist, expressionist, cubist, etc. All of these could be generalized to have come from the interaction of mind and nature. Each viewpoint also falls in somewhere on a spectrum between two poles (Fig. 2).

Reflections of mind have two poles, subjective and objective. Subjective means that beauty is in the eye of the beholder, objective means that beauty is something universal, independent of individuals or cultures.

Reflections in nature also have two poles, atomist and structuralist. Atomism, meaning beauty can be referenced to individual objects, or isolated pieces, or segment independent of the context or the whole. Structuralism and contextualism meaning that beauty is a matter of the context and does not mean anything in isolated pieces and independent of context. These two correlate with semantics and syntactics in language.



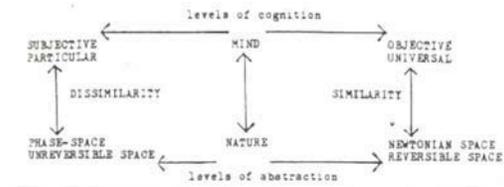
**Figure 1.** *Aesthetics as communication of mind and nature.* Source: Asghar Minai, *Aesthetics, Mind, and Nature*.

In the past each school of thought, or historic period, or style, emphasized one or a combination of some of these views in descriptions of their definitions of aesthetic objects. No doubt, each of the orientations represent the whole picture of beauty at a given time and culture. The problem arises when a multicultural orientation, and a world view is sought. Kant, for example, looked for a world view, and his answer is found in his reflective philosophy emphasizing the interaction of mind and nature and defining the objective world as reflective process. In other words, he defined beauty as something negotiated between mind and nature. "Beauty was the quality that an object has, regardless of its use" (France, 1920).

Existentialism, another school of thought, asserted that beauty was "a biological phenomenon related to human needs" (France, 1920), and therefore more connected to man's physio-biological conditioning which belongs to the sphere of nature rather than to the mind.

Hermeneutic philosophies added new dimensions to this complexity by trying to suggest that judgments are interpretive and subject to historic context, i.e., isolated pieces are void and incomplete. The phenomenologists similarly contributed their viewpoint, adhering to the idea that phenomena stand on their own independent of the observer as well as nature. In Heidegger's words, in our everyday dealing with things around us, "things do not appear first as a kind of pure world stuff, as 'raw' beings which would subsequently receive a 'form' of a 'subjective' coloring. Things appear primordially as 'ready to hands'" (Kockelmans, 1965, p. 39).

And finally, for Gert Eilenberger, a contemporary physicist, feeling for beauty is inspired by "the harmonious arrangement of order and disorder as it occurs in natural objects—in clouds, trees, mountain ranges or snow crystals. The shapes of all these are dynamical processes jelled into physical forms, and particular combinations of order and disorder are typical for them" (Gleick, 1987).



**Figure 2.** *Interaction between mind (and its levels of cognition) and nature (and its levels of abstraction).*

For us beauty is "in the 'communication' of all things (including man)—in nature's text, in the very nature of interconnecting patterns of all things," (Minai, 1993). That is, beauty could fall in anywhere as well as being everywhere in the spectrum (Fig. 1).

With computers and information processing technology these days we begin to get still broader definition of aesthetics, and somehow closer to the eastern positions; i.e., we lose the distinction between the hardware and the process. And this could be expanded all over with all the hardwares of life (objects) and their processes (behavior—sociocultural activity).

Eastern views have been different; while they have stuck to their holistic orientation they do not allow inputs of analytic modernist philosophy. Their views of beauty are mixed with undefined properties of mysticism and romanticism. The breakdown here is more in the layers of inner self rather than among the object world.

Aesthetic experience for me finds its definition somewhere between the eastern and western orientation. That is, the ultimate reality is reflected in forms of communication, which includes in it an irrational element, much like Hegel's identity-in-difference principle. Therefore, to introduce it here I have chosen to proceed through an antithetical position toward an appreciated or an understood synthesis. I introduce it in communication terms which best represent the identity and the difference, the opposite properties of the phenomenon.

Aesthetic communication and information theory are used not only to deal with the identity-in-difference, but also to heal the modern bifurcations of mind and matter, arts and sciences, subject and object and east and west. I believe that twentieth century science and humanistic studies have gone beyond the classical, absolute, and

abstract conceptions of the nature of things, whether expressed in Newtonian science or in the rational order of kinds, virtues, and values used to understand human behavior. In both of these areas a more functional, dynamic and contextual orientation has come about, and I propose to apply the same principles developed in information theory to these two antithetical modern realities making, the two sides of the same coin.

Since the ultimate reality for me is "information" then the usual metaphysical problems arise; from the one how did the existing many derive? Unity has no differentiations. Following Hegel, Nietzsche, Heidegger, and Derrida, I emphasize the "difference" principle that is associated with chance, the irrational, the spontaneous and the individual aspects of reality as opposed to the necessary, the rational, the formal, and the universal aspects of things. The emphasis finds expressions in my communication theory, aesthetic theory, and in the connection and similarity I see with such eastern ultimates as found in Taoism, Zen Buddhism, and Sufism. Perhaps the best expression of this is in terms of Hegel's identity-of-opposites.

It is apparent that there is much confusion between "information" and "meaning." And once this distinction is settled, "one is free to think about information (though not meaning) as an objective commodity, something whose generation, transmission, and reception do not require or in any way presuppose interpretive processes" (Dretske, 1981).

Information and meaning could be distinguished as follows: Information is objective, pure, and does not have anything to do with intentionality on the part of sender or receiver. It is any difference and compilation of differences, patterns, forms, structures, etc., out there irrespectively of who is looking at it, using to for whatever purpose. Meaning, on the other hand, has to do with self-referential systems. A piece of information is meaningful when it is matched against our mental information with a positive response. The Christian cross at first was nothing but a geometrical form carrying no meaning. Similarly, as Louis Kahn noted, a symbol is not what we invent, but what it becomes. He says "I can not build symbolically. But I hope my building does become symbolic." That is, he makes information systems, but the very same things become meaningful symbols. Neither information nor meaning are absolute; they both exist only in certain relativity between a sender, receiver and certain

referentiality. If for Carl Fredrich von Weizsacker information is only what is understood, then all information could be meaning as well. According to such a position, it is not only a human being who uses self-reference as a base for his judgments; any self-organizing system, as part of its process of self-organization has to make "judgments" against some form of referential system. That referential system, or information, exists "out there" by virtue of the system trying to self-organize, sometimes via some kind of optimization of its information. Selections are done by the system in comparison with something else that could have happened, in order to maintain ongoing unity and structure, as well as organization of a given self-organizing system.

Today with developments in information processing technology on one hand, and developments in cognitive sciences on the other, the separation between subject and object has been reduced to a great extent. The mental threshold once confined only to the brain boundaries, is now considered to extend to the outside world, and therefore the referrer and the referee in the field of self-referentiality are playing one and the same game. Meaning, therefore, once considered the property of brain function alone, is part of the contextuality of the ext of the object world as well. Or, in Bateson's view, redundancy in such a communication text is at least a partial synonym for "meaning." That is, if the receiver, let us say a self-organizing system, can guess on some missing parts of the message (fulfilling its structural integrity or unity), then the received parts must carry meaning which refers to the missing parts.

Information is described by the laws of entropy (Clough, 1977), manifested in both Boltzmann's and Shannon's formulas, which are here called "aesthetic communication."

$$H = K \log I \quad X = -P \log P$$

Although this is the view of the founders of information theory, including Shannon, nevertheless, many have read much more into the model, interpretations such as information is meaning, and a qualitative value system.

Information is one's measure of choice when selecting a message. It is based on similarities and differences in given occurrences. With this reading one accepts that the chance involved in information is the essence of freedom and freewill. This freedom then allows

for understanding “how meaning can evolve, how genuine cognitive systems—those with the resources for interpreting signals, holding beliefs, and acquiring knowledge—can develop out of lower-order, purely physical, information-processing mechanisms.” Such a framework would allow us to see that “the higher-level accomplishments associated with intelligent life can then be seen as manifestations of progressively more efficient ways of handling and coding information. Meaning, and the constellation of mental attitudes that exhibit it, are manufactured products. The raw material is information” (Dretske, 1981).

Could we by any chance suppose this transformation is an intelligent act? I think it is and I think our complex mental activities have no other origin but such simple transformations of information formation and transformation. Information is neither an absolute isolated phenomenon, nor something one claims as his own: it is part of the text. “To speak of information as *out there*, independent of its actual or potential use by some interpreter, and antedating the historical appearance of all intelligent life, is bad metaphysics. Information is an artifact, a way of describing the significance *for some agent* of intrinsically meaningless events. We *invest* stimuli with meaning, and apart from such investment, they are informationally barren” (Dretske, 1981).

Contrary to the common belief that information came at the later stages of the evolutionary process let us assume it came first. Such information, of course, does not have any value attached basis on any value system resulting from any pre-existence of intelligent life forms; rather it is just what information theory assumes to be pattern dispositions of similarities and differences in the circumstantiality of nature’s occurrences. Or, in other words, let us assume that information is in patterns of behavior in nature independent of our assigned interpretations. Or let us throw away for a minute any metaphysical existence and go back to bare nature where information is only a by-product of another information, a meaningless event acting on behalf of some natural processes, maximizing or minimizing some performance function. Instead of further restating what I mean by these assertions let me take this idea and compare it with some of the similar concepts presented by some of the philosophers.

This idea certainly differs from what dualists, such as Descartes, have supposed. While Descartes has

assumed matter and mind are two different things, this idea views mind and matter, although not as the same thing, as part of the same natural process of information formation and information process.

A comparison between these ideas and Husserl’s views might result in the closest approximation with the differences that Husserl’s account of phenomenology seems to have with certain “rules” on the part of the phenomena that mind does not assume to presuppose. In other words, the picture Husserl draws of the nature of intentionalities is somehow closer to rational and reasoned behavior than that of, let us say, Heidegger’s, which is more a play of a free agent like our model. Husserl’s intentions are still too value controlled to allow enough room for circumstantiality of information flow.

To search for its origin, we are starting with the prevalues era where all it was, was the flow of ‘information,’ i.e., circumstantiality of similarities and differences in pattern behavior of elements of nature, where there were constantly unfolding oceans of patterns and processes without any value attachment—no meaning, no directionality of any intentional behavior, and therefore no judgment.

The most important notion of information is that all things are *interconnected*. Anything we know and anything we do is part of some kind of a change in some state of these interconnections. The essence of being is considered to be *difference* and difference is the basis for any information. Its most manifested formulation is in physics. A combination of Newtonian ideas of reality and the Cartesian way of looking at the world has dominated our knowledge up to the turn of the century. The view presented here is 180 degrees opposite to this view, and is similar to that of the well known physicist Pauli. His significant observation relative to interactions between quantum theory and psychology reads: “It now appeared that the observation of nature also contained a subjective element—the irreducible link between observer and observed. Likewise, the personal nature of mind had now been shown to contain an objective, impersonal level” (Peat, 1987, p. 102). He indeed stresses the idea that there is a deeper interaction and similarities between matter and mind.

Here neither is the observer separated from the world nor is the physical world made of independent objects and events. Rather, everything is a flow of

information. Objects are material entities, events are dispositions and transformations of these entities, and associations are the interaction and interconnection of objects and events in space and time. Information flow is the single and ultimate form of all of these interactions.

Since everything here is viewed as being interconnected to everything else by manifestation of some forms of information flow, you therefore find not only that there are no autonomous entities or parts but also that there are no means or ends. Therefore, any form, formation, transformation, and its means and ends are part of the same information processes. Self-reference is a clue to everything you might imagine, that is because everything is defined via a reference to other things (including itself). Another characteristic notion of information is that there is no origin and destination or one-way chain of reaction between elements of the system (cause and effects); rather, any difference anywhere in the system is a source of information. Causal relationships are assumed to break down here because linear sequences of causality exist only when one is able to define a one-way interaction between those entities or events assumed to be "cause" and those assumed to be "effect." Here, in a multidirectional system of interaction every cause is at the same time an effect and vice versa; therefore, a one-way direction from A to B does not exist.

Information is the essence of life. It is the only agent which reproduces both matter and psyche. In linguistic terms that means it is the textual information process which produces a text and nothing else: Derrida supposes, "there is nothing outside of the text (Megill, 1985, p. 332). Cosmic system is viewed as "*information field*"; that is, there is nothing which is absolute. As Mackay reports, everything is defined as the state relative to all the other states, a system within which there are "no detachable parts, indeed no enduring, unchanging parts at all" (Johnson, 1988, p. 182).

Modern views of language are analogous to the notions of information system used here. This view of language was begun by Ferdinand de Saussure and further developed by his successors Levi Strauss and later Chomsky and others. The structure of the language is a more important function of a language than the elements of structure, the in-between the lines, the mosaic of inner meaning of a culture that its language becomes meaningful. Language is an "integrated nondivisible whole." Language systems are not to be "regarded as

collections of discrete semantic units, but as unified systems in which meaning derives from the relational exchanges between signs. The effect of this view was to locate meaning not in a one-to-one correlation between the sign and its external referent, but in the relation between signs" (Hayles, 1984, p. 22).

This idea of linguistic integration goes to the extent that Derrida describes the text as the beginning and end to any meaning. "There is nothing outside of the text." The assumption is that meaning in a literary text is derived not from a mimetic relationship between the text and "real life" but from the internal structure of the literary codes.

## **IDENTITY AND DIFFERENCE AS SOURCES OF INFORMATION**

The notion of identity and difference although used differently, is a key concept both in Hegel's philosophy and in Shannon's information theory (Taylor, 1986). Here this idea actually becomes the theme. Difference is information; information is everything. For Hegel spirit is "pure self-recognition in absolute otherness" (Taylor, 1986, p. 8). This view of spirit in his philosophy comes to being only at the "*union* of the union and nonunion." It is only in the interconnection of identity and difference where the union of ideas and spirit is born. To me information theory, on the other hand, is the only complete explanation of the nature of things which targets its very existence on the idea of difference. Order and disorder, the major characteristics of any difference, are the building blocks of the theory and entropy, the only full description known to me to mediate between the two sides of the "opposites," has the capacity to transform back and forth between the opposites. The assumption is borrowed from Shannon's information theory that chance or potentiality of having something or its otherness is hidden in the very choice which is the basis for creation of information. This is similar to Hegel's idea that "each contains its *own other* within itself and both are joined in a complex reflexive structure of identity-in-difference" (Taylor, 1986). In his philosophy Hegel "tries to avoid two opposite extremes. He wants neither to collapse difference in identity nor to dissolve identity in difference" (Guppy, 1964, p. 358). Nevertheless, in information theory such concern does not exist because the basic principle of the theory is the essence of this difference. The highest probability of

occurrence of an event corresponds to the lowest probability of its otherness and therefore there is no need for reconciliation.

This speculative concept of the world is also present in Zarathustra's views and their manifestation in Hegel and Nietzsche, neither of whom consider themselves nihilists as some interpreters have done. Information theory in its broadest perspective is an explanation to these people. In information theory, difference is not a judgment in favor of one side or the other, but rather the essence of being and being in difference. As Nietzsche assumes, for Zarathustra none and all are equal. He says: "*When I spoke to all I spoke to none*" (Taylor, 1986, p. 16). For Hegel this concept is the actual logos or the structure of everything that is. And for Nietzsche, "consciousness is inevitably relational, there can never be only one force but always must be at least two forces." Therefore, for him "force is actually a play of *differences*." This dialectic notion of difference in Zarathustra, Hegel, and Nietzsche, therefore, is not just some ideas or concepts but rather is the essence of reality. In short, to them existence is born out of this difference (Taylor, 1986, p. 9).

Since for me the ultimate is information and the continuous process is aesthetic communication, then everything is interconnected with everything else and nothing is independent. Aesthetic communication is like a game; it's like the game of life, which evolves from circumstances. This means that the self is not a closed package with fixed boundaries; rather, the explanation of any phenomenon is as a flux, described in field theory, where all relations are internal, similar to what comes from the concept of "emergence," a sense of coming from everywhere without walls, separation and barriers, a sense of circumstantiality, spontaneity, unpredictability, and open-ended horizon, or to what Langton termed "the new 'Science of Complexity': a kind of grand unified holism that would run the gamut from evolutionary biology to fuzzy subjects like economics, politics, and history" (Waldrop, 1992).

Western science in today's world view tends to deconstruct the particular into a web or field of energies, but eastern thought has always advocated the denial of particularity and desire, aiming at becoming one with Nirvana or Brahman or the Tao, the ultimate one and all. Or in the Sufi tradition, one living in the realm of the particular must begin from the particular in order to reach the universal through revelation.

With the emphasis upon "difference" one might expect individuality to assume the importance it has in Western thought, but such is not the case. Instead, whatever individuality might arise through chance, choice, or novelty is intuitively grasped aesthetically in terms of the mystical patterning of identity-in-difference that is beauty. This is somehow between neoplatonic orientation and Suhrawardi's innate way of seeing, that is, by not knowing things either by definition (Aristotle) or sense perception (Plato).

In Plato we have as most ultimate the good, the true and the beautiful given expression throughout the hierarchical order of kinds of reality. In Suhrawardi we know things not by mediation (either definition or sense perception) which necessitates separation of object and subject, but by "knowledge of presence" (Corbin, 1977), an innate experience—and through the essence which requires the union of object and subject. That is when consciousness and self are the same. This is close to what Langton and the artificial lifers refer to when they say that "the essence of life is in the organization and not the molecules" (Waldrop, 1992, p. 292). Or what Farmer says: "Life is a reflection of a much more general phenomenon that I'd like to believe is described by some counterpart of the second law of thermodynamics—some law that would describe the tendency of matter to organize itself, and that would predict the general properties of organization we'd expect to see in the universe" (Waldrop, 1992, p. 288).

For me, with my ultimate web of interconnectedness, and with all I assumed went wrong in western cultures and their linear thinking, all that is left objectively is beauty. Truth has fallen by the wayside with the removal of reason as basic. Goodness is removed from cosmic significance, from objectivity, because the reality of perfected kinds is supplanted by the levels of interconnected patterning, from the ultimate down to the least difference, in which each is what it is with no good or bad, perfection or lack of it, appropriate to it. Good and bad are all part of the accumulation of culture and therefore they are subject to their contextualities, settings, and points of references from which they have originated.

With this orientation, while there is the dynamism of identity-in-difference throughout, there is no real time or change involving duration and development. History as a sequence, a developmental reality, is an illusion. There are no means-ends relations, only patterns of identity-in-difference, some wider, some narrower, but ultimately all

interconnected with all. Much as in virtual reality or the emergent world, collective patterns, there are paradigms which, as in eastern mysticism, are local rules (individuals) making global or universal dynamics, in a world where everything reflects the cosmic information. This reflection in man has the advantage of being active and having presence. Therefore, in this study, we want to look into “the possibility of adopting an eastern philosophy with the idea of the world of ever changing processes of inseparable states, inseparable from their ‘origin,’ i.e., creation, and their ‘destination,’ i.e., elimination and destruction, as a flow of ever changing differences of information processes” (Minai, 1993). Because goodness and truth, under the influence of reason and science, have become so obsolete, abstract and inadequate, only beauty remains as expressive of anything real. That is, it is not only in the eye of the beholder.

The quest of modern science and the Age of Reason has been for the good in the name of the human condition, and while our modern orientation needs reworking from almost the ground up, to reinterpret that quest from an eastern and basically aesthetic perspective, what should be done is to render meaningless the realities up which the western quest has been based.

It is claimed that chance is a major player in the processes of the universe and human experience. It is also claimed that within the seeming randomness of today’s world view of life that is an “order” (Minai, 1989), which is more meaningful than the order imposed by formal rationality and which constitutes aesthetic forms and experiences. In this order, as described by “field physics” (Minai, 1984), everything including human choice and free will is subject to “chance,” which itself is a necessity. The presence of chance in life and art forms provides room for choice alteration, deviation, and change. These are the necessary conditions which allow for variety and higher levels of complexities and thus, creativity. Creativity exists only where there is a choice and possibility for change. This allows for a breaking of the rules and a replacement of the old with the new. Creativity is an inherent order within the uncontrollable/unpredictable/intuitive experience. Creative forms take shape at the crossroad of patterns of order and disorder (Fig. 3).

Random patterns are no longer seen as anomalies and should become important facts in the description of aesthetic form. Such properties hidden in the structure of any art form distinguish it from non-arts. As

Langton says, “the mysterious ‘something’ that makes life and mind possible is a certain kind of balance between the forces of order and the forces of disorder” (Waldrop, 1992). In other words, he’s saying that you should look at systems in terms of how they behave instead of how they’re made. And when you do, he says, then what you find are the two extremes of *order* and *chaos*.

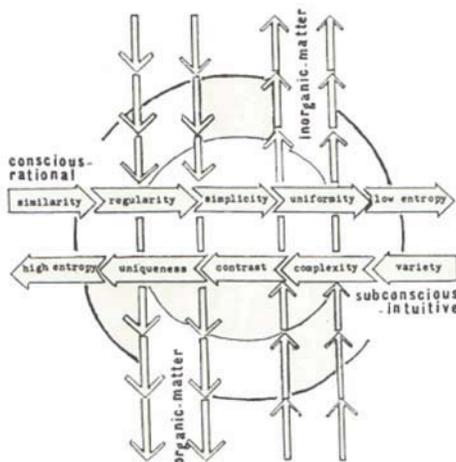
The alternative—the complex approach—it total Taoist. In Taoism there is no inherent order. The world started with one, and the one became two, and the two became many, and the many led to myriad things. The universe in Taoism is perceived as vast, amorphous, and ever-changing. You can never nail it down. The elements always stay the same, yet they’re always rearranging themselves (Waldrop, 1992).

Similarly, Prigogine and his associates in their notions of “dissipative structure” (Prigogine, 1983), and “order out of chaos” (Prigogine, 1984), talk about the same irreversible processes. Nevertheless, many are still offering reversible process as explanation for man’s culture and its aesthetic reflections. This would mean that because they assume such processes are reversible and predictable, then for its measurements they use methods and techniques which are incorrect. For our purposes of measurement and comparative analysis of culture, and its manifestation, aesthetic experience, we no doubt have to accept irreversibility as a fundamental function of evolution and culture and therefore accept its studies as dynamic processes involved with complexities not fully explainable. And if something is unpredictable and unexplainable it can not be advocated for use as a model of progress. This is reflected in the works of Szathmari when he searches for the origin of life, he supposes: “Our *biological* knowledge must be extendable *downward*, and our *physio-chemical* knowledge must be extendable *upward* to reach the no man’s land between the realms of molecular chaos and biological order” (Eros, 1989, p. 169). In other words, life could be found at the crossroad of where order and chaos meet, through “the operation of non-evolutionary self-organizing processes (such as those described by synergetics) and evolutionary transformations *sensu stricto* resting on the action of natural selection” (Szathmari, 1989).

From an evolutionary point of view organisms have two major components: replicators and interactors. While the former is reproduced through material processes, the other is not. From the theoretical biologist’s point of

view, on the other hand, the first is metabolic, that is, consumes material and energy, and the other is “a programme-controlling device.” The metabolic subsystem

Is a dissipative one; it assumes a far-from-equilibrium state, maintainable only by energy consumption and entropy production. In contrast, the programme-controlling sub-system, although inactive without energy consumption, is essentially a non-energetic entity. It is the *information* rather than the matter or energy that matters; widely different programmes can exist at (roughly) the same energetic level (Eros, 1989).



**Figure 3.** *Communication: A design model.* Source: Asghar Minai, *Design as Aesthetic Communication*. This is a metamodel: of a metaphoric representation of a holistic picture of interactions between the opposite forces in nature, i.e., “identity-in-difference.” Horizontal arrows represent the dialectic nature of dichotomy of opposing features of conscious-rational, and subconscious-intuitive mind. The vertical arrows represent the opposing natures of organic and inorganic phenomenon where the life forces tend towards an increase in order and the inorganic tends towards an increase in disorder. The design process in its broadest definition, whether a function of the designer’s mind, or as a function of an atom, an organism, or even the whole cosmos, is the interplay of all of these forces and takes place

where the laws of entropy (information and communication) negotiate.

Similar to Van der Leeuw we have come to the conclusion that man’s evolution as well as his culture, and aesthetic expression, as described in adaptation is nothing but information processes involved in matter, energy, and information, or objects, events, and associations. These are all components of communication systems which describe the world in forms of complex fields of interactions, where every single element is unique in its contextual setting and therefore its behavior. Or “matter, energy and information cannot be perceived or studied independently” (Van der Leeuw, 1981, p. 234). In other words it is only in the nature of the text, the context through which we could be able to see things. It is in this regard that Tverski and his associates propose their cumulative hierarchical nesting of information. To describe this concept the following points are given:

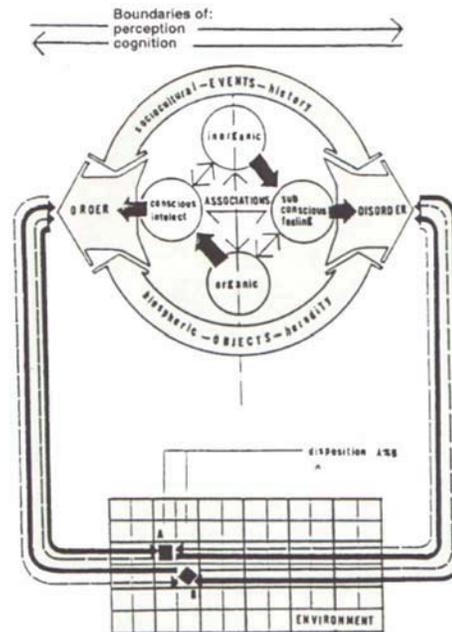
1. Similarity and dissimilarity should not be taken as absolute.
2. Judgment occurs by comparing the subject with a referent. Generally, the subject receives more attention than the referent.
3. Judgment is directly constrained by a complex (such as the other subjects or other referents around the one under scrutiny).
4. Whether a judgment of similarity or one of dissimilarity ensues is also constrained by the aims of the comparison (Van der Leeuw, 1981, p. 235).

One these bases Van der Leeuw offers the following model of perception (Fig. 4). He says, a first comparison of phenomena always takes place without any context because there is no precedent or context. There is no established rule for similarity or dissimilarity, only equality. Once the initial comparison had established a relevant context (i.e., patterns of similarity or dissimilarity), this context is tested against other phenomena. In such comparisons, “the subject is the pattern, the similarity, the referent is the phenomenon. Thus, there is a distinct bias in favor of the context, and of similarity. Once the context is firmly established, and no longer questioned, it is the referent in further comparison” (Van der Leeuw, 1981).

Such comparisons are of course biased towards the individual phenomena, and towards dissimilarity. When a large set of dissimilar phenomena are registered, the initial bias is neutralized. That is, the initial context is no longer considered relevant, and new judgments establish new context. This is exactly how “field theory” and “information and communication” concepts work. Information is driven out of context, out of similarities and differences established by the patterning of field or communication context. In other words, among humans, and between humans and



**Figure 4.** Schematic representation of conceptualization based on interaction between two levels of cognition. Source: S. E. van der Leeuw. Archaeological Approaches to the Study of Complexity.



**Figure 5.** Communication process between the mind and the environment through pattern characteristics: order versus disorder. Source: Asghar Minai, Design as Aesthetic Communication. A metamodel representing the interaction between the mind and the environment. The upper part of the model represents factors involved in mental processes (see Design Model, Fig. 3). The grid shown at the bottom represents the environment. The arrows connecting the two parts represent the communication process. These processes constitute a dialogue between the causal and physical processes (autopoiesis) between the mind and the environment. This dialogue negotiates (evaluates) the juxtaposition of environmental configurations, e.g. A & B (is it to be A or B) as well as, the Juxtaposition of internal processes (learning, knowledge adjustment, etc.) balancing actualities and potentialities. The arrows at the very top show that there are limits at the two ends of the spectrum of cognition and perception. Similar to the sensitivities of our ears and eyes, our mental activities best function as a certain range on this spectrum of perception and cognition. This range varies from person to person, as well as from culture

to culture. That is we have certain conditioning in our susceptibility to degrees of predictability, order and disorder.

Object world "channels originate among humans by the transmission of information itself. *Information flows are self-structuring*" (Van der Leeuw, 1981).

It is therefore suggested that a more prestigious position be given to the role of chance in formulating a definition of aesthetics and art forms, whether they be music, dance, plastic arts, architecture, film, or literature. This high position is held in field physics, information theory and the theory of chaos, where the availability of choice provides each point of a field space with relevant information and, thus, communication. This choice is based on the dynamics of the structural characteristics of a pertinent environmental context. This communication as a subject of human association, i.e., perception and cognition, results in symbolic information and human communication. Associations reflect processes of conscious and subconscious mind which are similarly ordered and disordered. The resulting picture of the reflected environment takes shape at the edge of order and disorder (Fig. 5).

Such a process in any artistic experience comprises two levels of an inseparable psychological whole dealing with intuition and cognition. These opposite yet complimentary halves are identified as having control over the rational/logical side of the process and the nonlogical/intuitive side. Harmony is attained where the halves are balanced, not only in communication arts, but throughout the continuum of life. The halves can be identified as morphic and entropic. Morphic is analogous to the rational/logical, having a specified comprehended form or shape. The entropic is analogous to the random/unstructured (logically)/uncomprehended, having the quality of a system undergoing change. This balance between the amorphous and the concrete or order and disorder is what constitutes an art form. The disorder/unexpected/unpredictable which cannot be explained by reason or logic. The power of perception which is the source of a creative act, goes beyond intellectual reasoning and cannot be replaced by logic and objectivity. While intelligence and formal rationality search for logical order, aesthetic experience searches for a higher form of "order" (structured randomness) in the midst of certainties and uncertainties. The first is a science and the

second is an art. The art is a harmony in the synthesis of the opposites, and unity of the diversities.

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