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Architecture Planning Built Environment Studies

An International Fully Refereed Journal
Published three times a year

In this issue:

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International Journal of Architectural Research

Archnet- IJAR

ArchNet International Journal of Architectural Research – Archnet-IJAR is the first of its kind; an interdisciplinary comprehensive scholarly journal of architecture, planning, and built environment studies, that is blind reviewed and published on the World Wide Web three times a year.

Objectives

Archnet-IJAR objective is to establish a bridge between theory and practice in the fields of architectural and design research, and urban planning and built environment studies. It reports on the latest research findings and innovative approaches for creating responsive environments, with special focus on architecture and planning in developing countries.

Archnet-IJAR is truly international and aims at strengthening ties between scholars from different parts of the world with contributors and readers reaching across geography, boundaries, and cultures.

Archnet-IJAR articles come from architects, interior designers, planners, and landscape architects, and from those working in these fields in academic institutions, universities, research centers, government agencies, and private practice.

Reader

Archnet-IJAR addresses academics, practitioners, and students of architecture, planning and interior design. It addresses those who are

interested in developing their understanding and enhancing their knowledge about how environments are designed, created, and used in physical, social, cultural, economic, and aesthetic terms. Archnet-IJAR content keeps readers up-to-date on the latest ideas, designs, and developments in built environment related fields.

Archnet-IJAR publishes research studies, criticisms and evaluation studies, and critical analyses about the creation, use, and evaluation of different types of environments at the macro and micro scales. The journal includes original empirical research papers, analytical case studies, and high quality position papers. Three major areas are covered by Archnet-IJAR:

Architectural and Design Research:

Topics include –but not limited to: architectural pedagogy and design studio teaching practices; architectural technology and sustainable design; design methods and architectural theories; design and project programming; environment-behavior studies; information technology; Islamic architecture; computer applications and virtual environments; post occupancy and facility performance evaluation; and social and cultural factors in design.

Urban and Built Environment Studies:

Topics include --but not limited to: administrative and political factors contributing to the shaping of communities, cities and urban regions, community planning; sustainable urban conservation; environmental planning and eco

development; housing policy, planning, and design; new urbanism; sustainable development; space syntax and GIS applications; and way-finding and signage systems.

Critical Essays on Architectural and Planning Projects:

Essays that cover the above topics; critically discussing projects in use; after they have been designed, built and occupied. Articles are preferred to utilize the case study approach as a critical method in built environment research.

Advisory and Editorial Boards

The Chief Editor is in charge of developing journal issues, seeking out resources and articles, establishing publishing strategies, coordinating the review process, and posting each issue and its articles online. Archnet-IJAR has two boards; advisory and editorial. The range of expertise of the boards that include the panel of referees –academics and professionals- ensures high quality scholarly papers and allows for a comprehensive academic review of contributions that span wide spectrum of issues, methods, theoretical approaches, and professional practice.

Submission Process

Unlike other printed Journals where contributors wait for periods that reach two or three years for their work to get published, the value of Archnet-IJAR as an online journal is that it eliminates the large lead time needed for publication. However, submission, referee, and publishing processes are strict and adhere to the following procedures:

Interested contributors contact the chief editor expressing interest, and submitting a summary of their paper. One page will do.

The chief editor consults with the advisory and editorial board members according to their relevant expertise.

Soon after receiving feedback from the referees, author(s) are contacted to submit their full papers.

When full papers are received, they will be forwarded to two editorial board members for blind review, according to the referee form.

The chief editor contacts the author(s) with the referee form filled by the reviewers. While papers will be blind reviewed, in exceptional cases author(s) will be asked to communicate directly with the reviewers.

Author(s) revise their papers as noted by the reviewers and re-submit their work to the chief editor.

Author(s) should make sure that their submissions should be free of jargon, clear, simple and to the point.

Papers will be published in the next issue according to the following schedule:

March 30th (publishing date): December 15th (deadline to receive papers after reviews)

July 30th (publishing date): April 15th (deadline to receive papers after reviews)

November 30th (publishing date): August 15th (deadline to receive papers after reviews)

Interested reviewers and members of the advisory board may submit their work for publication in Archnet-IJAR. Their work will go

through the same blind review process and will follow the preceding procedures.

Notes to Contributors

1. Submission of Manuscripts

The language of the journal is English. All submissions will be online. One copy of the manuscript (in word document format) together with original figures and tables must be submitted to the editor: Ashraf Salama ijar@mit.edu

The name, mailing address, position, affiliation, telephone, fax, and email of each author must be supplied in a cover letter attached to an email. All papers will be blind reviewed and assessed by at least two referees.

2. Preparation of Manuscripts Layout

Manuscripts should be typed in double spacing on one side of A4 (21x29.7 cm) paper with reasonable margins (2.5 cm). All pages should be numbered consecutively.

Title page (page 1)

The first page of the manuscript must contain a concise and informative title; names, affiliations and addresses (including e-mail) of all authors, and identify the corresponding author (who will be responsible for correspondence and reviewing proofs). An abbreviated title of less than 50 characters (including letters and spaces) should also be suggested.

Title of paper, abstract and keywords (page 2)

Title of the paper should be written at the top of abstract without authors' name. A concise and informative abstract must not exceed 300 words in length, should summarize the objective, methods and major findings of the paper. Keywords must be carefully selected to facilitate

the readers' search on Archnet Website, and should not exceed 5 key words.

Articles

Articles should not exceed 6000 words, including references.

Notes

Avoid the use of footnotes and endnotes, if unavoidable, label as (1), (2) and list all together at the end of the paper.

References

References in the text should give the surname of the author and the year of publication in brackets, for example, Rowe (1985) or (Rowe, 1985), followed by a, b,...when two or more references to work by one author are given for the same year. Page numbers should be given for quotes (Mitchell, 2003:33). At the end of the text the references should be listed in alphabetical order of authors' names and in chronological order for each author. Initial and final page numbers of articles and papers should be given. The names of books and periodicals should be given in full, and the publisher and the city of publication should be given for books, conference proceedings, etc. Details of availability should be given for unpublished conference papers. Full references should also be given for legal judgments, bylaws and regulations, and government publications, etc. Examples of reference citation are given below.

Dutton, T.A. (Ed.). (1991). *Voices in Architectural Education: Cultural Politics and Pedagogy*, Bergin & Garvey, New York, NY, USA.

Hegvold, L. (1999). "Seeking an Effective Cross-Cultural Design Pedagogy." In William O'Reilly (Ed.), *Architectural Knowledge and Cultural Diversity*,

Comportments, Lausanne, Switzerland, pp. 93-100.

Salama, A. (1998). "Integrating Environment-Behavior Studies into Architectural Education Teaching Practices," In J. Teklenburg, J. Van Andel, J. Smeets, & A. Seidel (Eds.), *Shifting Balances: Changing Roles in Policy, Research, and Design*, EIRSS Publishers, Eindhoven, Netherlands, pp.128-139.

Salama, A. (2006). "Learning from the Environment: Evaluation Research and Experience Based Architectural Pedagogy," *Transactions, CEBE-Center for Education in the Built Environment*, Cardiff, UK, 3 (1), pp. 64-83.

Salama, A., O'Reilly, W. & Nochis, K. (Eds.). (2002). *Architectural Education Today: Cross Cultural Perspectives*, Comportments, Lausanne, Switzerland.

Sanoff, H. (1992). *Integrating Programming, Evaluation, and Participation in Design*, Avery, London, UK.

Tables

Each table must be typed, and con-secutively numbered. They should have a brief informative title placed as a heading. Tables should be understand-able without reference to the text, but they should be referred to in the text. Explanatory captions should be brief and placed beneath the table.

Figures

Figures should be numbered consecutively throughout the paper and identified with the authors' name and the figure number outside the reproduction area. Figures should be referred to in the text and should be placed within the body of the paper. However, all figures should be supplied in separate files as JPEG file format. Figure dimensions should not exceed 21x30 cm. Photographs should be used with restraint and must be of high quality. Explanatory captions should be brief, placed beneath the figure.

3. Submission Process, Copyright, and Originality of Work

Proofs will be sent to the corresponding author for checking. Proofs should be returned within one week of receipt. Authors should correct typesetting errors only; they should not add any new material to the paper at proof stage.

Please read the submission process and procedures, and copyright notes under the general outline of the ARCHNET-IJAR.

All correspondence should be addressed to the chief editor.

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Crispino C Ochieng is a chartered and practicing architect in Kenya. He receive his degrees from University of Cape Town (Ph.D.), Catholic University-Leuven, Belgium (M.Arch.), and B.Arch. (Honors) from the University of Nairobi. Currently, Dr. Crispino is a Senior Lecturer, Department of Architecture, Jomo kenyatta University of Agriculture and Technology, Nairobi, Kenya and was the Chairman of the Department (2000-2003). He has a considerable number of publications including refereed journal papers, international conference proceedings. During the 2005 World Exposition in Architecture (Aichi, Japan), he was the architect for the Kenyan Exhibition Stand and won the Silver Medal out of 126 competing countries. He is the corresponding editor for Design-research News, a bulletin of the Environmental Design Research Association, Oklahoma, USA. He can be reached by email at cochieng@hotmail.com

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Besim S. Hakim

Besim S. Hakim Fellow of the American Institute of Certified Planners, Member of the American Institute of Architects, and a degree in Urban Design from Harvard, has been researching and writing about traditional codes from the Mediterranean region since 1975. His goal is to articulate how those codes shaped the traditional built environment, so as to provide lessons and models for contemporary and future architects, urban designers, city administrators and officials, and lawyers, who are involved in formulating or revising codes. He has practiced architecture and urban design and also taught those disciplines for over two decades. He is currently working as a consultant in urban design and independent scholar. He can be reached by email: arcan@sprynet.com

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Abeer A. Hasanin

Abeer A. Hasanin is assistant professor, graphic designer and painter. She graduated from the Faculty of Art Education, Helwan University, Zamalek-Cairo, Egypt in 1989. She holds the degrees of Masters and Doctor of Philosophy from the same University. With a wide variety of interests in teaching, painting, and design she bridges between design in academe and in practice. She holds the assistant professor position in the Faculty of Art Education, Helwan University in Cairo (On leave). She has held an adjunct assistant professor at the Interior Design Department for girls, King Faisal University, Dammam, KSA (2006-2006). Since 1995, she has developed an interest in information design exploring the role of signs and signage systems in achieving environmental graphic design goals. This is based on the belief that good environmental graphics would foster the urban context and would enhance human behavior in that context. Her paintings explore the relationship between the organic and the geometric, depicting themes from the Egyptian culture and nature.

Nikos A. Salingaros

Nikos A. Salingaros M.A., Ph.D., ICTP, ICoH is the author of "Anti-Architecture and Deconstruction" (2004), "Principles of Urban Structure" (2005), and "A Theory of Architecture" (2006), as well as numerous scientific papers. Both an artist and scientist, he is Professor of Mathematics at the University of Texas at San Antonio, and is also on the architecture faculties of universities in Holland, Italy, and Mexico. His work underpins and helps to link new movements in architecture and urbanism, such as New Urbanism, the Network City, Biophilic Design, Self-built Housing, and Sustainable Architecture. Dr. Salingaros collaborated with Christopher Alexander, helping to edit the four-volume "The Nature of Order" during its twenty-five-year gestation. In recognition of his efforts to understand architecture using scientific thinking, he was awarded the first grant ever for research on architecture by the *Alfred P. Sloan Foundation*, in 1997. Dr. Salingaros is a member of the *INTBAU College of Traditional Practitioners*, and is on the *INTBAU Committee of Honor*. He can be reached by email at nikoss@lonestar.utsa.edu

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EDITORIAL: THE DEBATE CONTINUES

Ashraf M. Salama

A considerable effort has been put into the first issue of Archnet-IJAR, the inaugural issue. The widespread online circulation enabled many scholars, academics, and practitioners to read it, or at least know about it. The result was an excellent, encouraging, and supportive feedback from tens of people around the globe, from South America to Australia, from United States to India, Bangladesh, China, and Japan, and from Norway to South Africa.

In the context of outlining the feedback received on the first issue and the journal in general, I would like to note the marvelous encouragement of many people and organizations including IAPS-the International Association for People-Environments Studies as currently the journal is announced in its website among many distinguished and well established journals. The chief editors of two major journals have also expressed support and interest in different forms of collaboration including Nicholas Wilkinson of OHI-Open House International, and Tasleem Shakur, of GEBR-Global Built Environment Review.

In addition to the excellent feedback received

from colleagues worldwide, Archnet-IJAR is now archived and classified among other distinguished journals and magazines in the Archnet Digital Library. The Archnet administration team led by Ophelia Celine the Archnet Content Editor and Administrator, made excellent efforts toward posting, key wording, and archiving the articles of the first issue. I am thankful to this team and especially to Ophelia whose punctuality and responsiveness made this possible.

Today, Archnet-IJAR carries two ISSNs (International Standards Serial Numbering), one is international (1994-6961) and granted from the international ISSN Center in Paris, and the other is from within the United States (1938-7806) from the Library of Congress. This keeps, maintains, and preserves the identity of Archnet-IJAR, while invigorates its credibility, and enhances its international presence.

As part of the recognition of Archnet-IJAR, the journal is now classified in the WorlCat and OCLC-Online Computer Library Center under the number (# 145980807). Founded in 1967, OCLC Online Computer Library Center

is a nonprofit, membership, computer library service and research organization dedicated to the public purposes of furthering access to the world's information and reducing information costs. More than fifty thousands libraries in over hundred countries around the world use OCLC services to locate, acquire, catalog, lend and preserve library materials. OCLC and its member libraries cooperatively produce and maintain World Cat—the OCLC Online Union Catalog. WorldCat is the world's largest network of library content and services. Its libraries are dedicated to providing access to their resources on the Web, where most people start their search for information. Researchers, students, faculty, scholars, professional librarians and other information seekers use OCLC services to obtain bibliographic, abstract and full-text information when and where they need it.

Another important step is that the journal was recently added to the LOC-Library of Congress Catalogue and Database (# 2007212183). Under both the OCLC and the LOC, the Journal is classified as part of these keyword searches: Architecture – Periodicals, Architectural design – Periodicals, City planning – Periodicals, and Architecture -- Environmental aspects -- Periodicals.

While this is really pleasing to me personally, and I am sure to the advisory and editorial board members, speaking on their behalf, it carries with it more responsibility and also accountability. In essence, it needs continuous technical support from both boards. Therefore, in order to cover some areas for advising, reviewing, and refereeing, a number of distinguished theorists, critics, and scholars were added to the already established list of

distinguished members. Michael J. Crosbie, Nikos A. Salingaros, Besim S. Hakim, and Jamel Akbar have accepted to offer advising whenever needs arise. Rabee M. Reffat and M. Alaa Mandour have also accepted to be included as members of the editorial board. I am thankful to all for their willingness to take part in Archnet-IJAR in order to develop and maintain a leading journal while building on the efforts and the success of the inaugural issue.

Similar to the first issue in terms of energy and effort, this second issue of Archnet-IJAR encompasses six papers spanning across the spectrum of architectural design and built environment studies. While they are diverse in nature, certain commonalities are found. The paper of Newton D'Souza addresses an important topic that continues to pose itself on the map of academic research in architectural and design education. D'Souza addresses the complexity of design tasks and how it requires individuals with a wide array of skill sets - for example, spatial visualization, problem solving, verbal skills, communication skills, interpersonal skills and so on. He argues and one tends to agree with his thoughts that design education today seems to limit skills to form manipulation and graphical skills. These latter skill sets, although essential to design, predict only a part of a designer's application in the real-world contexts. He introduces the theory of multiple intelligences and its underlying types as an important vehicle for conceiving the skills required for future architects. He calls academics to value and nurture diversity in architecture, empathize with the variations of individual cognitive strengths, and implement diverse tools to evaluate different areas of design thinking.

The papers of Ocheing Crispino, Jörg Seifert, and Ashraf Salama introduce different arguments but with similar concerns. Crispino critically analyzes issues that pertain to housing affordability in Pumwani, Kenya. He reviews the national housing policies and how they have resulted in users' dissatisfaction. Quoting Crispino; although the new housing was slightly of an improved physical and spatial quality it was unaffordable. Beneficiaries were required to pay an average monthly rent of US\$157 for up to eighteen years towards purchase of the new house. In the beginning, some of them had declined to take position of the newly built houses. Investigating the institutional decision making factors within which the affordable housing development process took place, Crispino's paper qualitatively analyzes the political, socio-cultural and socio-economic aspects that influence such a process within Pumwani's context.

Jörg Seifert in his provocative translated article questions the reliability and validity of UN slogans and underlying activities. The decade from 1997 to 2006 which ended just a few months ago was the first United Nations Decade for the Eradication of Poverty. Within that context, the Union Internationale des Architectes (UIA) and UNESCO joined in sponsoring the international ideas competition entitled "Architecture and the Eradication of Poverty". The competitors were to propose solutions aimed at improving the living conditions of the most deprived in all the regions of the world, developed or developing and across the sphere of human settlements. The size, type and chosen locality were left to the choice of the participants. The pertinence of the proposals it was hoped, would make it possible to establish the social

nature of the mission of the architects. Seifert's article attempts to answer a number of critical questions: Did this initiative represent a genuine commitment, a half-hearted initiative or a cynical intellectual mind game? The fates of the projects developed for the competition raise a number of questions. Seifert critically analyzes some of the winning projects addressing the contribution of architecture in the eradication of poverty at different levels and in different social and cultural contexts including New York, Hanoi, Mumbai, and Qusier.

Ashraf Salama builds on the idea of trans-disciplinary and the integration of what he calls "lifestyle Theories" into the affordable housing research and practice with particular emphasis on the Gulf States. He criticizes the typical approach of affordable housing research and practice which views cost reduction as one single determinant, while other crucial factors such as lifestyles of the targeted populations, people satisfaction of their current houses and residential environments, and their aspirations and preferences in future houses are always oversimplified or superficially addressed. Therefore, the objective of this paper is to argue for a comprehensive approach for affordable housing practices in the Gulf States. The approach is based on a new paradigm of research: trans-disciplinary; a form of inquiry that crosses the boundaries of different disciplines. Brief notes to highlight affordable housing issues in the Gulf States are outlined. An argument on the impact of trans-disciplinary thinking on understanding affordable housing is developed, then is placed within the perspective of how lifestyle theories and their underlying concepts including place attachment, appropriation, visual preferences,

and people satisfaction, can be integrated into a comprehensive investigatory process.

While the preceding three papers of Ochieng, Seifert, and Salama attempt to articulate real life issues and solving the contemporary problems of specific segments of contemporary societies, the paper of Alaa Mandour takes us to the future and argues for the need of new design thinking, tools and techniques, simply "the paradigm of virtual architecture." Mandour argues that the information age has led us to experience our environment in innovative ways, especially after the emergence of virtual spaces. Our senses have been triggered and our perceptions have been significantly altered through our experience of ever developing virtual spaces, comprising of spatial metaphors coded through an abstract flow of electronic signals, or physical spaces, constituted in zones adapted to activities and channels of communication providing links between zones, or a combination of both. His paper attempts to explicate the concept of shared mixed realities in the field of architecture based on the construction of transparent boundaries between real and virtual spaces. On another direction, Khoukhi Maatouk's paper covers the engineering aspect of architecture and introduces a simulation study on the air flow patterns and stake pressure for a high rise building in Seoul, Korea. While some may see that this paper goes beyond the interest of the reader of Archnet-IJAR, it should be noted that the journal covers the entire spectrum of built environment related studies.

I should note that based on some discussions with some colleagues and board members, a decision was made to add a new section,

which is exclusively dedicated to reviews and trigger articles. In this section, non-refereed thought provoking articles are published while book reviews, conference announcements of interest to Archnet-IJAR readers are outlined and summarized including critical reviews of recent books. The intention of this section is to give room for more voices so that the debate goes beyond pure academic writing. Therefore, the new section represents a means of rapidly disseminating innovative ideas or lessons learned from experience and practice. However, while following the same graphical format, submissions are reviewed by the editor and interested board members principally on the basis of usefulness and interest to Archnet-IJAR readers. However, the section is not necessarily a regular section and it will be available based on submissions. For this section distinguished contributions are presented by Besim Hakim, Michael Crosbie, Abeer Hasanin, Ashraf Salama, Nikos Salingaros, and Akhtar Chauhan.

I invite the members of architectural, planning, and design communities, academics and practitioners, to contribute submissions to either section, so that critical debates on improving the physical and social world in which we live continue.

Ashraf Salama
Archnet-IJAR Editor
July 2007

DESIGN INTELLIGENCES: A CASE FOR MULTIPLE INTELLIGENCES IN ARCHITECTURAL DESIGN

Newton D'Souza

Abstract

The complexity of design tasks today requires individuals with a wide array of skill sets - for example, spatial visualization, problem solving, verbal skills, communication skills, interpersonal skills and so on. Yet design education today seems to limit skills to form manipulation and graphical skills. These latter skill sets, although essential to design, predict only a part of a designer's application in the real-world contexts. Identifying and recognizing multiple intelligences then becomes important for architects and researchers to value and nurture diversity in architecture, empathize with the variations of individual cognitive strengths, and implement diverse tools to evaluate different areas of design thinking. In essence, the paper proposes a multiple intelligence approach to architecture design in the studio environment using educationist and cognitive psychologist Howard Gardner's multiple intelligence theory.

Keywords

Design skills; design ability; multiple intelligences; studio teaching.

Introduction

The Multi-Skilled Architect

The idea of a multi-skilled architect is not new. In Vitruvian time, architects were multi-skilled to fit into the role of *master-builders*. But what place does such a multi-skilled architect have today? According to Barrow (2000), the current day practice is observing a re-emergence of the master-builder concept, where architects are challenged of integrative project leadership in dealing with a dynamically networked team of consultants in the design process. This means that architects have fallen back into the role of a master-builder, perhaps as an 'integrator' of various skills and knowledge. A designer could then be considered analogous to a decathlon athlete, who needs not be specialized in a particular track and field event, but needs to perform consistently in a diverse set of events. Understanding design as a composite of different design intelligences could then allow for inclusive ways of learning and thinking. In this regard recent studies have outlined that architectural pedagogy and practice need to be considered from a diverse performance criteria (See NAAB report for 34 performance

All diagrams were developed by the author unless otherwise noted

criteria in design, 2004: Groat & Ahrentzen, 2001; Robinson, 2001).

Yet the current design education and practice seem to focus on limited skills and in some cases, caught up in the early 20th century structure of architectural inquiry. The primary means of education, the architectural studio is built on an apprenticeship model, where learning is heavily based on the pedagogical focus of the instructors. On one hand architectural education, by nature and tradition, holds vast potential as a model for the integration in the discipline (Boyer & Mitgang, 1996). On the other hand, by assuming that student skills and learning in architecture are broadly homogenous, the studio system privileges a narrow section of students, ones who know how to play the game (Stevens, 1984). Importance to individual differences and diversity of skills are rather an accidental outcome than a deliberate pedagogical strategy.

To this effect I will introduce the theory of 'multiple intelligences' in design studio first proposed by psychologist and educationist Howard Gardner. Gardner's multiple intelligence theory published in his book, *Frames Of Mind* (1983), was influenced mainly by his study of cognitive problems in people suffering brain damage. He was intrigued by patients who had lost ones ability, such as *spatial* thinking, but retained another, such as *linguistic* ability. The fact that two abilities could operate independently of one another suggested the existence of separate intelligences. Note that Gardner's use of the term 'intelligence' was meant to be provocative than literal, and the term 'intelligence' is more akin to abilities and skills than anything else.

Gardner contends that a true intelligence will have a distinct faculty associated in the brain and outlines eight forms of intelligences: *Verbal/linguistic*, *Logical/mathematical*, *Musical*, *Spatial*, *Bodily-kinesesthetic*, *Intrapersonal*, *Interpersonal* and *Naturalistic intelligences* (see table 1 for brief descriptions). According to Gardner, every individual can be considered intelligent in a variety of ways and could develop each aspect of intelligence to an average level of competency. The multiple intelligence theory has become an accepted model in educational settings, where the appeal of diverse abilities has become immediate.

Overview of Architectural Design Inquiry Relating to Design Intelligence

Before understanding how multiple intelligence theory fits into architectural design a brief overview of architecture design inquiry is presented. Historically, one of the first attempts in formulating rules for design and thereby explicitly proposing corresponding design skills could be attributed to the *functionalist movement* of the 1930's. Backed by the scientific outlook toward design, it was argued that tradition and intuition had been successful in the past because problems were simple. The present era needed tangible tools and description of the design process. Viewing traditional architecture as equivalent to *disorder* and *irrationality*, architects such as Corbusier, asserted a rational use of rules that created machine-like quality of buildings.

Parallel to the advances of functionalism and the rapid advancement in technology, *the design methods movement* came in vogue, working toward planned decision making rather

than the process of trial and error. The emphasis was on efficiency and the belief that design problems could be quantifiable and worked as stage phases such as *analysis*, *synthesis* and *evaluation*. In other approaches such as *cybernetics and systems theory*, problems were seen as an organization or system rather than individual components. Alexander (1964) and later Bijl (1989) explored these systems theories in design and regarded them as important problem solving tools.

The later paradigm, namely, the *organic style*, propagated by the works of Wright (1955), dismissed the rigid functionalistic dictum of *form follows function* to a new philosophy that considered *form and function as one*. The focus during this time shifted to tactile issues such as expressive forms of nature and materials. There was also a renewed attention to the complexity of *architectural spaces*. Rowe and Slutzky (1976) for example showed much interest in visual ambiguity and inverted spatial effects influenced by the gestalt studies of visual perception. Preceding works by Schon (1988) and Lawson (1997) showed that spatial gestalts were an important aspect of the design process and spatial skills became important.

In the late 60's some design researchers, influenced by linguistic studies from Chomsky and others (1965) conceived design as a form of *language* with a definitive underlying structure. For example, shape grammars (Stiny, 1980) were introduced as formal rules in which design elements must be combined through geometric and visual logic (Mitchell, 1977; Knight, 1994). Others such as Barthes (1967) and Eco (1976) considered design a formal structure made of syntactic and semantic components

much like any other language. The belief was that by identifying the structure one could understand the discourse of design. Language narration has also been used as an analogy in design (Isabel, 1997) and to bring in a fictional quality to design inquiry (Hedjuk et al, 1988). Verbal and narrative skills hence became prominent.

Other trends have explored design inquiry in terms of meanings and pluralistic approaches. These include *phenomenological* and *pragmatic* approaches. Phenomenological studies conjure personal and subjective experiences in design (Norberg-Schulz, 1979; Bachelard, 1969). Here intrapersonal skills are given importance. Taking a choreographic view of design, Tschumi (1994) proposes a way in which architecture can be explored as an instrument to express the body's experience of order, movement and temporal dimension, where kinesthetic skills are highlighted. The pragmatist approaches (action research, universal design) emphasize a more collaborative and critical role to the designer where empathy and empowerment of society is considered important (Whyte, 1991; Sanoff, 1989). This role highlights the architects to develop interpersonal skills.

In summary, while '*design intelligences*' as a subject matter has not been explicitly discussed, it has been addressed implicitly at various levels of design inquiry. Starting from epistemological and theoretical influences from philosophy and social sciences (Heidegger, 1927; Popper, 1959; Chomsky, 1965), to examining personality traits of architects (Cross and Nathenson, 1981; Newland et al, 1987; Mackinnon, 1978; Balchin and Coleman, 1965), or studies conducted

on design process and methods (Jones, 1970; Lawson, 1997; Schon, 1983; Downing, 1989) or the nature of design itself (Cross, 1986; Archer, 1984). Within these bodies of literature one can find an attempt to describe different design skills and intelligences.

| Intelligence Type | Characteristics |
|---------------------------|--|
| (i) Verbal/Linguistic | A person with verbal intelligence is sensitive to meaning and order of words. Verbal intelligence involve excellence in activities such as hearing, listening, impromptu or formal speaking, tongue twisters, humor, oral or silent reading, documentation, creative writing, spelling, journal and poetry. Personalities associated with verbal intelligence are poets and journalists. |
| (ii) Logical-mathematical | A person with logical-mathematical intelligence is able to handle chains of reasoning and recognize patterns, numbering and order. Logical-mathematical intelligence involves excellence in activities such as understanding abstract symbols/formulae, deciphering codes, numerical calculations and problem solving. Personalities associated with logical intelligence are mathematicians and computer programmers. |
| (iii) Musical | A person with musical intelligence is sensitive to pitch, melody, rhythm, and tone. Musical Intelligence involves excellence in activities such as musical recitals, singing on key and musical compositions. Personalities associated with musical intelligences are composers and conductors. |
| (iv) Spatial | A person with spatial intelligence can perceive, transform and modify spatial information easily. Spatial intelligence involves excellence in activities such as recreation of images, drawings, sculptures, forms, color schemes and so on. Personalities associated with spatial intelligences are artists, painters and sailors. |
| (v) Bodily-kinesthetic | A person with bodily-Kinesthetic intelligence is able to use the body, has control over motor actions and the ability to manipulate external objects. Bodily-kinesthetic intelligence involves excellence in activities such as drama, role playing, sports and dancing. Personalities associated with bodily-kinesthetic intelligences are dancers, gymnasts and rock-climbers. |
| (vi) Intrapersonal | A person with intrapersonal intelligence has the ability to recognize personal feelings and emotions. Intrapersonal intelligence involves excellence in activities such as silent reflection, concentration skills and higher order reasoning. Personalities associated with Intrapersonal intelligences are writers and thinkers. |
| (vii) Interpersonal | A person with interpersonal intelligence has the ability to recognize others feelings, beliefs and intentions and understand people and relationships. Interpersonal intelligence involves excellence in activities such as group projects, counseling and feedback. Personalities associated with Inter personal intelligences are counselors , human resource personnel and teachers. |
| (viii) Naturalistic | A person with natural intelligence is able to connect with the intricacies and subtleties of nature. Naturalistic intelligence involves excellence in activities such as archeology, paleontology and wildlife watching. Personalities associated with naturalistic intelligences are botanists and archeologists. |

Table 1: Multiple Intelligence Theory: Types and Characteristics.

A Loose-Fit Definition of Intelligences for Architecture

Some architectural purists may consider the coupling of the term '*design*' and '*skill*,' or as referred in this paper '*design*' and '*intelligence*' as provocative, even antithetical, because traditionally architectural design has connotations of art, while intelligence has connotations of science; architecture design as art is considered subjective and intuitive, intelligence on the other hand is commonly viewed as objective and measurable (Mackinnon, 1978). This reasoning is not unfounded if one examines the definitions of intelligences available in the psychological literature that usually render intelligence as objective and abstract (Freeman, 1955; Sternberg, 1985; Das, 1973). Architectural design researchers hence tend to be more comfortable with the term '*creativity*' to describe inherent abilities of designers (Mackinnon, 1965). Creativity also is a favored term if one assumes that the objective of design process is not simply to *produce*, but also to *produce creatively* (Louridass, 1999).

Other authors have also suggested that architectural design be regarded as a unique form of intelligence which is different from the scientific or scholarly thinking styles, but as powerful (Cross, 1982). Cross observes that even though the criteria to study design as a separate form of intelligence are inconclusive, such a study could be important because it focuses attention on design as a cognitive ability, helps to identify and clarify features of the nature of design ability, and finally clarifies a framework for developing further the case for *designerly* ways of knowing, thinking, and acting.

While Cross's view brings a much needed appeal to the study of design intelligence, the idea of design as a unique form of intelligence could reduce design to another extreme way of defining it (similar to objective notions of intelligence). However, design if described more inclusively allows for a loose-fit definition of intelligence that includes diverse performance criteria.

Furthermore, there seems to be a recent blurring of gap between the construct of *intelligence* and *creativity*. Studies on creativity have shown that the so called rational subjects like science and mathematics can be highly creative (Lawson, 1997). Others like Mackinnon (1978) suggest the definitions of creativity range all the way from the notion of creativity as a simple problem-solving exercise to conceiving it as the full realization and expression of an individual's unique potentialities. Gardner himself does not make a strong distinction between *intelligence* and *creativity*. For Gardner, as long as one can find a culture that values an ability to *solve* a problem or *create* a product in a particular way, then one could strongly consider that ability as intelligence. The blurring of the terms '*intelligence*' and '*creativity*' suggests that it is perhaps useful to consider design intelligence as a combination of multiple factors, and examine the components of these factors in much more detail. For the purpose of this paper, hence, a *loose-fit* definition of intelligence is used as a starting point. What this means is that insofar as the study of design intelligence is concerned, it is not restricted to one set of variables but rather considered a flexible framework consisting of multiple intelligences that can be configured or combined.

Multiple Intelligences: Scope and Limitations

Gardner (1993) critiques the current education system that focus on logical and verbal intelligences only and hence fails to serve the academic and career needs of many students whose strengths lay outside of these two intelligences. The appeal of multiple abilities was immediate and a welcome change from IQ in educational circles. However, the use of MI theory in architectural design could be relevant inasmuch as it affords a way to think of architectural designing as a diverse set of intelligences and to understand individual differences among designers. It will also help to explore how these intelligences are learnt and experienced in the studio environment. Finally, it could be potentially useful as a diagnostic or career guidance tool for architectural education and practice. Assuming multiple intelligence theory as an acceptable model for understanding design intelligences in the studio setting, the following research questions are asked in this paper:

- (i) What intelligence(s) are important to architectural designing?
- (ii) Is there diversity or consistency among architectural designers in their priority of using multiple intelligences?
- (iii) If the use of multiple intelligences is substantiated, to what extent can they be used in pedagogy and practice?

Multiple Intelligence Among Architectural Designers

The MIDAS Scales

To measure multiple intelligences among designers a MIDAS questionnaire was used. MIDAS (Multiple Intelligence Development

Assessment Scale) was developed by Shearer (1999) to assess multiple intelligence theory of Gardner. The MIDAS profile is intended to give a reasonable estimate of the person's intellectual disposition in each of the eight main intelligence areas (*linguistic, logical-mathematical, spatial, musical, kinesthetic, naturalist, interpersonal and intrapersonal*). There are a total of 119 items within MIDAS, for the eight scales related to the multiple intelligences of Gardner (see table 2 for brief description).

Shearer considers Gardner's following definition of intelligence as an important starting point to construct the scales. '*Intelligence is the ability to solve a problem or create a product that is valued in one or more cultures.*' (Gardner, 1983). Based on this definition the MIDAS is operationalized as follows:

- (i) The measurement of *creative, practical* and *hypothetical-abstract* aspects of intellectual abilities.
- (ii) Importance of the *person-in-context* and *social influences* that contribute to recognition, activation and development of personal skills.

| MIDAS Scale/TYPE | Description |
|-----------------------------|---|
| MUSICAL | To think in sounds, rhythms, melodies and rhymes. To be sensitive to pitch, rhythm, timbre and tone. To recognize, create and reproduce music by using an instrument or voice. Active listening, a strong connection between music and emotions. |
| Vocal Ability | A good voice for singing in tune and in harmony |
| Instrumental Skill | Skill and experience in playing a musical instrument |
| Composer | Makes up songs or poetry and has tunes on her mind |
| Appreciation | Actively enjoys listening to music of some kind |
| MIDAS Scale/TYPE | Description |
| KINESTHETIC | To think in movements and to use the body in skilled and complicated ways for expressive and goal directed activities. A sense of timing, Coordination for whole body movement and the use of hands for manipulating objects. |
| Dexterity | Ability to move the whole body for physical activities such as balancing, coordination and sports |
| Dexterity | To use the hands with dexterity and skill for detailed activities and expressive moment |
| MIDAS Scale/TYPE | Description |
| LOGICAL-MATHEMATICAL | To think of cause and effect connections and to understand relationships among actions, objects or ideas. To calculate, quantify or consider propositions and perform complex mathematical or logical operations. It involves inductive and deductive reasoning |
| Everyday Math: | Used math effectively in everyday life |
| School Math: | Performs well in math at school |
| Everyday Problem Solving: | Able to use logical reasoning to solve everyday problems, curiosity |
| Strategy/Logic Games | Good at games of skill and strategy |
| MIDAS Scale/TYPE | Description |
| SPATIAL | To think in pictures and to perceive the visual world accurately. To think in three-dimensions and to transform one's perceptions and re-create aspects of one's visual experience via imagination. To work with objects effectively. |
| Space Awareness | To solve problems of spatial orientation and moving objects through space such as driving a car |
| Artistic Design | To create artistic designs, drawings, paintings or other crafts |
| Working with Objects | To make, build, fix, or assemble things |
| MIDAS Scale/TYPE | Description |
| VERBAL/LINGUISTIC | To think in words and to use language to express and understand complex meanings. Sensitivity to the meaning of words and the order among words, sounds, rhythms, inflections. To reflect on the use of language in everyday life. |
| Expressive Sensitivity | Skill in the use of words for expressive and practical purposes |

| | |
|-------------------------------|--|
| Rhetorical Skill | To use language effectively for interpersonal negotiation and persuasion |
| Written - academic | To use words well in writing reports, letters, stories, verbal memory, reading / writing |
| MIDAS Scale/TYPE | Description |
| INTERPERSONAL | To think about and understand another person. To have empathy and recognize distinctions among people and to appreciate their perspectives with sensitivity to their motives, moods and intentions. It involves interacting effectively with one or more people |
| Social Sensitivity | Sensitivity to and understanding of other people's moods, feelings and point of view |
| Social Persuasion | Ability for influencing other people |
| Interpersonal Work | Interest and skill for jobs involving working with people |
| MIDAS Scale/TYPE | Description |
| INTRAPERSONAL | To think about and understand one's self. To be aware of one's strengths and weaknesses and to plan effectively to achieve personal goals. Reflecting on and monitoring one's thoughts and feelings and regulating them effectively. The ability to monitor one |
| Personal Knowledge / Efficacy | Awareness of one's own ideas, abilities; able to achieve personal goals |
| Calculations | Meta - cognition, "thinking about thinking" |
| Spatial Problem Solving | Self awareness to problem solve while moving self or objects through space |
| Effectiveness | Ability to relate to self and others. Able to get along with people |
| MIDAS Scale/TYPE | Description |
| NATURALIST | To understand the natural world including plants, animals and scientific studies. To recognize, name and classify individuals, species and ecological relationships. To interact effectively with living creatures and discern patterns of life & natural force. |
| Animal Care | Skill for understanding animal behavior, needs, characteristics |
| Plant Care | Ability to work with plants, i.e., gardening, farming and horticulture |
| Science | Know ledge of natural living energy forces including cooking, weather and physics |

Table 2: MIDAS Scales and Descriptors (from the MIDAS Manual, Shearer, 1999)

What Intelligences are Important to Architectural Design?

The measurement of MIDAS among architecture students was conducted among 36 architecture students (18 juniors, 9 seniors and 9 graduate students) distributed among

the seven design sections. Note that the later phases of the study included 104 students as a larger part of the item construction process which culminated in the ADIAS (Architecture Design Intelligence Assessment Scales) and is proposed as a forthcoming paper. In psychometrics, *item construction* process refers

to the construction of reliable scales through repeated testing, refining and improving them. An *item* refers to a single question designed to elicit a response from a test-taker. Items of the same substantive construct are grouped under a common *scale*. Each of Gardner's eight intelligences can be considered as a distinct scale and questions under these scales can be considered as *items*.

When MIDAS scores were calibrated, in the aggregate, mean percentage scores for 36 architecture students ranged from 68% (for *spatial* intelligence) to 50% (for *musical* intelligence). The frequency chart and bar chart for the aggregate mean percentage

scores for the various intelligences across student population is shown in table 3 and figure 1. The relatively low difference (of only 18%) between the highest scale (*spatial* intelligence) and the lowest scale (*musical* intelligence), shows that there is a consistency of mean percentage scores of intelligence across student population, demonstrating that architecture students may be good at several different intelligences rather than specialized in one or two. The highest scores were registered for *spatial* intelligence (68%) and *intrapersonal* intelligence (65%). The lowest scores were registered for *musical* (50%) and *kinesthetic* intelligence (50%). The rest of the intelligences registered midlevel scores.

| Type | N | Minimum | Maximum | Mean | Standard Deviation |
|-------------------------|----|---------|---------|-------|--------------------|
| <i>Spatial</i> | 36 | 21.67 | 89.23 | 67.97 | 17.57 |
| <i>Intrapersonal</i> | 36 | 39.89 | 91.67 | 64.76 | 12.88 |
| <i>Interpersonal</i> | 36 | 16.25 | 4.72 | 57.72 | 16.06 |
| <i>Logical</i> | 36 | 14.00 | 92.65 | 56.83 | 17.76 |
| <i>Linguistic</i> | 36 | 27.50 | 78.75 | 54.69 | 13.00 |
| <i>Natural</i> | 36 | 9.62 | 92.31 | 53.39 | 19.45 |
| <i>Kinesthetic</i> | 36 | 19.23 | 73.08 | 50.04 | 13.94 |
| <i>Musical</i> | 36 | 7.14 | 73.21 | 49.76 | 16.48 |
| <i>Valid (listwise)</i> | 36 | | | | |

Table 2: Descriptive statistics for MIDAS scales for architecture students (n=36) (Mean percentage scores).

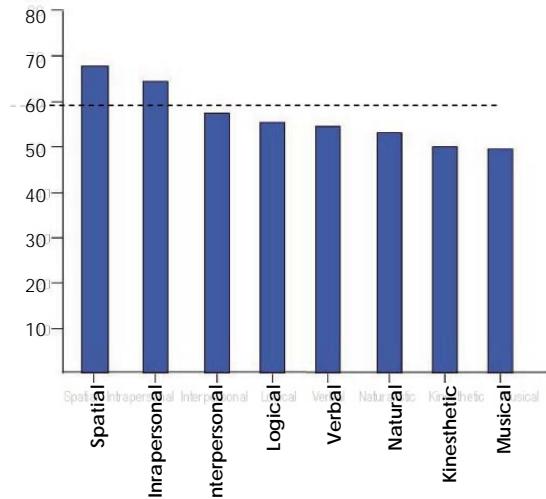


Figure 1: Bar Chart Showing Mean Percentage Scores for MIDAS Among Architecture Students (n=36). Highest Scores Recorded for Spatial Intelligence (68%) and Lowest Scores for Musical Intelligence (50%). Scores Above 60% Score are considered high in MIDAS.

While the scores for *spatial intelligence* were predictably high, the high scores registered for *intrapersonal* and *interpersonal intelligences* perhaps demonstrate the importance of communication, self reflection and critical thinking that the architectural design studio demands. The aggregate mean scores for the overall student population concur with frequency distribution for each of these intelligences. The histograms in figure 2a are arranged from left to right (left indicating more than 60% scores and right indicating less than 60% scores, with a dashed line indicating the 60% mark). One can see that the histograms are skewed slightly to the right of 60% for *spatial* and *intrapersonal* intelligence and slightly to the left for *musical*, *kinesthetic* and *natural* intelligence. Other intelligences remain in the middle.

The histograms can also be arranged in terms of variation of frequency distribution as arranged in figure 2b (left indicating low variation and right indicating high variation). The histograms reveal a relatively low variation in distribution for *spatial*, *verbal*, *intrapersonal* and *logical* intelligence (also refer standard deviation in table 1), indicating that these scales are relatively stable and that architecture students are consistently good at these intelligences. A high variation is found for *kinesthetic*, *musical*, *naturalistic* and *interpersonal* intelligences indicating that there were high individual differences for these intelligences. In particular, *musical* intelligence was the only intelligence that registered low scores as well as high variation making its validity questionable, or at least making the items for this scale in need of modification insofar as its validity to architectural design is concerned.

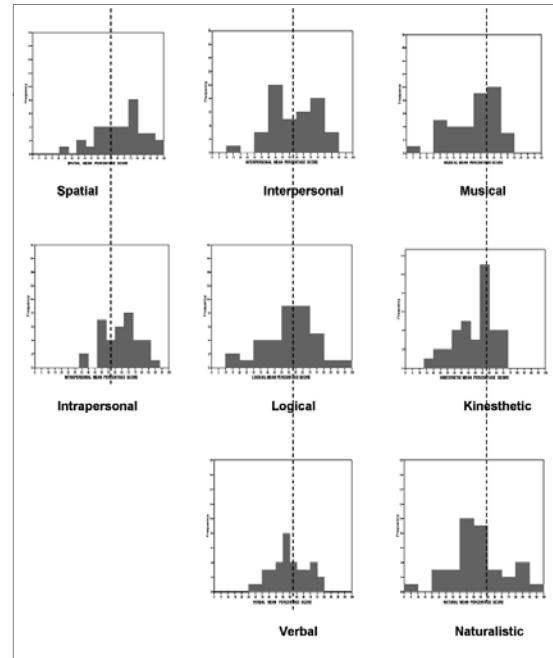


Figure 2a: Frequency Polygons Arranged in Terms of Mean Percentage Score for MIDAS Across Architecture Students (n=36). The Dashed Line Indicates the 60% Mark. Read from Left to Right columns, the Histograms are Skewed Slightly to the Right of 60% for Spatial and Intrapersonal Intelligence and Slightly to the Left for Musical, Kinesthetic and Natural Intelligence. Other Intelligences Remain in the Middle.

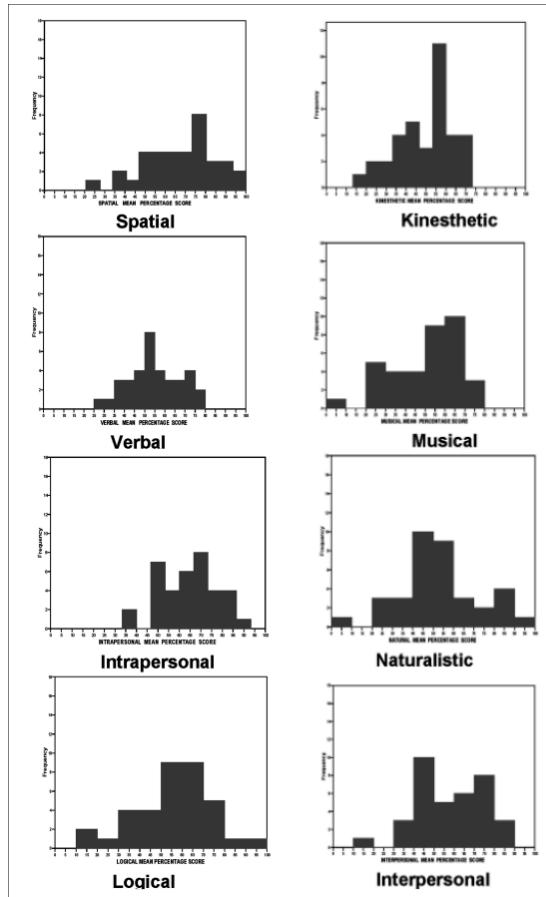


Figure 2b: Frequency Polygons Arranged in Terms of Frequency Distribution for MIDAS Across Architecture Students (n=36). Read from Left to Right, the Histograms Reveal a Relatively Low Variation of Distribution Curve for Spatial, Verbal, Intrapersonal and Logical Intelligence Indicating that these Scales are Relatively Stable and that Architecture Students are Consistently Good at these Intelligences. A High Variation is Found for Kinesthetic, Musical, Naturalistic and Interpersonal Intelligences Indicating that there were High Individual Differences for these Intelligences.

Comparison of MIDAS for Architecture Students with other Domains

To analyze how architectural students stand in the spectrum of other domains, comparisons were made with other groups. The groups were chosen to demonstrate the diverse characteristics of different domains and a sample size that could make a reliable comparison (from studies conducted by Shearer, 2002). These groups included engineering majors (n = 93), psychologists (n=30), arts club (n = 79), naturalists (n=17), music majors (n = 40), and dancers (n=17). Although the sample size for these groups is relatively small and not standardized it can provide an indication of how architecture majors stack up with other groups in terms of multiple intelligences.

As seen in figure 3, the range of scores that architecture majors produced was placed at the center of these groups suggesting that architectural designers had neither too high nor too low scores compared to other domains. This means that architecture students were good at several intelligences at a nominal level. In other words the multiple intelligences of architecture students were found in a well-balanced range (i.e. not very high, nor very low), indicating the characteristics of architecture as an interdisciplinary domain. However, architecture majors were also found to excel in other groups on two intelligences – *spatial* and *intrapersonal* intelligence across domains. This contradictory result points out that, although architecture on one hand is to an extent is interdisciplinary, on the other hand it consists of enough rigor in two intelligences that might suggest the makings of a well-defined domain.

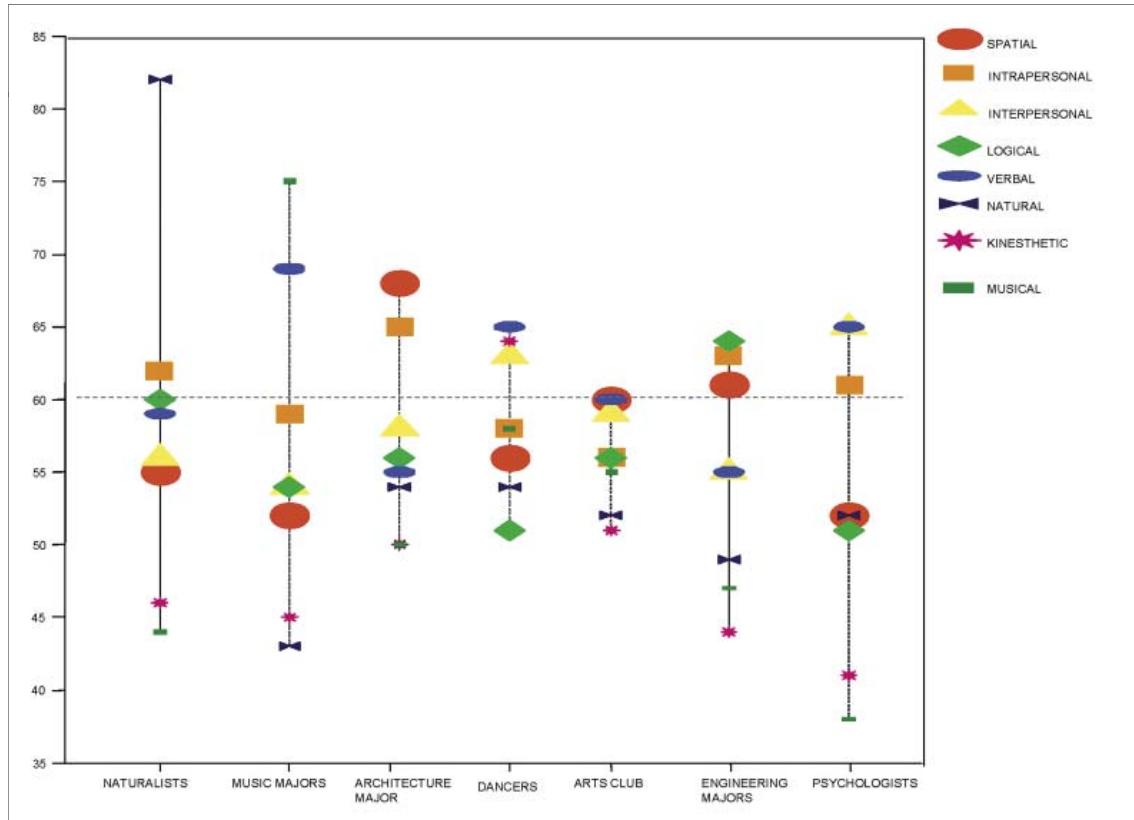


Figure 3: Drop-line Graph Showing Mean Percentage Score distribution for MIDAS Across Well Defined Groups. From Left to Right, Naturalists (n=17), Music Majors (n = 40), Architecture Majors (n=36), Dancers (n=17), Arts Club (n = 79), Engineering Majors (n = 93) and psychologists (n=30). Architecture majors produced were placed at the centre of these groups i.e. in a well-Balanced Range, Suggesting they Had Neither Too High Nor Too Low Scores.

This argument seems apt especially in architecture and it is not surprising that Gardner originally did not associate any of these intelligences with architects or architectural design ability (in his prior edition of *Frames of*

Mind). The view provides more traction that architectural design is interdisciplinary (Groat & Ahrentzen, 2001; Robinson, 2001). Hence thinking of design as a domain which consists of interplay of various intelligences may be more

plausible, than thinking of design as a separate form of intelligence.

In summary, the study indicates that design intelligence cannot be restricted to one set of variables but rather should be considered as a flexible framework consisting of multiple intelligences that can be adapted to produce desired outcomes. This *loose-fit* definition makes the study more inclusive and open to richer data. It helps to understand that architecture design problems could be solved in a variety of ways and thereby through alternative viewpoints.

Implications

Empathizing with Individual Differences in Learning

MIDAS may help instructors in understanding individual differences among students and make sense of different approaches, so that they can develop a strategy to intervene on the student's behalf. This can be done in different ways. To diagnose a students' performance through MIDAS, first, students can be asked to self-identify their individual capabilities through MIDAS. The instructor can also rate the students using the same instrument. Once a reasonable profile is identified for the student, the differences between the two ratings as well as strengths and weaknesses could be identified and communicated with each other. This will help in a two-way communication between the instructor and the student.

Once a MIDAS profile is established formative questions could be asked. For example, if a student has limited skills, should that student

be taught to broaden the repertoire of intelligences? On the other hand, if a student has several skills should that student be instructed to focus on certain skills alone? While these questions are important, they may not always work effectively in all the cases. A student may be narrow and rigid but yet be rigorous and effective in those intelligences, or a student may be able to compensate for scarce abilities in one area by increasing competency in the other. Hence, given these questions ultimately individual differences should be considered on a case-by-case basis. The role of the instructor then would be to recognize the individual strengths and differences in which students operate and provide the necessary flexibility. Identifying and recognizing multiple intelligences then becomes important for instructors and students to value and nurture diversity in design thought, empathize with the variations of individual strengths, and implement diverse tools to evaluate different areas of design thinking.

Rethinking the Experience in the Studio Environment

Assuming that multiple intelligences can be used as an explicit pedagogical tool in design, one may need to re-examine the current studio model. While this studio system has its distinct advantages, the primary problem in such a system is the assumption that learning occurs sequentially from a beginning level to an advanced level and that students absorb the complexity of architectural problems in a cumulative manner and could deter students in dealing with architectural complexity in the later studios. This assumption leads to training in the beginning level studios limited to largely

formal issues. If complexity is brought into the system early, students may be willing to regard architectural complexity as a part of the problem rather than something external. A multiple intelligence approach to beginning design studios may be one way of dealing with architectural complexity.

In this context the structure of the studio system is worth examining. Currently, in North America, most architecture schools are structured in such a way that the first two semesters focus on '*architecture fundamentals*.' Design, here, is looked upon as a formal exercise of lines, planes and volumes (where the primary importance is provided for *logical* and *intrapersonal* intelligences). The studios preceding it consist of '*basic architectural design*,' where program and pragmatic issues are brought to bear. These studios usually present a real world problem such as a design of a museum, library and so on (where the importance perhaps shifts to *interpersonal* and *spatial* intelligences). The final sequence of courses allows for '*advanced architectural design*,' either in the form of *specialized* studios (for example exploration of materiality, architectural details, particular building typology and so on) or as *comprehensive* studios that allow developing a broader world view (*microcosm*, *phenomenology*, *cultural landscapes* and so on). It is only at this stage that a true opportunity for exploring different intelligences is afforded.

The challenge is then to devise architectural problems that afford the use of multiple intelligences, yet maintaining the appropriate degree of difficulty for a specific undergraduate level. What is needed are design problems that test a combination of intelligences based on the

degree of difficulty that a particular program needs. This could be done at different scales and different levels of abstraction. Another way to achieve this is to alternate students between specialized and comprehensive studios as students proceed through different levels of architectural school. Perhaps studio 'cross-modules' that allow juniors and seniors to take part in a joint studio could be useful. Other studio such as '*Study Abroad*' studios might help in this regard, because they have the ability to foster the learning of certain intelligences -- such as *interpersonal*, *kinesthetic* and *intrapersonal* intelligences quicker than in the studio environment—as students are exposed to tacit learning in an external environment. However, the study abroad studios are usually optional and not all students can afford the costs.

Cross-modules can also be considered at a university level. Most universities run courses ranging from pure art colleges to mixed programs of engineering and design. Cross disciplinary courses could be encouraged in which architectural design is seen as a continuum between different design disciplines. One end of the continuum could be occupied by disciplines such as ecological design, urban design, and landscape design and so on, and the other end by industrial design, product design or graphic design. This way translation could occur within the continuum between different design disciplines. Experimental studios could also be conducted, for example, between apparently distant faculties, such as architecture and dance schools, for a design problem that involves a retail design store, as different disciplines bring about different levels of priority and focus of intelligences (for example, *kinesthetic* intelligences in dance).

Another issue in the studio system is the use of support courses. Currently, the support courses such as *environmental systems, human behavior, architectural theory* etc., do not necessarily infiltrate the studio system effectively. A curriculum that integrates these support courses in real time with the ongoing studio projects may help to some extent, and thereby encourage lateral thinking between different domain areas.

Multiple Intelligences as a Career Guidance and Achievement Tool

According to Shearer, the MIDAS is designed to provide an objective measure of the multiple intelligences as reported by the person or by a knowledgeable informant and its philosophy is based on a person-centered assessment. In line with Gardner's criticism of psychometric testing, Shearer observes that while traditional psychometric tests serve to mark the limits of the person's *general intelligence*, the MIDAS strives to describe the course and direction of intellectual growth and achievement potential in *specific areas of skill* for the eight intelligences.

Compared to other domains (such as engineering, management, medicine) where standardized tests are established, there is very little empirical analysis of architectural design aptitude (Arvola, 2002). In the light of the diagnostic tool outlined in this paper, perhaps the multiple intelligence scales may be helpful in developing these tests. Quite a few schools use intelligences testing in architecture. According to an international survey of 60 schools (Goldschmidt et al, 2001), 55% rely on Scholastic Aptitude Tests and 26%

rely on special architectural aptitude tests. Salama (2005) has identified that, by and large, admission policies reflect the tendencies of most schools of architecture to emphasize skills in drawing and form manipulation. Because they test primarily universal and abstract decision making skills, these aptitude tests are often de-contextualized from the naturalized setting of architectural design, and hence limited in testing prospective students who can apply their reasoning to real-world contexts. Moreover, personal intelligences (such as *intrapersonal* and *interpersonal* skills), which stands out as critical in MIDAS are often overlooked in prevailing aptitude testing.

Another area where the MIDAS could be important is to bring clarity to architectural performance criteria and architectural achievement. In North America, the National Architectural Accrediting Board (NAAB) creates and defines performance criteria to help accredited architectural degree programs prepare students for the profession. NAAB has outlined 34 performance criteria for this purpose. While NAAB has been much more forceful in recent years to stress the development of *interpersonal intelligences*, other intelligences such as *intrapersonal, logical, and kinesthetic intelligences* are not addressed rigorously. Moreover, NAAB criteria also fail to elaborate on the descriptors for '*fundamental design skills*' needed by students. The multiple intelligence framework – particularly, the *spatial* intelligence category - could help develop this criteria.

Implications for Architectural Practice

While the measurement of multiple intelligence in this paper was done in an academic setting, the framework of multiple-intelligences may have important implications to practice as well. Of course, the goals and challenges of architectural practice are very much different than a studio. One important difference is that professionals have a greater power in redefining their tasks, while the students are bound more rigidly to the studio system. It may also be the case that students are overtly concerned with the grading criteria while success in practice is more openly defined. Add to the fact that practice involves collaborative design and seldom focuses only on individual acts of designing.

Given the differences, nevertheless, the idea of multiple intelligences could be useful in practice where building design and construction have increased in complexity, products, and project participants. Design practice also needs to be evaluated within its own culture, especially if one considers architects as members of a larger community of practice. The concept of a *community of practice* refers to the process of social learning that occurs when people who have a common interest in some subject or problem collaborate over an extended period to share ideas, find solutions, and build innovations (Lave and Wenger, 1991; Wenger, 1998). Lave and Wenger suggest that while most communities of practice are usually formed within a single discipline in order to focus knowledge sharing, and resources, more recently multidisciplinary participation has become inevitable given the complex nature of the technological and global age in which

organizations function. This is perhaps more true to the domain of architecture than any other, and a multiple intelligence approach could help in advancing this idea.

In this context, professional capacities need to be diagnosed perhaps in a different way because practitioners use a high degree of *interpersonal* intelligence, in the form of client interaction, communication skills, as well as associated skills to fit into the process of the larger community of practice. Moreover, understanding and applying the shared repertoire of communal resources that the community of practice develops over time (that include routines, sensibilities, artifacts, vocabulary, styles, etc.) become more important in practice than an academic setting.

Some Limitations

The different scales contained very different content questions, and their testing through a paper format was not always easy. Some scales such as *musical* scales are harder to determine than other scales such as *spatial* scales because architecture students are more comfortable with, or are trained in *spatial* rather than *musical* medium. Moreover, since the MIDAS survey was mainly a self report, it was vulnerable to inaccuracies. To rectify this, some form of aptitude testing could be developed to make sure that the student is indeed competent in a certain field that he/she claims to be.

Because this study was conducted within one school and a studio group, the sample sizes may not be big enough to claim validity for the broader design population and different

cultural settings. The MIDAS scales can be further validated by increasing the representation of designers in different groups such as practitioners and students, and standardized norms (performance by a defined group on a particular test) could be set as a guide to measure design intelligence. The study sample is made up of only one level of architecture students (juniors), which could deter understanding the developmental aspects of multiple intelligences in architecture schools. Taking measurements throughout a student's stay in the school may provide this data, and help to understand the process of architectural learning in a much more valid way.

A larger sample could also help to increase the reliability of scales with other statistical devices such as factor analysis. This will allow understanding whether one factor accounts for more of the variance than others. If items do not load on this factor it might be considered for elimination. Factor analysis could also help in the development of subscales. Multiple intelligence theory itself is still under development as Gardner has since considered the existence of other possible intelligences such as *spiritual/existential* and *moral /ethical* intelligences (Gardner, 1999). The further development of MI theory may provide more incentives to understand new descriptors in architectural domain.

Within these limitations, the understanding of multiple intelligences may have wide consequences in the contemporary architectural context in how one values designs in the studio, how one accept students into design schools and how one defines competency in practice.

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AFFORDABILITY OF LOW INCOME HOUSING IN PUMWANI, NAIROBI, KENYA

Crispino C. Ochieng

Abstract

Since 1987, in Kenya, through the National Housing Corporation (NHC), an arm of the central government that delivers affordable houses, the local government embarked on the redevelopment of Pumwani the oldest surviving affordable low income housing in Nairobi. Pumwani was started in 1923 and it targeted early African immigrants to Nairobi.

Currently, the old Pumwani is home to some of the city's poorest dwellers majorities who depend on the informal sector for an income. Redevelopment was targeted at housing all the genuine dwellers. Instead delivery ended up with house types that were at first rejected by the beneficiaries.

Although the new housing was slightly of an improved physical and spatial quality it was unaffordable. Beneficiaries were required to pay an average monthly rent of US\$157 for up to eighteen years towards purchase of the new house. In the beginning, some of them had declined to take position of the newly built houses. To raise the basic rent majorities of those who have since moved in have opted to rent out some of the space. To date there is still standoff with some of the houses still unoccupied. Except during the period of social survey when the beneficiaries were brought in to supply the necessary information, the entire construction process was undertaken by NHC under a turnkey project. Among other factors the construction process was at fault

for it raised the costs. Also, some of the basic housing needs were not effectively looked into. There was a housing mismatch.

Keywords

Housing delivery; affordability; housing needs; sustainability; actors.

Introduction

Pumwani, aka Majengo, is Nairobi's oldest government informal settlement. The massive increase in Nairobi's population has not been matched by housing provision. The majority of Nairobi's population has settled in the informal settlements that dot the city's landscape. Residents of these settlements depended on unreliable forms of employment and earning. Informal housing only covers less than four percent of the land area. The majority of these settlements are in dilapidated conditions with some of the basic amenities such as water and toilets missing (Mutunga, 2000). By 1997, the City Council of Nairobi had recognized 49 informal settlements. Informal settlement is a basic part of Nairobi's landscape. To a great extent, past housing policies and strategies and failing

All diagrams were developed by the author unless otherwise noted

economy are to blame (Government of Kenya, 1967 & Government of Kenya, 1997). These did not address the true situation of the majority of the residents of Nairobi.

Because of its status as a capital city and the assumed opportunities, Nairobi has continued to attract rural urban immigrants. Upon their arrival in the city the immigrants' move in to settle with their kinsmen majorities who reside in the informal settlements (Mutunga, 2000). The lucky few end up in poorly paying casual employment while others will move on to self-employment that is hardly rewarding. Majorities of the immigrants trade in imported ware in the streets of the Central Business District. Since the council would not allow this, the traders are always escaping from the law enforcement officers; hence the trade is not safe. At times, one may end up losing all the ware to the officers. Lately, *Pumwani* has been the center of dispute between the government and the targeted group that was to benefit from its upgrading program.

Pumwani has been redeveloped thrice. Each time a sector has been isolated and redeveloped. The main actor has been the National Housing Corporation (NHC), a non-profit making arm of the central government. The government disburses the housing funds to the local councils through this authority. The first redevelopment was in 1968. Before this, to identify future beneficiaries, NHC undertook a social survey among the residents of *Pumwani*. The second redevelopment was in 1987 and the most recent one was in 2002.

This recent development of the housing has brought about numerous violent protests by

the targeted population. Firstly, they view the allocation exercise as being riddled with corruption. Although the NHC thinks otherwise, the beneficiaries opine that the 1968 census results have been overtaken by event. Secondly, they view the monthly repayments as being beyond their means. In a two-roomed apartment, they have been offered opportunity for subletting one of the rooms at a rental charge that is much higher than they were earning from subletting before the upgrading. Thirdly, beneficiaries opine that they were never involved in the redevelopment. Although the latest redevelopment was completed in October 2005, the beneficiaries have refused to accept the offers. A housing delivery system that the government was of the view that would assist with housing the poor has been rejected outright.

Methodology

A qualitative case study design was used for data collection. The method was used because of its ability to enable research to evaluate and also to explain housing strategies that have been applied to the settlement (Patton, 1997 & Leedy, 2002). First, a pilot study that lasted for seven days was used to confirm the guideline. During this period, key informants were identified and bridges with the community were built.

Combined methods including archival research, photography, sketching, discussions and watching people as they went about their normal life were used (Patton, 1997 & Leedy, 2002). Focused group discussions were also undertaken. Informants were selected from among long-term residents, women leaders,

youth groups' representatives, and opinion leaders.

Data collection lasted for six months (Leedy, 2002). In the weekends when the majority of the residents would be home, researchers would strive to spend the entire day in the settlement. With time, researchers were slowly accepted as part of the settlement. There were times when researchers were welcome to some of the houses and asked to share in a meal or a drink. There were social places, like the recreational hall, where researchers would meet with participants in a focused group discussion. The sessions were very lively especially as some of the participants would try to dominate the session. In the end sanity always prevailed as they joked over the whole discussion.

Data has been written in a narrative form (Leedy, 2002). Later on when reading these, underlying issues in housing system delivery were isolated. The rates of occurrences were recorded. There was the need to interpret some. Issues arising were easily followed through during the next exercise. The analyzed data, also, has been presented in a narrative form.

Pumwani's Background

Started in 1923 and located 2.5 Km from the Central Business District (CBD) *Pumwani* is the oldest informal settlement in Nairobi (fig. 1). Although it has an outlook of an informal settlement the entire place was originally planned and targeted to be a site and service scheme for the African populations which were then thinly spread around Nairobi. This is evident from the footprint of the overall plan. Land was parcelled into 1500 square feet pieces. The

settlement was planned for and provided with the necessary infrastructure and services such as roads, drainage, public baths and toilets.

Since 1968, some sectors of the settlement have since been redeveloped with high-rise housing blocks being built in the places that were previously occupied with slowly spreading individual ownership unit blocks (fig. 2).

The local government is the custodian of the entire land with the beneficiaries being in possession of temporary letters of allocation that gives them access to the land. Today, those with such letters are required to pay a nominal monthly ground rent to the council. So far, the government has confiscated about 158 parcels of land from those who have been unable to pay the ground rent.

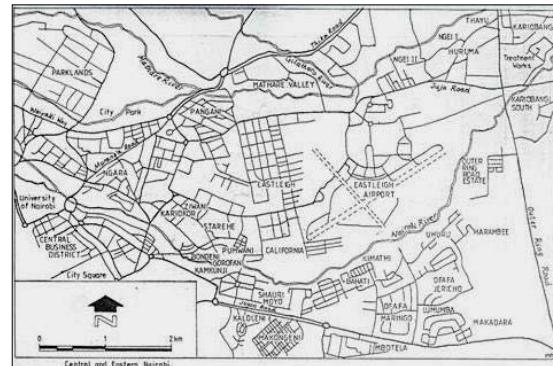


Figure 1: Location Map of *Pumwani* (sources: City council of Nairobi, Forward Planning Group).



Figure 2: New Housing on the Background against the Old Houses that are at the Forefront. (Source: C. Ochieng).

Social and Economic Factors

The majority of the residents here live in a marked level of poverty. And for the monthly rent payment, then relationship with the landlord is an important factor. This becomes useful during periods of crisis when one could have difficulty with rent payment. Lastly, people here have developed strong social relationship with one another. This helps in achieving some of the needs.

A considerable portion residents were engaged in poorly paying menial jobs with more than half the workforce earning less than one thousand Kenyan shillings a month (Ksh.1000.00 or US\$ 13.9). They could hardly afford a single meal a day. Few were in full-time employment, with the rest being engaged in casual employment and in the informal sector trading. They worked as security guards, cobblers, traders, hairdressers,

and sellers of illegal alcoholic beverages.

Here, trade in the street is a show of poverty. Here it can be witnessed products from the factory that have been dismembered and re-packed by the street traders to be sold at a cost that is affordable to the populace over here. For example, popular foodstuff that is sold in the streets are the skeletal parts of the fish that some of the traders buy at a throw away prize from the nearby fish processing industry. This is a delicacy. The flesh from this is exported by the industry to countries overseas. Dismembered factory products such as repacked solid cooking fat, tea-leaves, and soap among other things find their way into the street.

The number of people who have had to migrate from Pumwani and to move out to some of those settlements where they can still afford also explains poverty. Such settlements

are spread throughout Nairobi.

Within some of the sectors of *Pumwani*, there was a booming trade in sex and drugs. The former was carried out at the back of selected blocks where there were separate rooms that would be entered from the back and that were used for this trade. Elsewhere, drug locally known as *miraa* was traded in the open in front of selected blocks and also along the street. This is a locally grown plant whose leaves are chewed. Kenya Drug and Pharmacy Board have classified this as a harmful drug.

Those who have resided in *Pumwani* for more than half a century regard the place as "home". They reside in the same room with other family members. Slightly older siblings would move out to rent elsewhere preferably within *Pumwani*. Some have moved into the neighbouring *Eastleigh*, a settlement with traits that are similar to *Pumwani*. Some of the residents had relocated their family members to the rural home.

In *Pumwani*, for those who were renting, the landlord was seen to have a human face. When there was no money that was forthcoming a tenant would easily negotiate to pay the rent by instalments or when the monies could be available. Monthly rents ranged between seventy and one hundred sixty-five shillings a month (Ksh70-165 or US\$ 1-2.3).

More than 75 percent of the population developed different types of relationship with religion being the largest institution that had brought most people together. Kinship relationships were also dominant. Although not popular a few drew social bonds from ethnic

relations. Overall, people would easily reach out to assist those that are affected in times of need.

Although they were poorer, residents of *Pumwani* had developed ways of successfully achieving both their social and likewise economic needs. They were involved in all sorts of informal trading and employment. To fulfil their social need they relied on strong social networks.

Politics in *Pumwani* Housing

In *Pumwani* there were several power bases. While some of these draw their power from outside, there are those who drew their power from within. The latter included the village elders, locally known as *wazee wa vijiji*, and some religious leaders.

The first type of leadership was by the government. They included the local chief, a much-hated figure. This was an appointed leadership. They enforced the laws and were blamed for some of the shortcomings especially with the ongoing redevelopment.

The second type of leadership was provided by the *wazee wa vijiji* who were from the settlement and were elected by the residents. They included those who were generally viewed as opinion makers and were at the same time committed to the needs of the settlement. Included in this were some of the religion leaders, selected group of elders and some of the elderly youths. They played a role in settling disputes by acting as the intermediaries among other roles. Last leadership is provided by the local Member of Parliament and the

council representative. The government took opinions of these two leaderships seriously.

In the informal settlements, politicians and those who advocate them continue to inform reactions to way that ideas are perceived. When some of those in leadership positions are left out of decision-making processes, there is minimal success.

Pumwani Housing Delivery System

Today, Kenya has no national housing policy that could guide the development, regularization of land allocation and security of tenure in an informal settlement. This has been so in spite of the housing delivery system being the one that serves more than 75 percent of the city's population (Government of Kenya, 2003).

Both the 1968 and 1987 redevelopments of *Pumwani* were informed by the 1965/66 housing policy that addresses formal housing in which shelter was viewed in terms of health, security and privacy (Government of Kenya, 1967). This had emphasized on housing with minimum standards at the cost of all the other needs.

The 2002 housing delivery system in *Pumwani* was a turnkey one (Government of Kenya, 2003). The housing delivery system that had been employed to help in the redevelopment was not participatory. Upon its completion, each beneficiary was allocated a three bedroom apartment that had all the facilities in it. They were expected to sublet the extra bedrooms and to only occupy one. It was anticipated that the rent from this unit would be enough to provide for the housing needs. In an apartment, amenities such as toilets,

shower and kitchen were shared between the families. It was expected that they would sustain themselves from the subletting (Government of Kenya, 2003). The government expects the houses to be well maintained.

In the old *Pumwani*, houses were self-built with little help from craftsmen and the local labour force. They had been built from the savings and borrowings from friends. Resources were drawn from the cheap building materials that would easily be scavenged from the surroundings. Materials that were popular in the old housing blocks included waste metal sheets and wooden boards among other waste building materials. They built simple dwelling units that were targeted at providing basic shelter (Fig. 3a and 3b). A single housing block would have an average of eight minimal sized rooms that opened onto the double loaded corridor. The corridor provided room for communal activities while at the same time serving as a kitchen (Fig 3 a).

In the new *Pumwani* the actors did not invite participants of the future beneficiaries. They prescribe the housing needs without understanding underlying issues in an informal settlement and that at times inform some of the decision making.

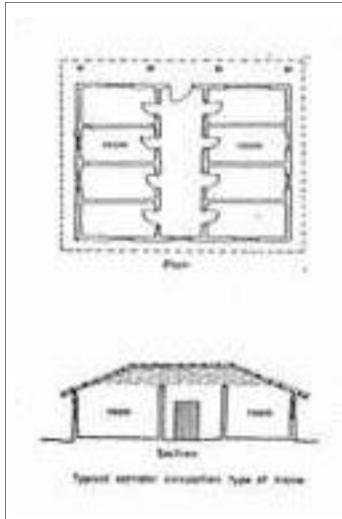


Figure 3-A: Old *Pumwani*, Typical Single Dwelling Block Plan and Section (Source: C. Ochieng).



Figure 3-A: *Pumwani*, Old block Built from Waste Metal Sheetting and Timber . (Source: C. Ochieng).

Redevelopment and Housing Affordability

Pumwani has experienced housing redevelopments both in 1967, 1987 and 2002 as the most recent. In all the three, NHC has been main actor. NHC has its own pool of consultants and a list of approved building contractors and sub-contractors. To date the beneficiaries have not been involved in any decision making except for the social survey in 1968 when this happened.

In all the redevelopments, the contractor used conventional building materials such as masonry blocks, cement and roofing sheeting materials and machine technology (Fig 4). Paid labour was sourced from outside the *Pumwani*.

All the three developments delivered multi-storied apartment blocks. An apartment had a lounge, two living spaces, and centrally located kitchen, shower room, toilet and a lobby (Fig. 5). The rooms provided an opportunity for use by different families. Except for the living rooms that were meant for an individual family use, the rest could be used jointly. The typology was supposedly informed by the social survey and the old housing typology (Fig. 5).



Figure 4: *Pumwani* Ongoing Construction Works during 2002 Redevelopment. (Source: C. Ochieng).

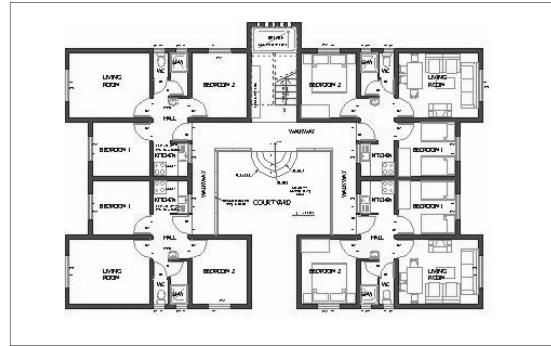


Figure 5: Ground Floor Plan (source: National Housing Corporation).

In 1987, the cost of constructing a three room apartment was two hundred and seven thousand shillings (207 000 or USA \$ 2836) and in 2002 this rose to one million one hundred shillings (1 100 000.00 or USA \$ 15 068). In 1987, the beneficiaries were asked to pay a monthly rate of three thousand shillings (3 000 or USA \$ 41.5) for ten to fifteen years after which they would own the house. In 2002 the new redevelopment repayment rate rose to six thousand (6 000 or USA \$ 83.3). Being a tenant purchase scheme there was no down payment or any other kind of charges that were required. This was expected to reduce the cost.

NHC anticipates that with the advantage that the location offers in terms of opportunities, the rent from a single dwelling unit would be in the excess of the current one for the old houses that rent an average of seventy shillings per unit (70.00-165 or, US \$1-2.2). Estimated new rents per room would be six thousand shillings (6 000 or US \$ 83.3). The settlement is within a short walking distance both from the CBD and

likewise the industrial area.

Since the 2002 redevelopment, 444 apartments have been completed. Recent reactions have taken the form of protests. Firstly, there were complaints over the monthly payment that was considered by some to be prohibitive. Secondly, the list that was being used to identify the beneficiaries had been overtaken by history. NHC was using the 1968 census list. Allocations have since been put on hold and the NHC chief executive officer sacked.

The NHC estate manager refuted the allegations about corruption. According to the NHC, it is the 1968 list that establishes who was there then. NHC has an obligation to the original residents and not to the late-arrivals. As for the increase in repayment, there was no alarming difference between the 1986 repayment figures and the 2002 as it was Kenyan currency that had lost its value against the hard currencies. Then the dollar was worth eighteen shillings to the current rate of seventy-two.

NHC opined that the protests were due to the requirement that before being allocated a house the individual is required to physically demolish the old structure so that the demolished site may be used for the future expansion. The majority of the beneficiaries were unwilling to carry this out. NHC strategy views redevelopment in terms of improving the physical housing conditions with other housing needs taking the back seat.

Reflections - Conclusion

Important parameters that should inform housing delivery system includes housing needs, affordability, housing policies, social and economic factors and politics. In the old *Pumwani* the provided infrastructure and services have since decayed due to neglect and lack of management.

The 1965/66 policy and selected housing delivery system that were relied on to inform the development in 1968 and similarly in 1987 were blind to affordability. They focused on health, security and privacy at the cost of relatively important housing needs. Unlike the previous one, the 2002 housing policy advocates for the government role to be limited to that of an enabler and for housing to be sustainable. Research raises questions on whether this latest redevelopment of *Pumwani* was sincerely informed by the same policy. Affordability has been a critical issue.

Residents of *Pumwani* are among the city's poor who can barely manage to survive on minimal resource a day. Such people prioritize housing needs with negotiation playing an important part in their survival. In the old *Pumwani* rent

payments were negotiated especially during periods of hardship. New developments required rents to be paid within a given period to the NHC. The human face of the landlord in the old settlements had been taken over by that of an institution, an anonymous face that is both callous and was not cultured to reason out.

Another important aspect of the poor is the social network. This provided security to everyone. Here, religion brought all together. Finally the majority having lived here for the better part of their life considered the settlement as their "home" and have developed sentimental attachments to it. Thus they would easily invest there. Due to many inherent factors that are bound to influence any settlement, it is necessary to adopt an inclusive approach for any redevelopment from the start.

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386 FORGOTTEN IDEAS: ARCHITECTURE AND THE ERADICATION OF POVERTY - A RETROSPECTIVE ACCOUNT

Jörg Seifert

Abstract

The decade from 1997 to 2006 which ended just a few months ago was the first United Nations Decade for the Eradication of Poverty. Within that context, the Union Internationale des Architectes (UIA) and UNESCO joined in sponsoring the international ideas competition entitled "Architecture and the Eradication of Poverty". Did this initiative represent a genuine commitment, a half-hearted initiative or a cynical intellectual mind game? The fates of the projects developed for the competition raise a number of questions.

Keywords

Architecture; poverty; competition; UIA, International Union of Architects; UNESCO.

All photographs are obtained from their original sources, courtesy of their owners, or taken directly from the competition entries booklet.

All diagrams were developed by the author unless otherwise noted

Introduction

In the announcement for the "Architecture and the Eradication of Poverty" competition, the UIA and UNESCO invited architects and architecture students from all over the world to present "ideas that will show that architecture has a social mission and that it can play a part in the betterment of the living conditions in the whole world – in developed or developing countries" (competition catalogue, 1999:10). In response, 386 participants from 55 countries, including numerous teams, developed and submitted project concepts in the form of posters in A0 format in the autumn and winter of 1997/1998 (1). Divided into separate categories for architects and students, eight submissions were selected for different awards, some of which had been established by such prominent architects as César Pelli, Mario Botta and Toyo Ito. Forty-five other projects received honorable mentions. The jury convened in Bucharest in April 1998, and the awards ceremony took place in Lausanne in conjunction with the festivities commemorating the fiftieth anniversary of the UIA in June 1998. The entries were exhibited at the UIA World Conference in Beijing in 1999 and

on other occasions as well. The initiator of the competition, then UIA Secretary General and later UIA President Vassilis Sgoutas, wrote the following words for the catalogue featuring the 53 award-winning projects in 1999: "It is clear that this competition is the first link in a chain of events that will highlight our involvement with the triptych Architecture-Shelter-Poverty" (Ib.:8). At the end of the UN Decade, it is now time to ask what has since become of the 386 project proposals (2).

Ideas Without Impact?

An enquiry with the UIA Secretariat in Paris in the autumn of 2006 brought the sobering revelation that no attempt had been made to follow the individual projects after the end of the competition, since it had been conceived as an ideas competition from the outset. In view of this attitude, one is prompted to wonder whether it was really architectural ideas that were lacking in the global war on poverty at the end of the 20th century at all. Hadn't people learned by 1997 how to build suitable accommodations for human beings or established minimum requirements for social housing?

Efforts to propagate familiar ideas that have proven worthy in other contexts can indeed be very useful. Innovative solutions may very well emerge from the process of adapting such ideas to specific situations, as local conditions always pose unique challenges of their own. Yet without a genuine commitment to realization, such initiatives can easily draw suspicion of being nothing but intellectual mind games devoid of serious intent to bring about change – and, in the specific case of the ideas

competition, expose the actual objective of the UN Decade to ridicule.

As early enquiries during the invitation phase of the competition suggested, neither the UIA nor UNESCO was interested in any form of realization of the submitted project proposals. German architect Wolfgang Tochtermann, former Director of UNESCO's Human Settlements Division and a member of the competition jury, had positive recollections after eight years – of active participation in all five UIA regions, of the thematic and regional diversity of the proposals and of the substantive quality of the entries. Thus he has expressed regret that the competition had always been regarded as a self-contained event and that no other projects had emerged from it. This option had been discussed, but was ultimately discarded due to a shortage of personnel and financial resources within the UIA. But why did UNESCO fail to play a more active role? In this regard, Tochtermann cited fundamental developments and criticized UNESCO for its failure to support the Human Settlements Program he had managed with the same intensity following his retirement. According to Tochtermann, that program, which was devoted among other things to urban and slum renewal projects, quickly lost momentum and was ultimately abandoned by UNESCO.

Would it not have been the duty of the UIA in such a situation – since it had initiated the competition in the first place – to demonstrate the earnestness of the undertaking by continuing to observe, document and support the projects in collaboration with other partners? Couldn't the UIA have sought cooperation with UN-HABITAT, an organization

with which a cooperation agreement has been in effect since 2005? Or with aid organizations like *Architecture sans Frontières*, which have developed precisely the skills and know-how required? The declared objective of the competition was “to highlight ideas for improving the built environment of the less privileged” (Ib.:10). But is it possible to pursue such a goal – based on the premise that architecture has a social mission – in a credible way at the purely abstract level of “highlighted ideas” without any thought of concrete realization? Was the goal too ambitious? Or had it been charged with an ethical component in order to draw public attention to the discipline of architecture within the context of this theme? Was the primary purpose to demonstrate that architects possess the knowledge and technical skills needed to bring about improvements in the living conditions of the socially underprivileged – and thus ultimately to lobby for public support while sensitizing architects themselves to a fundamental issue of the future?

Heightened Awareness through Public Presence or an Exaggerated View of the Role of Architects?

Regardless of what one thinks of such a strategy, an essential prerequisite for its success is surely the presence of the initiative in the public and the professional community. As it turns out, however, the international ideas competition evidently left no lasting impression within architectural circles. When asked about the competition in 2006, prominent architecture critics and journalists – who presumably would have written about it at the time – no longer recalled the event through which the UIA and

UNESCO sought to mobilize architects from all over the world (3). Even Peter Burk, Chairman of *Architects over Frontiers* (the German section of *Architecture sans Frontières*), could not remember anything about the ideas competition. He recalled that there had been dialogue and contact with UN organizations during the UN Decade, as manifested for example in participation in the dissemination of UN building standards and invitations to UN-HABITAT conferences in Barcelona and Vancouver. Yet Burk was not aware of any enquiries from the UIA or UNESCO to German aid organization or affiliated organizations in other countries.

When asked about what architects could contribute concretely to the eradication of poverty, Burk made it clear that, in his opinion, attempts by architects to offer help are never more than a drop in the bucket. After all, he contended, the world’s massive poverty problem could not be attributed to causes related to building or architecture – nor, incidentally, to medical care emergencies or drinking water shortages – but are rather the products of profound and far-reaching economic imbalances. It is there, he said, that efforts must be made and key players mobilized. Compared to such issues as microcredit, architectural projects devoted to combating poverty were largely insignificant. The architect is a service provider, an absolutely secondary fringe figure who plays no particularly important role in the legal or economic system. While there are surely good reasons for holding competitions, mobilizing architects is much less effective than addressing economists, financial experts and local authorities in the southern hemisphere – and to promote competitions

on such themes as hereditary lease models or approaches to informal settlements.

Was the ideas competition sponsored by the UIA and UNESCO merely an expression of the persistent exaggeration of the importance of the role of architects among members of the profession and thus of no consequence whatsoever? Despite justified criticism of failures and missed opportunities, such a blanket assessment would be inaccurate, and would also discredit the efforts and commitment of all those who participated. As feedback from several award-winners clearly shows, some of the submitted projects did indeed achieve local impact – not least of all because contact with social institutions and organizations was sought during the preparatory phase in these cases. The following sections offer a brief look at the fates of five of the 386 submitted proposals. The selection is based on random hits obtained through personal research, as the initiators of the competition were prohibited by privacy laws from releasing contact information on the participants. Thus, only a few of the hundred-plus award winners could be found. The majority of entries and their subsequent histories will presumably remain unknown to the public unless the UIA and UNESCO decide after all to undertake the systematic research that has been neglected until now.

Housing for the Homeless in New York, A Youth Center in Tozeur, Strategies for Hanoi

Paul Parkhill, an urban planner and current Director of Planning and Development at the Greenpoint Manufacturing and Design Center in Brooklyn, “the only not-for-profit industrial

developer in New York City”, submitted a project in collaboration with architect Nolan Zail which he describes as a “reinvention of the flophouse” and which earned an honourable mention for both in the architects’ category. Their “reinvention” consisted of very compact temporary overnight accommodations for the homeless, shelters that offered an opportunity for intimacy and retreat and represented a viable alternative to the usual group shelters.

The project was developed in close cooperation with Common Ground, a New York non-profit housing company. The idea for these individual accommodations came from Rosanne Haggerty, Director of that organization, who had long been a strong advocate of the approach. When the competition was announced, the draft proposal, including specific suggestions for realization in New York City, was already complete for the most part. Quite apart from the competition, Common Ground took steps to realize the idea, and the proposal actually culminated in a concrete project, which was still in the construction phase last year (Fig 1). Thus it is reasonable to assume that the recognition of this project, which presumably would have taken place with or without the UIA/UNESCO competition, succeeded thanks to cooperation with a local non-profit organization.

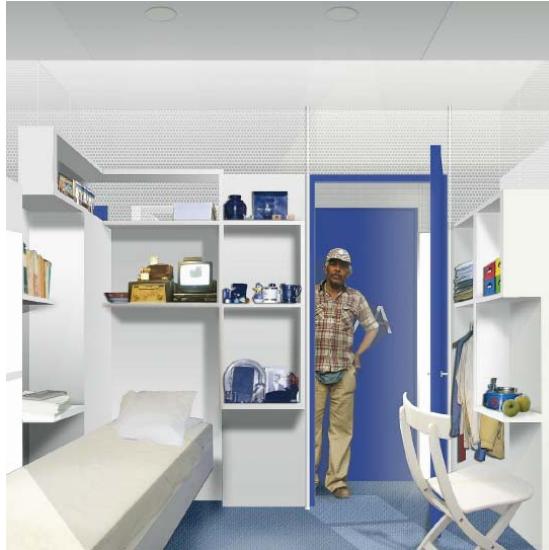


Figure 1: Realization of Paul Parkhills' and Nolan Zails' „re-invention of the flophouse“ by Common Ground, New York City (rendering).

Yet Parkhill regards such competitions as useful nonetheless. In his opinion, competitions of this kind “are very important in emphasizing to designers of all backgrounds that the most interesting, challenging and important work is not helping rich people live more extravagantly, but helping people without means to live decently”. Common Ground sponsored a design competition of its own with a similar objective in 2003. When asked whether he would have welcomed more interest in the realization phase on the part of the UIA and UNESCO, Parkhill said that he certainly thought “UNESCO has the ability and resources to push this kind of thinking further than a competition”.

Because architects receive relatively little recognition for social commitment as compared to planners and other NGOs, he would like to see more programs which involve designers in projects that have some public benefit. In his view, big architectural firms should be encouraged to assume more responsibility. Yet like Peter Burk, Paul Parkhill also points out that all of these efforts would amount to little in the absence of political and financial support for the realization of these projects.

Another competition project that was actually recognized is that of Bouslama Chamakh, a member of a student team from Tunis who received an honourable mention in UIA Region V. The group began its own initiative initially under the supervision of Professor Lotfi ben Abdelrassak, who has since died, by researching possibilities for local intervention. Chamakh chose as his project the extension of an existing youth center in a suburb of the Tunisian city of Tozeur, an area plagued by high unemployment. The student group had planned to pursue the projects to the point at which the actual construction plans were drafted.

In keeping with the action-based approach, the team sought contact with local decision-makers, to whom the finished plans were presented following several trips to Tozeur. Chamakh explains that he was fortunate to have attracted interest in his proposal and approval for recognition by the local authorities. Yet no further opportunity for collaboration – during the building phase for the youth center or as an architect on other social projects – arose in Tunisia. Even the honourable mention by the competition jury was not a sufficiently

strong reference. Bouslama Chamakh now lives and works as an artist near Bern, where he is involved among other things in projects for the blind and visually impaired.

Less successful in terms of recognition was the entry by Nguyen Xuan Anh and Pham Trung Hieu, students at Hanoi Architectural University at the time the competition was announced, who took part in the competition in a team of two and also received an honourable mention. In their large-scale approach to a theme of high complexity the two Vietnamese students proceeded from the premise that the concept of poverty comprises both a physical and a mental component. For Vietnam, a poor country with a rich cultural tradition, they regarded preservation and development of the cultural heritage as an effective strategy which could help local economic growth. On the basis of this premise, they devoted themselves

to political and urban-development strategies for an old district in the city of Hanoi comprising numerous typical, traditional “tube houses” as well as old pagodas and temples (Fig 2).

The project was discussed in the press, and a number of other renovation projects were planned for the old city of Hanoi. UNESECO also became involved in this matter outside the framework of the ideas competition. Yet by 2000 the plans had essentially been set aside for the most part. The reasons cited included the shortage of financial and structural resources: “International organizations financed a number of plans, but did not fund concrete realization programmes” (Waibel, 2000:15). Instead, the government in Hanoi has been promoting a suburbanization campaign involving the development of large-scale settlements in the so-called New Urban Areas in recent years (cf. Waibel & Schnepf-Orth, 2004).

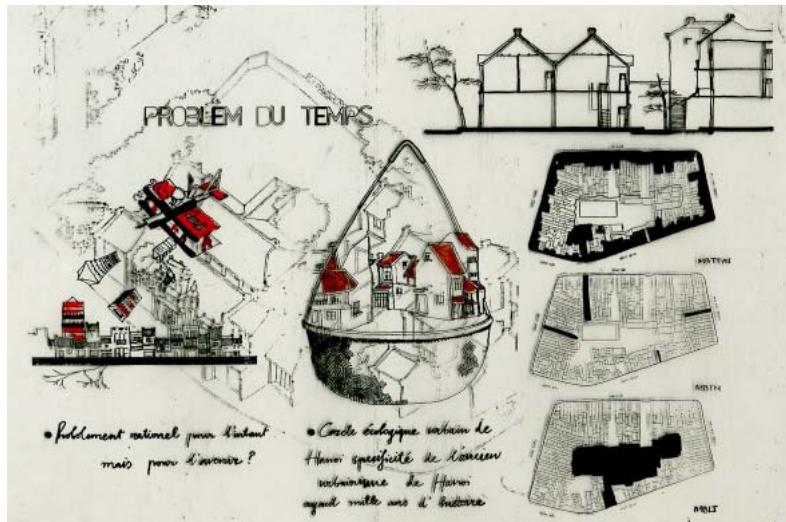


Figure 2: Pham Trung Hieu / Nguyen Xuan Anh: Political and Urban Development Strategies for a Hanoi District (competition entry details).

Low-Cost Housing in Bombay and Participative Design Processes in Egypt

The competition entry by Esther Sinnappoo and Markus Schäfer was an outgrowth of a documentary project. Sinnappoo and Schäfer were students of architecture at the RWTH Aachen at the time of the competition and now live in Bamberg. Their competition entry, for which they also received an honourable mention, was preceded by several months of research in Bombay. This study was made possible by a grant from the Carl Duisberg Gesellschaft under the ASA programme, which is concerned primarily with the cooperation of local NGOs. In collaboration with the Save

Bombay Committee and the Goethe-Institut in Bombay, Sinnappoo and Schäfer documented a specific, court-style form of settlement that originated in the 19th century – the *wadi*, in which residents enjoy a high level of spatial quality in social communities that are often still intact today (Fig 3, 4).

A type of house frequently encountered in *wadis* is the *chawl*, a residential building with exterior-corridor access and shared sanitary facilities which offer both density and privacy. The two students investigated both the architectural and social structures of ten out of about thirty existing *wadis* which exhibited highly typical features.



Figure 3: Esther Sinnappoo and Markus Schäfer: Documentation of Bombay Wadis (entrance to Bhang Wadi).

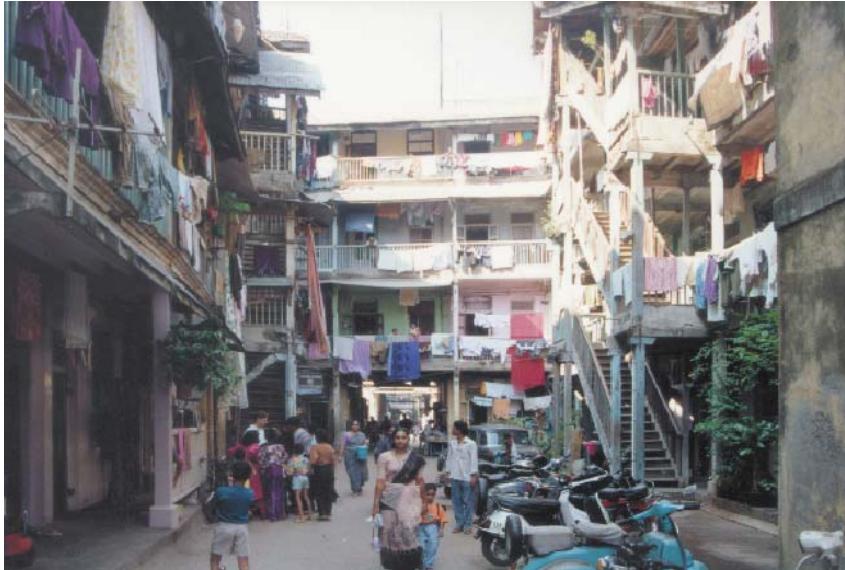


Figure 4: Esther Sinnappoo / Markus Schäfer: Documentation of Bombay Wadis (court of Amar Wadi).

Rents in Bombay are among the highest in the world. Thus one of the objectives of the competition project was to give people who could not afford a flat in the city a roof over their heads. The *wadis* and *chawls* documented in the study served as the typological model for the low-cost housing project proposed by Sinnappoo and Schäfer. They selected for their purposes a clearly underutilized area in Bombay with which they had become acquainted during an earlier research trip.

The competition project was supervised by a professor at the RWTH Aachen. The results of the students' research culminated in the brochure entitled *Wadis in Bombay*, which was co-financed by the Goethe-Institut. A presentation of these results at the Goethe-Institut attracted

considerable interest in Bombay, thus prompting the local press to take up the issue of the *wadis*. After the end of the competition, Sinnappoo and Schäfer also sent documentation on their award-winning design project to the Goethe-Institut. Yet contact with Bombay eventually broke off, and no further signs of interest in the project were forthcoming. The two architects continue to concern themselves with the theme of poverty today. They are currently involved in an effort to bring the photo exhibition "The Architecture of Homelessness" to Bamberg.

In contrast, the Egyptian architect Ashraf Salama, now a professor at Qatar University in Doha, focused on the subject of poverty at a more abstract level. He received the Paul Chemetov Prize, which included a grant of 5.000 US dollars, for his competition project. In addition to minimum income and the lack of access to water, infrastructure and recreational areas, Salama sees poverty manifested above all in the inability to play an active role in society. Proceeding from this position, he focuses on the democratization of design processes in order to offer people ways to contribute to shaping their living environment.

Because Salama was already involved in the work of various organizations and research groups devoted to structuring participative design and planning processes before the competition began, he was able to incorporate the results of a survey of some 35 people regarding their basic everyday needs along with insights gained in several different workshops into his project (Fig 5, 6). His competition entry was published in several academic research papers, and was also introduced as an important consultancy document. However, it did not progress beyond the concept phase and was never implemented. Still – and Salama is convinced of this – he was able to help heighten awareness among Egyptian architects and planners of the need to involve users more closely in design processes.

Furthermore, his successful participation in the competition provided Salama the encouragement he needed to develop and practice his principle of participative design processes. As an educator, his goal is to “teach

future architects how to adopt a facilitator role; that is, not to solve people’s problems but to create a process that enables people to solve their own problems.”

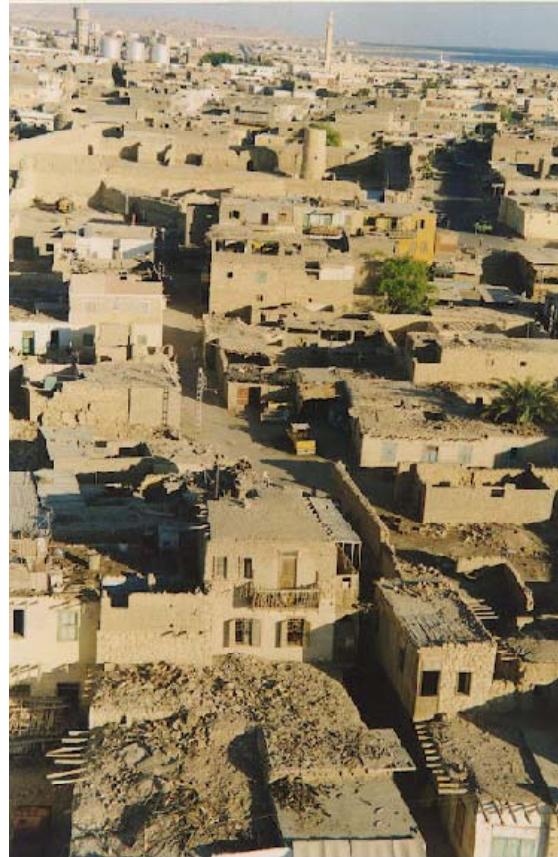


Figure 5: Overview of Quseir: Deteriorated Houses and Poor Physical Condition in the Urban Core.
(Courtesy: A. Salama).

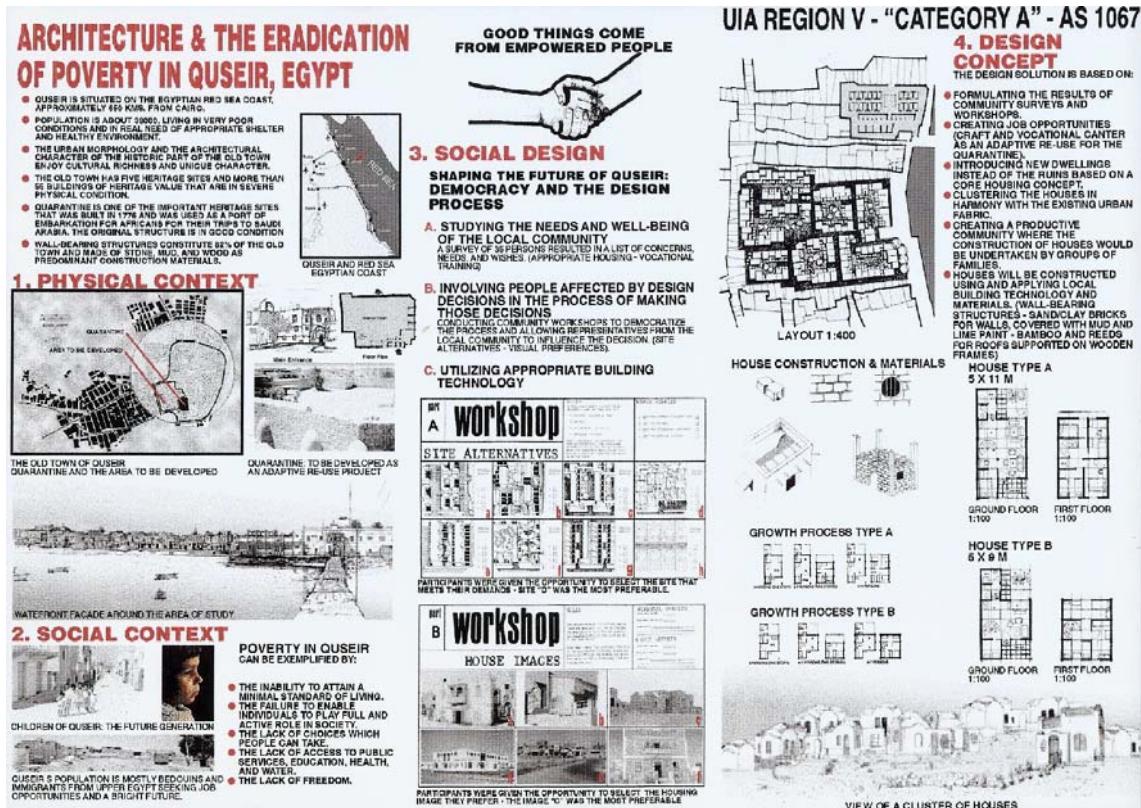


Figure 6: Democratization of Design Processes- Submission of Ashraf Salama, (competition entry details).

The Extended Grace Period

The UN Decade for the Eradication of Poverty, which prompted the competition under discussion here, has been criticized since its conclusion from several different sides. One critic even pronounced the devastating judgement that it had been a "lost decade" that fell far short of achieving its goal. This is attributable

among other things to the realization that, while the number of people living below the poverty level has declined world-wide, Sub-Saharan Africa had almost 100 million more people living on less than a dollar a day in 2001 than in 1990. "The past decade can be measured in promises broken and hopes deferred. In fact, it has been a decade of poverty ..." noted Sister Joan F. Burke, Chairperson of the

NGO Committee on Social Development, in February 2006 at the 44th Conference of the Commission for Social Development (CsocD) in New York. Characteristically, the participating governments were unable to reach an agreement on a resolution on the main theme of the conference, a review of the first UN Decade for the Eradication of Poverty. Even an attempt to achieve minimum consensus ultimately failed due to acute disagreements between the developing countries of the G77 Group and the United States, and the resolution was simply postponed (4).

The declared goal of international commemorative days, years or decades proclaimed by the UN is "to attract world-wide attention to problems" and to set specific points and periods of time for the purpose of "assessing past achievements, reviewing the facts and examining convictions and resolutions with respect to future action" (5). Thus they should serve as a means of taking stock of progress in efforts to combat global problems and assessing the fundamental goals of the global community as well as the instruments employed for these and other conceivable purposes. Such a stock-taking took place during the UN Decade for the Eradication of Poverty. "At the turn of the millennium, the United Nations presented an alarming summation: At that point in time, more than one billion people were living in extreme poverty. In other words, every fifth person in the world is forced to live on less than one dollar a day" (6). On the basis of this summary assessment, the UN member states reached agreement on the eight so-called "Millennium Development Goals" as well as a timetable for recognition by 2015 at the Millennium Summit in New York in September 2000.

It is uncertain whether these goals will be achieved by the year 2015. In his report delivered on March 21, 2005, Kofi Annan, UN Secretary General until 2006, noted in a critical vein that "The promise of the Millennium Development Goals still remains distant for many", because "too few Governments – from both the developed and developing world – have taken sufficient action to reach the targets by 2015" (Annan, 2005). Yet the year 2015 represents a new time horizon – an extension of the grace period within which national politicians may hastily complete the homework they failed to do during the first UN Decade. One might also hope that the UIA and UNESCO will use that time to take another look at the ideas and projects that have emerged from their competition and pursue, observe, document and support them wherever possible and useful. The initiators have nearly eight years to demonstrate that their interests deserve to be taken seriously – and to quell the suspicion that they had merely engaged in a cynical, intellectual, totally inconsequential mind game in 1997/1998.

Notes

(1) In collaboration with Tove Wallsten of Sweden, author Jörg Seifert also submitted an entry to the Architecture and the Eradication of Poverty competition in 1998, for which they received an honourable mention. This can be considered as one motivation for this article which was originally published in German in *archithese* 2/2007, pp. 12–17. (English translation: John Southard).

(2) Distribution of entries by category and UIA Region: Region I (Western Europe): 102 entries in the students' category / 81 entries in the architects' category; Region II (Eastern Europe and Middle East):

58/28; Region III (America): 19/21; Region IV (Asia and Australia): 45/19; Region V (Africa): 10/3 (cf. competition catalogue, 1999:10).

(3) Most of the respondents selected on a random basis were culture-section journalists writing for major daily newspapers and editors of architecture journals.

(4) for data and quotes in this section: <http://www.un.org/esa/socdev/csd/csocd2006/PressReleases/Development-TheLostDecade.pdf>

(5) <http://www.dgvn.de/veranstaltungen/dgvnun-dekaden.htm>

(6) <http://www.wusgermany.de/index.php?id=969>

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NAVIGATING HOUSING AFFORDABILITY BETWEEN TRANS-DISCIPLINARITY AND LIFE STYLE THEORIES THE CASE OF THE GULF STATES

Ashraf M. Salama

Abstract

The typical approach of affordable housing research and practice views cost reduction as one single determinant. Other crucial factors such as lifestyles of the targeted populations, people satisfaction of their current houses and residential environments, and their aspirations and preferences in future houses are always oversimplified or superficially addressed. Therefore, the objective of this paper is to argue for a comprehensive approach for affordable housing practices in the Gulf States. The approach is based on a new paradigm of research: trans-disciplinarity; a form of inquiry that crosses the boundaries of different disciplines. Brief notes to highlight affordable housing issues in the Gulf States are outlined.

An argument on the impact of trans-disciplinary thinking on understanding affordable housing is developed, then is placed within the perspective of how lifestyle theories and their underlying concepts including place attachment, appropriation, visual preferences, and people satisfaction, can be integrated into a comprehensive investigatory process. In turn, a framework of inquiry is developed while reflected on affordable housing knowledge types. A translation of the framework into a survey tool is conceptualized. The tool is introduced in the form of a questionnaire to be implemented in the context of the Gulf States. The testing of the questionnaire --in the context of the city of Jeddah--

- as a tool of inquiry reveals its validity, corroborates the value of integrating different knowledge types into affordable housing practices, and accentuates the value of incorporating lifestyle theories as a new form of transdisciplinary knowledge necessary for affordable housing research and practice.

Keywords

Lifestyle theories, trans-disciplinarity; Gulf States, affordable housing

Introduction

Rapid growth of urbanization worldwide and especially in the Gulf States is continuously putting pressures on urban economy, facilities, infrastructure, and the social and the physical environment. Typically, housing provision lags behind the rapid growth of urban population. If houses are available for renting or buying, they are generally beyond the affordability of a considerable segment of society in those states, especially in rapidly growing urban centers such as Jeddah, Riyadh, Doha, Dubai, Abu-Dhabi, Dammam greater area, and many others. The rate of urbanization

All diagrams were developed by the author unless otherwise noted



in these cities would call one to argue that they are representing regional metropolis at varying degrees where the recent impact of globalization is unprecedented. Urbanization and globalization are interdependent and mutually influencing the reshaping of urban morphology and activities in these emerging urban metropolis. The impact of globalization has typically reduced the role of governments in the provision of housing, facilities, and infrastructure.

The discovery and commercial exploitation of oil and natural gas in the Gulf States, especially in Saudi Arabia, Kuwait, and Qatar, has been a catalyst for unprecedented urbanization and population growth. Large scale urban development projects such as land reclamation, road and infrastructure expansions, and public housing have been sponsored and financed by both governments and the private sector. The transformation of the built environment in the Gulf States and especially in housing environments can be seen as a material testimony to a new socio-cultural condition of regional metropolis or urban centers in a global world.

The rising demands on affordable housing in the Gulf States and the increasing interest of developers to invest in affordable housing projects mandates a clearer understanding and appreciation of the lifestyles and cultural values of the local societies in those states. Dealing with affordable housing as products or commodities only results in less than appealing and depressing environments that do not meet basic needs or satisfy the preferences of potential users.

The idea of this paper is culled from a number of issues I have explored over the past few years (Salama 2005, 2006 a & b). However, the basic premise here is that affordable housing has not been addressed in a comprehensive manner; it has been approached from a professional milieu as well as from an academic perspective. At the two levels, it has been an issue of debate where numerous conferences, publications, and consultancy reports have addressed different aspects of affordable housing. Investigating the literature that has been developed over the past two decades reveals critical arguments on the way in which such an important subject has been approached in practice, or debated in academe over the years.

Discussions and methodological research on housing and affordable housing included took place through six approaches (Lawrence, 1997): aesthetic or formal interpretation, the typological approach; evolutionary theories and physical explanations such as building technology and climatic aspects; social explanations such as defense theory and household structure; socio-cultural factors; and religious practices. In the Arab world including Gulf States, debates around housing of all types seem to have drifted into two domains that seldom meet (Serageldin, 1990): A) technical discussions about the problems of mass housing including land acquisition, services, credit, finance, and urban planning, or B) stylistic discussions of the cultural authenticity of housing production. However, issues are always addressed in isolation and many factors, critical to the success of affordable housing projects and essential for developing knowledge about existing projects, are oversimplified, superficially addressed, or ignored. Therefore,

a new innovative and alternative approach is obviously needed; an approach that has the capacity to address multiple issues at a time while reflecting the thinking spirit of the present era that is based on trans-disciplinarity; the integration of different types of knowledge and ultimately crossing the boundaries of different disciplines.

Brief Notes on Housing in the Gulf States

The stated objective of housing policies in most Gulf States is to ensure that all segments of societies, particularly the lower income population, have greater access to adequate and affordable housing and related support facilities. However, reality is different as the objective goes beyond credits, finance, monthly installments, or giving greater access to an affordable house where the main concerns should be the quality of life and the socio-economic impact of housing developments. A number of concerns can be conceived in this respect. One concern is the gap between supply and demand. In most Gulf States as in other parts of the world housing supply normally reacts to housing needs/demands. However, housing development involves a long process of planning, designing, and construction; it is usually difficult for the supply to meet the demand. In essence, housing units that are completed for occupation today are actually based on the demand of two or three years ago. The demand conditions change by the time units are available in the market for renting or buying. Generally, the result is either oversupply or under supply. While the supply-demand issue remains important, the most important concern is the nature of societies in the Gulf States and their housing spatial needs

and cultural aspirations.

Taking the Kingdom of Saudi Arabia as an example a number of issues can be raised. Since most construction cost is significantly related to dwelling size and finishing, it is critical to understand the peculiarity of affordable housing needs within the Saudi context (Salama, 2005). The Saudi dwelling size goes beyond the international standard which equals the size of three affordable housing units in Egypt and five in India (Nabeel, 2004). For example, a typical Saudi family of 7 persons needs six bathrooms due to privacy needs and social norms, exceeding the standards of contemporary housing in the US. As well, the Saudi society in generic terms is selective of higher quality of housing finishes and fixtures due to cultural and social aspirations (Figure 1) and some times the pressures encountered from peers, colleagues, and the larger family (Proceedings of the Second Housing Symposium on Affordable Houses in Saudi Arabia, 2004).

In Saudi Arabia, there has been a declining income from oil production that continued during the nineties, which has led to a reduction in government revenues. As well, the influx of rural and desert population into urban areas has exacerbated the problem of providing affordable housing to the populace. However, the recent boom in oil prices, which started in parallel to the second Gulf war and the flourishing economy led to a surge in the construction of housing environments where many projects are currently undertaken by government agencies and through many private sector initiatives. In this context, the Saudi environmental and socio-cultural contexts demand that affordable housing

should not aim at merely providing shelters to lower income populations, it should also offer design solutions that are sensitive to the local context. Issues such as privacy, social cohesion, and perceptions on residential density, preferences, and the lifestyles of the target populations should be considered in providing desirable, affordable, and sustainable housing (Salama, 2005, 2006 a & b).

The state of Qatar is another example that corroborates a dramatically different condition than that of Arabia. Sharon Nagy

has conducted intensive investigations on housing and urbanization in Qatar. Based on her studies, a number of issues are revealed (Nagy, 2004). The economic circumstances in the country have created a situation in which it is economically viable for Qataris to construct new homes or renovate old ones (Nagy, 2004). The first official housing policy in Qatar was constituted in the mid 1960s providing for the distribution of homes to the disabled, elderly, unemployed, and those who were asked by the government to relocate in order to accommodate urban development plans.



Figure 1: Examples of Proposals of Affordable Houses Developed by Architects for Real Estate Companies in the Kingdom of Saudi Arabia - Courtesy of Al Oula Real Estate Company, Al Khobar, Saudi Arabia

The policy established a system to provide free houses to those citizens as an incentive to relocate. However, in the mid 1980s the housing policy was expanded to avoid the exclusion of the growing numbers of the educated and employed Qataris. Such a policy still exists where all Qataris are eligible to receive free houses.

Typically, recipients of housing grants may either select the design of the house from a manual of pre-approved models or find

an independent designer of an architectural office. Most Qataris use the grant to build two story villa style homes with a small service annex on the periphery of the property. In some cases another annex is added as for male guests. These houses are dramatically different from the one story houses that were built around courtyards. It can be argued that significant changes in the house form, style, and the overall physical appearance through the new housing policies (Figure 2). The question in this context is: have these changes influenced the



A. A Renovated One Story House Built in the 1960s, Doha, Qatar (Source: A. Salama)



B. A Two Story Affordable House in Doha Based on the Housing Policy of the 1980s. (Source: S. Nagy)



C. New Housing Developments in Strategic Locations within Doha (Source: A. Salama)

Figure 2: Housing Developments in the State of Qatar

family structure or the way in which the house is used. A simple answer is that most houses are designed in a manner by which residents can adjust the dwelling form and the overall spatial organization to accommodate changes in the household structure resulting from life cycle changes and also economic circumstances.

According to Nagy (2004), given the variable and dynamic family organization in Qatar, the social boundaries of the family do not necessarily reflect or correlate to the physical boundaries of the house. This is exemplified by the fact that during a family's development cycle, new family members are added to the existing house while others leave to form their own house, or join another existing house. For example, a married son who has established his own house with his spouse and their children leave the family's house. However, in some cases sons maintain residence in more than one house and frequently shift residences between their natal and marital homes. Also, men with more than one wife may maintain separate houses for each wife.

The preceding examples from Saudi Arabia and Qatar are in fact applicable to other Gulf States with varying degrees. Therefore, now the question that can be raised in this context goes like this: Should cost still be seen as the most important determinant when discussing or investigating or designing affordable housing. A simple answer once again tells us that social and cultural norms, family structure, and the lifestyles of those who will occupy future houses or renovated existing ones are more critical in the context of affordable housing in Arabian Gulf States.

Affordable Housing Research and Practice: Missing Conceptions and Misconceptions.

The issue of affordability has been treated and approached differently while contextual societal and cultural issues remain a continuous challenge. Although a considerable knowledge of components and elements on how to plan, design, and construct successful housing projects is available gaps between targets and achievements still exist due to the mismatch between economic and cost issues on one hand, and social needs and cultural aspirations on the other.

Despite the current surge in the construction of housing environments in the Gulf States, the quest for affordable housing remains elusive for a large segment of societies in those states. Descent, affordable housing is emerging as a critical issue toward the social and economic well being of the individual countries and the Gulf region as a whole. Demands for such housing continue to far outstrip supply and those projects that are currently built suffer from severe cost constraints, while lacking important qualities that relate to people needs, societal norms, and lifestyles.

To many architects, engineers, and developers, the terms "affordable housing", "design", and "the preferences and lifestyles of the targeted populations" are exclusive and are looked at in isolation. Once the goal of providing quality design and once the goal of understanding people preferences and their lifestyles enter the discussion, it is generally assumed that the cost will automatically increase. When production techniques are developed to provide genuinely affordable housing, effort is often focused on

cost reduction only while preferences and lifestyle aspects are overlooked. Theorists like Alexander and Burnham argue that it has proven difficult to strike a harmonious balance.

While recently there have been notable developments in housing design that demonstrate our increased understanding of social issues and construction techniques, cost efficiency is perceived as contradictory to the overall design quality and the lifestyles of potential users. There have been many explanations given. Most often it is first blamed on a lack of funding. However, another underlying reason may stem from the public perception of what affordable housing should look like. Some well-designed projects make people uncomfortable because they are 'too nice'. "...The underlying belief is that people who do not have a lot of money do not deserve to live in nice housing" (Maurer, 1994). This notion is a flaw since it is believed that quality design and meeting the preferences of users are critical to instill a sense of pride in potential occupants. "It must also bestow on its inhabitants a sense of dignity...To ignore this aspect of housing or to consider it a prerequisite for only those who can afford market-rate housing, is to invite both social and financial disaster" (Davis, 1995).

People need to have a personal psychological investment in their houses and are well aware when asked to live in impersonal housing. Unattractive housing directly affects the self-respect of the occupants. All people want to see themselves reflected, to express themselves on paper or canvass and in speech, dance, and their choice of car, clothing or built environment (Alexander et al. 1977, Altman,

1980). If people are consistently told, through the kinds of housing offered, that they are only worthy of a certain level of quality, they may come to believe it. Understanding preferences and the lifestyles of people gives architects and planners the chance to create a sense of individual expression and thereby a pride at an affordable cost (Burnham, 1998).

The preceding discussion conveys that there are misconceptions in the conventional approach where affordable housing worldwide in general and in the Gulf States in particular is always understood from the perspective of cost reduction only as one single determinant, while other critical determinants such as the lifestyles of the targeted populations, their satisfaction of their current houses, and their preferences of the future houses need to be addressed. Even when these issues are addressed they are introduced in a superficially articulated manner that does not do justice to the local population. This, in essence, requires an alternative approach that integrates these concerns in a comprehensive manner, especially in light of the peculiarities of social norms and practices in the Gulf region.

A Responsive Argument: Producing Trans-Disciplinary Knowledge

Theorists and practitioners have been discussing the issue of architectural knowledge for several decades. Recent years, however, have witnessed an intensive debate in built environment literature. Donald Watson attempted to define a demand for knowledge in architecture and built environment. He argues that: «*The discipline of architecture*

needs a rigorous knowledge base by which to support its premises and principles that define the relationship between human and community health, and between building and urban design," (Quote from Boyer and Mitgang, 1996). Henry Sanoff confirms this view when he argues that architecture should be based on knowledge of people needs; it should not be based just on the creative impulses of architects (Sanoff, 2003).

To date, the development of rigorous theory/knowledge building has been at the edge of the profession and frequently marginalized as something separate from the profession of architecture, that is: environment-behavior studies, building sciences, environment-technology studies, etc. As a result, most practitioners are not well equipped or even interested to understand the value of their professional services. Concomitantly, the standing of the profession is marginalized in the eyes of the public. That is, without research, scholarship and a rigorous knowledge base, the profession cannot take stands on significant health, economic, social, political or ethical issues.

Watson argues for the need for a rigorous knowledge base in architecture. He believes that this knowledge could strengthen architects potential to understand the object proper of their professional expertise and its value in relation to other fields of expertise (Woyseth, 2002). Along the same line of Watson's thinking Amos Rapoport (1994) argues for the need for the discipline of architecture to develop a quantifiable body of knowledge based on qualitative measures by calling for a dramatic departure from the art metaphor that the

profession and its education are based upon to one based on science and research. Rapoport introduced a number of questions underlying the heading of "knowledge about better environments"; these are: what is better, better for whom and why it is better? (Rapoport, 1994, 1995).

Recently, John Habraken introduced an argument similar to those of Watson, Rapoport, and Sanoff, but with a focus on the education of future professionals. Habraken argues, and rightly so, that *«We need to teach knowledge about everyday environment. How it is structured, what we can learn from historic and contemporary evidence, how different examples compare, how it behaves over time and responds to change of inhabitation or other circumstances... Teaching architecture without teaching how everyday environment works is like teaching medical students the art of healing without telling them how the human body functions. You would not trust a medical doctor who does not know the human body. Knowledge of everyday environment must legitimize our profession...»* (Habraken, 2003: 33).

In essence, the preceding eloquent arguments call for a more stable basis for knowledge in architecture and in the creation of built environments and affordable housing is no exception. Such basis would be in the form of a more balanced and integrated types of knowledge. Therefore, an elaboration upon these arguments in the context of recent discussions on different modes of knowledge production and on different types of knowledge in architecture and the built environment is needed.

Modes of Knowledge Production

Planning and architecture, like other fields of vocational expertise, can be classified as professional disciplines, especially when we regard them as fields of inquiry (Becher, 1989). Ulf Sandström has followed the development in profession-related studies since he identified two trends in research and knowledge production in the field of professional expertise: one which is oriented towards the production of mono-disciplinary academic knowledge, and the other which is directed towards subjects derived from concrete life situations, these being solution-oriented (Woyseth, 2002).

King and Burnell offer a broad and convincing representation of what constitutes an academic discipline. They propose several aspects that include a community, a network of communications, a tradition, a particular set of values and beliefs, a domain, a mode of inquiry and a conceptual structure ^[13]. Another definition, by Toulmin, focuses more on epistemological considerations, presenting disciplines like this *"...each is characterized by its own body of concepts, methods and fundamental aims"* (Becher, 1989). In his important work on trans-disciplinarity, Gibbons describes two parallel and competitive modes of knowledge production (Gibbons et al., 1996). He described them as outlined in Table (1).

| Modes of Knowledge Production | Descriptive Definition |
|--|--|
| Mode 1 Mono-Disciplinary Multi-Disciplinary | The complex of ideas, methods, values and norms that has grown up to control the diffusion of the Newtonian model of science to more and more fields of inquiry and ensure its compliance with what is considered sound scientific practice. |
| Mode 2 Trans-Disciplinary | Knowledge production carried out in the context of application and marked by its: trans-disciplinarity; heterogeneity; social accountability and reflexivity; and quality control, which emphasize context – and use-dependence. It results from the parallel expansion of knowledge producers and users in society. |

Table 1: Definition of Modes of Knowledge Production

The definition of Mode 2 introduces the notion of trans-disciplinarity that can be described like this: Trans-disciplinarity is a new form of learning and problem solving involving co-operation among different parts of society and academia in order to meet complex challenges of society. Trans-disciplinary research starts from tangible,

real-world problems. Solutions are devised in collaboration with multiple stakeholders. Thus, trans-disciplinarity is about transgressing boundaries of disciplines.

As a practice-oriented approach, trans-disciplinarity is not confined to a closed circle

of scientific experts, professional journals and academic departments where knowledge is produced. Through mutual learning, the knowledge of all participants is enhanced, including local knowledge, scientific knowledge and the knowledge of concerned industries, businesses, and non-governmental organizations. The sum of this knowledge will be greater than the knowledge of any single partner. In the process, the bias of each perspective will also be minimized (Kelin 1999, Kelin et al., 1999).

The trans-disciplinary type of knowledge is partly based on epistemological research. While mono-disciplinary and multi / inter-disciplinary research is clearly encompassed by Mode 1, trans-disciplinary knowledge production is the very essence of Mode 2. Gibbons maintains that Mode 1 has its role mostly for providing a stable basic educational training and for instilling in individuals a sense of disciplinary identity. On the other hand, he argues that there is a demand for the aptitude to co-operate with experts from other fields and for the ability to see problems in a complementary manner. Such faculties rest upon the capacity to assume multiple cognitive and social identities. Thus, both modes of knowledge production are in demand and should find a mutual balance (Sommerville and Rapoport, 2002).

The Impact of Trans-Disciplinary Knowledge on Understanding Affordable Housing Within the Context of the Gulf States

The preceding discussion on trans-disciplinarity as a thinking paradigm reveals that "trans"

in the term is about transition and movement where the rigor of research and knowledge production is matched by the concerns for establishing connections and inter-relationships. This means that there is a "middle zone" of exchange between disciplines. It also means shifting the grounds of research in both the sciences and the arts from a concentration on disciplinary needs and history of things/issues, to an emphasis on how needs of one discipline are connected to knowledge goals and aspirations of other disciplines. In other words, it can be argued that no discipline can make strong claims anymore about its own direction, value, and output in isolation from what is happening in other areas of research.

Looking at the latest literature on sustainable affordable housing as a field of research, one could trace its trans-disciplinary nature (Beer, 2004; Buki, 2002; Chatfield et al., 2000; Hall and Pfeiffer, 2000; Munoz, 2003; and Vittori, 2002). It involves research paradigms that range from policy making, economics and financial concerns, to environmental and cultural aspects, to planning, design, management, and operations. This is due to the fact that the provision of sustainable affordable housing is always constrained by the need to consider social, environmental, and economic implications.

Affordable housing can be viewed as a web of influences and inter-relationships of a wide spectrum of issues and this reflects the trans-disciplinary nature of sustainable affordable housing investigation or development. For example, it is acknowledged in the literature that the morphology of residential production influences the development of cities and

concomitantly generates environmental impacts and infrastructure stress. It is also acknowledged that the typology of houses influence the social and environmental performance of neighborhoods. These inter-relationships mandate a comprehensive understanding of sustainable affordable housing where the creation of trans-disciplinary tools of inquiry would be indispensable.

Within the preceding context it should be noted that while research studies on affordable housing highlight the multifaceted nature of the process of investigating or creating affordable housing projects, little emphasis was placed upon addressing the socio-cultural, economic aspects in an integrated manner and the way in which they influence one another as different disciplinary issues. This is clearly evident where one could see studies that place emphasis on policy and economic issues without looking at the impact on other critical concerns such cultural and environmental aspects. On the other hand, the author notice other types of studies that place emphasis on the physical characteristics of dwellings or neighborhoods, again, without clear indicators of how physical aspects can be linked to socio-cultural concerns (Salama, 2005).

While social and cultural issues are introduced in the literature as successful determining factors, very little is offered on how to introduce such issues either when investigating sustainable affordable housing in a research process, or when attempts are envisioned to develop sustainable affordable housing projects in a developmental process. The fact that affordable housing is always defined in economic terms or by the relationship between

household's income and expenditures does not mean that other issues, such as socio-cultural concerns including people preferences, lifestyles, and cultural aspirations are oversimplified or addressed in isolation. This suggests that creating affordable housing projects and that producing knowledge about affordable housing requires a new paradigm of thinking, which is based on trans-disciplinarity that crosses the boundaries between wide spectrums of issues that stem from different disciplines. In this context, the author assert that the typical approach for investigating affordable housing adopts the perspective of cost reduction only as one single determinant, while other critical determinants such as the lifestyles of the targeted populations, their satisfaction of their current houses, and their preferences of the future houses are typically absent from the inquiry process. Therefore, emphasis is placed upon integrating economic, cultural, social, and behavioral aspects in addition to other contextual measures within which sustainable affordable projects are created.

Life Style Theories Incorporated

Since the intention of this paper is to develop a new approach for investigating affordable housing in the Gulf States, it is essential to redefine the nature, direction, and orientation of knowledge about affordable housing to be more relevant to the socio-economic and cultural contexts of Arabia. It is therefore proposed that adopting a trans-disciplinary thinking requires that trans-disciplinarity is viewed as a realm of research that differs from other forms of inquiry. Concomitantly,

investigating affordable housing in a transitory fashion that crosses the boundaries between different disciplines is paramount. It is also envisioned that the unique characteristics that the kingdom enjoys in terms of economic, social, and cultural particularities necessitates a comprehensive mechanism that addresses the misconceptions, which characterize other conventional approaches of inquiry that rely heavily on knowledge types emerging from one single discipline. Thus, a number of perspectives are incorporated in a proposed alternative approach, derived from different disciplines while at the same time crosses the boundaries between them. Such an approach is based on introducing lifestyle theories.

The proposed approach involves the introduction of lifestyle theories into other concerns including financial, cost reduction, and affordability issues. Understanding how the issue of affordability may relate to people preferences and lifestyles mandates an understanding of lifestyle theories that emerged from other disciplines and branches of science such as ethnology, anthropology, and sociology. Ethnology is defined as *“the science that analyzes and compares human cultures, as in social structure, language, religion, and technology”*, while anthropology is defined as *«the scientific study of the origin, the behavior, and the physical, social, and cultural development of humans»* (AHD, 1994). It should be noted in this context that ethnology is also defined as a branch of anthropology that addresses cultural issues thereby is often referred to in the literature as *«cultural anthropology.»* On the other hand, sociology is defined as *«The study of human social*

behavior, especially the study of the origins, organization, institutions, and development of human society.» (AHD, 1994). Sociology involves the analysis of a social institution or a societal segment as a self-contained entity or in relation to society as a whole.

Literature on lifestyle and social issues as they relate to geography and place reveals important perspectives (Adler et al., 1987; Giddens, 1984; Pred, 1984). Giddens in 1984 introduced the theory of structuration in his book *«The Constitution of Society: Outline of the Theory of Structuration.»* His theory is based on establishing a dynamic perspective of how different elements of a society interact. Such a work is based on a critical understanding of people, organizations, agencies, and the power that each element of a society would have (Giddens, 1984). The introduction of the theory of structuration generated an intensive debate on linking issues that pertain to the relationship between the structure of society and the physical environment, namely the concept of place. Allan Pred in his article titled: *«Place as Historically Contingent Process: Structuration and the Time-Geography of Becoming Places»* introduced a framework that is based on an integration of time-geography (place) and the theory of structuration. He conceptualized place as a human product as well as a set of features visible on the landscape. In essence, what should concern researchers in this regard is the term *«human product»* (Pred, 1984).

The views introduced by Giddens and Pred on the one hand, foster a deeper insight into affordable housing. For example, the assemblage of buildings in a housing

environment, land use patterns, and arteries of communication that constitute that environment as a place cannot emerge fully or formed out of nothingness, stop or grow rigid, or indelibly etched in the once-natural landscape; they represent a human product. In other words, such an environment is seen as a place that involves an appropriation and transformation of space and nature; processes that are inseparable from the reproduction and transformation of society. On the other hand, such views invigorate an understanding that the social aspects of everyday life can be seen as rich realm that offers valuable theoretical, epistemological, and substantive contribution to how affordable housing environments can be investigated. Three major theories appear to have influenced recent conceptions about lifestyles and human preferences. These are of the Danish ethnologist: Thomas Hojrup; the British anthropologist: Mary Douglas; and the French sociologist: Pierre Bourdieu.

Thomas Hojrup introduced the concept of life-mode in his book «*State, Culture, and Life-Modes: Foundations of Life Mode Analysis* (2003)”. He argues that our values are constrained by cultural-relational dialectics and are product of cultural life modes (Hojrup, 2003). He attempted to address the problem that different cultural values conflict when they are brought together. The three life modes he introduced are: self-employed life mode, wage earner life mode, and career oriented life mode.

The preceding classification shows that based on income level, work sector, and work style of an individual, house needs and preferences vary dramatically. Putting these three life

modes into a house/home, or affordable housing perspective, one could relate them as follows:

The first mode is *self-employed* where means of production are owned and included within the house. Therefore, the house acts as both living and working place, and no separation between working time and space time.

The second mode is *wage-earner* where the house is either regarded as a primary place serving recreational purposes, or as a place where important spare-time activities are undertaken.

The third mode is *career oriented* where ideally the house reflects the personal progress in order to reflect position, social status, and past and recent experiences.

In 1996, Mary Douglas introduced a similar life style theory. Four different sub-cultures stem from this theory; these are: competition and individualism; isolation and avoidance of social controls; equity and negotiation; and hierarchical communities (Douglas, 1996). These sub-cultures relate directly to how affordable housing environments could be understood and investigated. Housing typology in terms of house size, house integration within the neighborhood and the community, and the overall house image are important elements when reflecting this theory on affordable housing.

Pierre Bourdieu's theory corresponds with Douglas's theory since he introduced in 1984 three key concepts for understanding the concept of lifestyle; these are: habitus, position, and distinction (Bourdieu, 1984). Habitus

refers to past experiences and embedded preferences as well as socio-behavioral practices. Position means what agents have in terms of different kinds of capital and he means by agents people and institutions. Distinction involves being distinguished and being an individual. This understanding can

be linked to affordable housing investigation, especially when developing mechanisms of inquiry about what housing environment people have experienced and what housing environment people would like to live-in in the future; inquiry about issues that reflect people past experiences and social practices and preferences of the future.

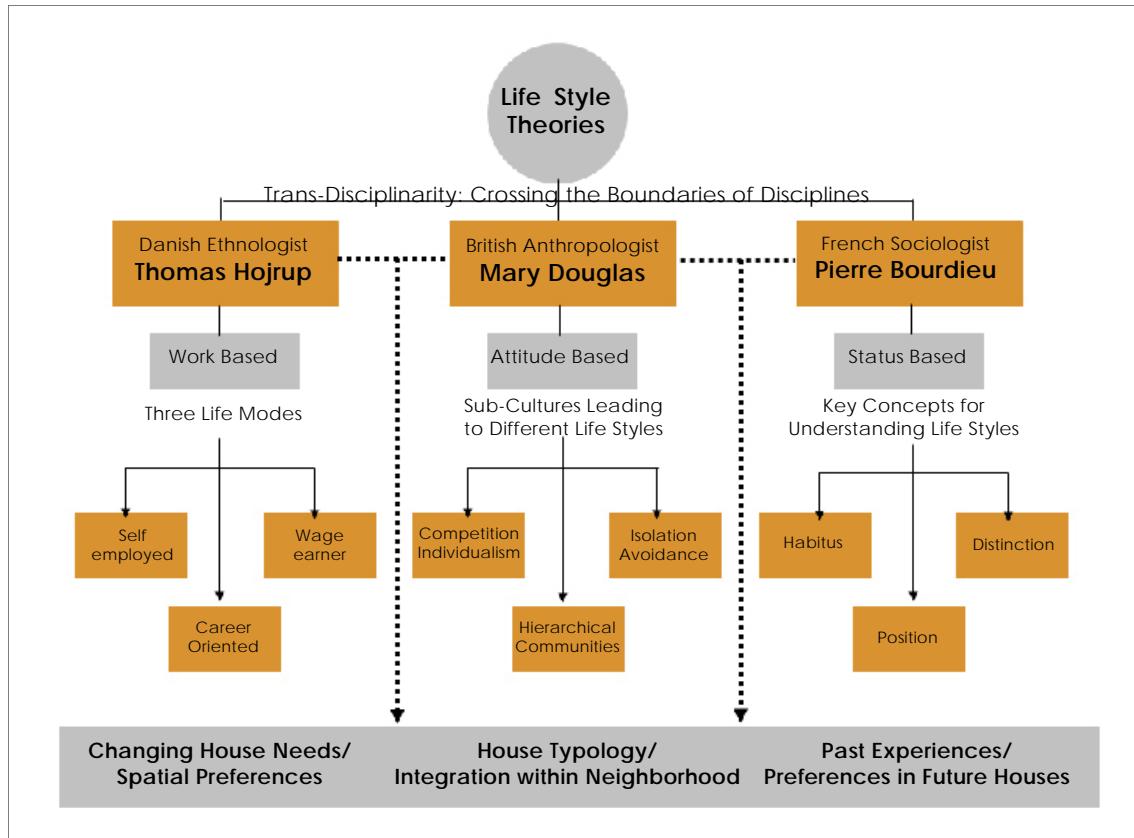


Figure 3: Incorporating Trans-disciplinary Thinking and Life Style Theories into a Comprehensive Investigatory Process of Affordable Housing

It is apparent that the three theories are based on different set of interests under different lifestyles aspects. Therefore, Hojrup's theory can be labeled as a work-based theory, Douglas's theory can be labeled as attitude based theory, while Bourdieu's theory can be labeled as status based theory. All are conceived to dramatically influence the understanding of affordable housing in physical and social terms. Thus, they should be included in any inquiry aimed at knowledge production about affordable housing. Such understanding is illustrated in Figure (3).

Introducing lifestyle theories can be viewed as an enabling mechanism for a deeper investigation of affordable housing in the context of the Gulf Region. However, two additional concepts appear to be crucial when establishing a comprehensive investigatory process; these are: a) place attachment and b) home appropriation since they collectively represent a critical relationship between the physical characteristics of a housing unit (which needs to be seen from a "home" perspective), the degree of satisfaction of the existing home environment, and the preference of the home and the overall residential environment of the future. The question that can be raised at this point is how lifestyle theories and their underlying concepts can be utilized in affordable housing research. The following section provides the answer in the form of a comprehensive framework that ultimately leads to designing a tool of investigation.

Designing and Testing a Tool for Developing Affordable Housing Projects in the Context of the Gulf States

In light of the preceding crux of the argument, the three lifestyle theories, and the discussion of environmental psychology relevant literature, a framework for investigating affordable housing is conceptualized based on the fact that people current experiences and degree of satisfaction and people future needs and preferences should be integrated in a comprehensive investigatory mechanism. This is derived from the value of integrating lifestyle theories in a trans-disciplinary manner. The framework is structured in four clusters; each of which seeks out the development of a specific type of knowledge as illustrated in Figure (4). The four clusters of the framework can be outlined as follows:

Cluster (1): addresses personal information including gender and age.

Cluster (2): aims at developing knowledge about family that reflects different life-modes among other issues. It includes issues that pertain to number of family members, educational level, work sector, income level, presence of domestic labor, and number of cars used by family members.

Cluster (3): investigates issues toward developing knowledge about current home that translates key concepts of understanding lifestyles including issues that pertain to appropriation and place attachment. Such issues are translated into a number of questions that involve home type, ownership status, space availability, and the degree of satisfaction.

Cluster (4): seeks out the development of knowledge about future home that reflects the three life style theories. It includes issues related to future space needs, position within the community/neighborhood, and home typological preferences.

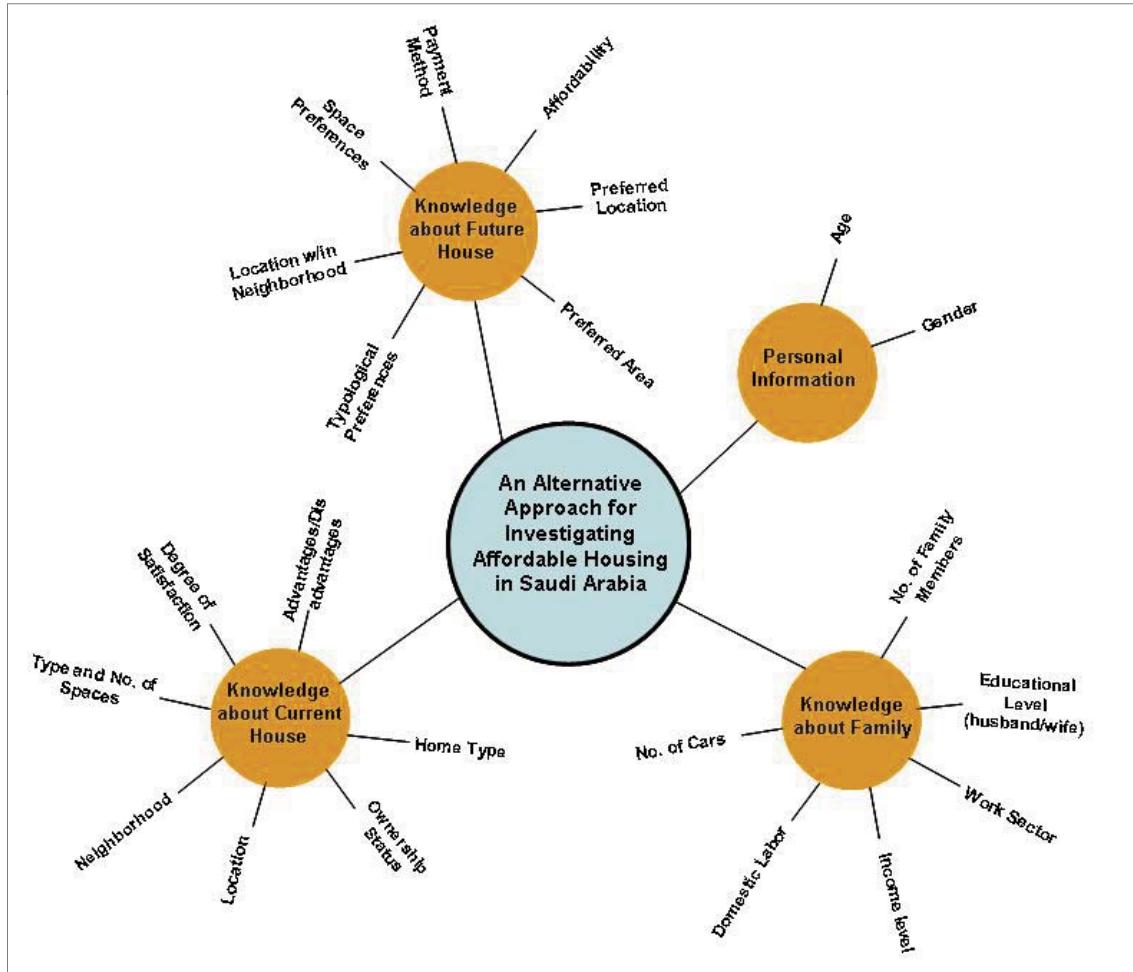


Figure 4: A Framework for Inquiry about Affordable Housing in the Gulf States, Tested in the Context of Jeddah, Saudi Arabia.

The proposed framework is translated into a survey tool in the form of a questionnaire, developed and designed based on the structure of the framework. In this questionnaire, questions are categorized in a manner that follows the sequence of the four clusters. The questionnaire was developed in Arabic since the intention is to address the Saudi context, and therefore it was examined in the same context. The city of Jeddah was selected for testing its validity. A large number of questionnaire sheets were distributed in a real estate exhibition where many real estate development companies display their projects; many of which are affordable housing projects. It should be noted in this context that sampling was not of concern since the main aim was to examine the validity of the framework and the tool. Also, it should be noted that no generalizations are drawn in the context of the whole country, rather it is only limited to the testing sample. Strikingly, over three hundred and fifty questionnaire forms were gathered from potential home buyers.

Several relationships that manifest a trans-disciplinary thinking and that establish links between wide varieties of issues can be conceptualized based on the responses received. An example of how more than one issue of concern to affordable housing knowledge production can be illustrated by developing a relationship between income level and house layout preferences. In terms of the layout and the overall house type, 27% of the respondents prefer a corner individual house (overlooking two streets) and the same percentage prefer living in a house within a group of houses that overlooks a public garden. 17% prefer to live in a typical private (individual)

house that has its own boundaries, and only 9% prefer the duplex house type. Some interesting results are drawn when linking these figures to income levels .

Linking house layout preferences to income levels, the following relationships can be drawn as follows:

15 respondents out of 64 who prefer individual house that has separate boundaries have income in the range of 3001-7000 SR a month.

29 respondents out of 87 who prefer individual corner house (overlooking two streets) have income in the range of 7001-10000 SR a month.

10 respondents out of 34 who prefer duplex type house have income in the range of 10001-15000 SR a month.

35 respondents out 104 who prefer a house within a group of houses that overlooks a public garden have income in the range of 3001-7000 SR a month.

Conclusion

It is clearly evident that a new paradigm of thinking is emerging where no one theory or discipline would have the upper hand in developing a comprehensive understanding of affordable housing. In the old paradigm, the value of affordable housing is assumed to be in the quantifiable attributes of dwellings and their related cost, while in the new paradigm affordable housing inquiry can be viewed within relationships between the process, the product, and the socio-cultural aspects of the targeted populations. Simply, the old paradigm views affordable housing in terms of what it is, rather than what it does for the local populations and

the way in which they perceive their current environment and aspire to environments more responsive to their social needs and lifestyles.

This study aimed at developing a comprehensive innovative approach for investigating affordable housing in the Gulf States. Such an approach was based on introducing a new paradigm of research: trans-disciplinarity as a form of inquiry that crosses the boundaries of different disciplines. An argument on the impact of trans-disciplinary thinking on understanding affordable housing was developed and placed within the perspective of how lifestyle theories and their underlying concepts can be incorporated into a comprehensive investigatory process. In turn, a framework of inquiry was developed while reflected on affordable housing knowledge types.

The proposed framework was conceptualized and translated into a survey tool which was then devised in the form of a questionnaire to be implemented in the context of Saudi Arabia. The tool was tested in the city of Jeddah since it was distributed in one of the major real estate exhibitions. The testing of the questionnaire as a tool of inquiry reveals its validity, corroborates the value of integrating different knowledge types into the investigatory process of affordable housing, and accentuates the value of introducing lifestyle theories as a new form of knowledge necessary for future inquiry on affordable housing.

It is important to shed light on the fact that the proposed approach involves a number of correlations that aim to reach reliable results. The approach represents a structured method

for investigating affordable housing in the Gulf States that is based on a critical understanding of the issues involved. As well, it incorporates novel ideas where issues derived from different disciplines are integrated. The importance of such an approach lies in the value of how trans-disciplinary thinking in built environment related realms can be introduced, where the boundaries of different disciplines are crossed. In essence, planning and architectural aspects, social and cultural issues, and cost and financial issues are all incorporated into one mechanism toward a comprehensive inquiry on affordable housing.

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MIXED REALITY: THE DECONSTRUCTION OF TIME/THE RESTRUCTURE OF THE FUTURE

M. Alaa Mandour

Abstract

The information age has led us to experience our environment in innovative ways, especially after the emergence of virtual spaces. Our senses have been triggered and our perceptions have been significantly altered through our experience of ever developing virtual spaces, comprising of spatial metaphors coded through an abstract flow of electronic signals, or physical spaces, comprising of zones adapted to activities and channels of communication providing links between zones, or a combination of both. Using the two types of spaces, an architect can more easily interact and communicate with fellow architects as well as clients. This paper intends to explicate the concept of shared mixed realities in the field of architecture based on the construction of transparent boundaries between real and virtual spaces. In order to manage their communication, participants can utilize spatial properties (i.e. containments and movement) through the use of shared space technologies which aim to create electronic environments.

Keywords

Virtual world; mixed reality; augmented architecture; cyberspaces; space flow.

Introduction

The information age affects the experience of our environment in several ways. On one hand a radically different 'placeless' accessibility to virtual worlds develops through broadband media, on other hand the material world might gain a new importance based on embodied experience. New technologies challenge our perception and experience of space and places. Virtual places have a long history though - from worlds created in paintings and texts, perspective constructions, photos and movies, and the successive development of electronic media since the 1840s. Every time the virtual dimensions have been extended through new possibilities, history has seen paradigm shifts of genuine importance (Drewe, 2001).

We are more familiar with physical than with virtual space both as users and as practitioners. Physical space is the material object of spatial planning and urbanism. It comprises, traditionally, zones adapted to activities and channels of communication providing links between zones. Virtual space, on the other

All diagrams were developed by the author
unless otherwise noted

hand, is less familiar. This partly explains the frequent use of spatial metaphors to describe it: web site, information superhighway or electronic highway, teleport, virtual community or electronic neighborhood, virtual or digital cities, the city of bits, etc. These spatial metaphors need to be handled with caution as they tend to obscure issues or even turn into ideologies (Graham, 1998). Metaphors are to be avoided when the issue is how to deal with the interactions between physical and virtual space. In other words, they must be defined as distinct entities. Virtual space, the less familiar of the two is, after all, "no more than an abstract flow of electronic signals, coded as information, representation and exchange" (Graham 1998).

This review is an approach to illustrate shared mixed realities based on the construction of transparent boundaries between real and virtual spaces. Shared space technologies aim to create distributed electronic environments where participants can exploit spatial properties such as containment and movement in order to manage their communication.

Virtual Architecture: Design in the Era of Complex Communications

Architecture as a discipline of designing and organizing space is undergoing notable transformations nowadays. Undoubtedly all approaches to architecture are affected by technology used for its imagination, visualization and realization. In this regard, Martin Heidegger's doctrine of the essence of technology implies that technology is not exclusively a tool, but it rather has an ontological nature and relates to

how the universe appears in the eyes of human (Heidegger, 1998).

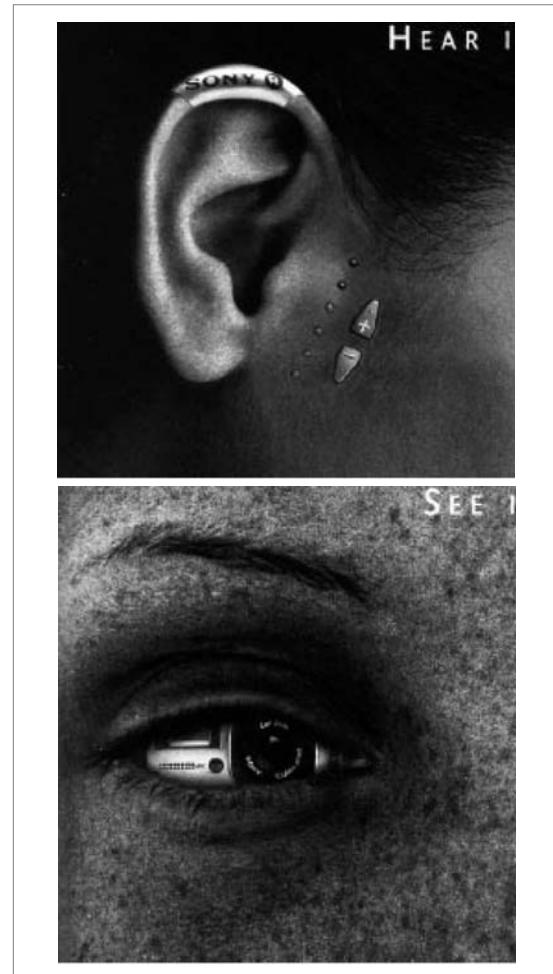


Figure 1: Audiovisual Mixing between Human and Technology.

(Source: <http://deseretnews.com/dn/view/0,1249,585036699,00.html>)

The technology of virtual reality makes its mark on architecture in three arenas. First, the communication and information technology provide a medium for designers to create a new world via imagination. In fact, virtual space is considered a prelude to artificial environment, transmitting the space-related experiences from the real world to the world of virtual realities.

The second arena of the influence of the virtual reality technology on architecture is the creation of perceptual spaces in the newly developed perceptual-experimental fields, resulting in unconventional thought and imagination processes. From this point of view, virtual architecture provides a tool for realization of designs free from real world restrictions (e.g. gravity, friction, form, light, and heat) through the use of concepts and endless forms closely associated with cyberspace. This leads to the notion of trans-architecture and the appearance of architectural ideas fundamentally different from those constructible in the real world. Virtual architecture, therefore, promotes the notion that free design within cyberspace, which represents an expressionistic formalism, bases a fluid or materialless architecture. The use of formless spaces implies the ideology that the real world is far more mysterious than what is conveyed by the mere facts (Jourabchi, 2003).

Finally the third arena of interaction between architecture and technology of virtual reality is the design of cyberspace itself. The information space is on its way to replace the real space, thus, its configuration in the form of computer presentations can be considered as an alternate view of virtual reality, highly regarded

for financial investments. Real-world simulations within the cyberspace accommodate more and more of real life activities everyday, necessitating the architectural formulation of this new space. A global life in virtual reality is not far from realization and very soon the conventional architectural spaces will lose their functionalities. Electronic activities such as e-businesses, e-learning, e-government and many other virtual operations pave the road towards an electronic life which requires a new architecture for designing, organizing and defining three-dimensional environments within the virtual space.

Virtual Architecture: An Approach to Visualization and Realization of Physical Architecture

Utilizing virtual reality technology as a flexible design medium enables architects to visualize their ideas in a revolutionary way to further improve and develop them prior to construction in the real world. In this respect, software plays a vital role in efficient realizations of the projects at various stages, from drawing and modeling to project management and control. As a result, the nature of architectural design and even spatial-physical status of architectural offices have experienced a significant change (Jourabchi, 2003).

Since the Renaissance, standard methods of architectural design, based on drafting and drawing, have become an essential part of architecture. Limitations of traditional methods of architectural design cause models to be used only for geometrical-formal presentations. Many more architectural qualities such as

light, shadow, materials, colors, etc, which have undeniable effects on the final quality of design, are actually being forgotten, or are involved in decision-making with minimum effect. However, the progress in design techniques, from blue prints to the virtual reality technology for visualization of architectural ideas, has provided the designers the possibility of alternating spatial and formal elements and patterns through interactive experiments to overcome the abstractions due to limitations in the visualization of ideas, and to interactively assess multifarious qualities.

In conventional design methods, models and drawings can present only a few project aspects. Thus, a large part of the design must be processed in human mind and the extent of presentable architectural information is greatly reduced. In contrast, virtual technologies transform notable volume of mental processes to external processes and facilitate decision-making. In addition, traditional models can be reused to a much lesser extent compared to new virtual models. Accordingly, alterations and improvements of the ideas in the traditional models face more difficulties, whereas virtual technologies while visualizing multiple factors mentioned only in textbooks, present testable, changeable and improvable models for content and quality evaluation of the projects at minimum cost (Jourabchi, 2003).

Virtual technology may be utilized at different stages of the project. Two-dimensional drafting and three-dimensional modeling during design as well as still frame and real-time rendering during the presentation are the most basic functions offered by virtual reality in architectural design. Other common assessments offered by

this technology prior to construction in the real world include static modeling, structural load bearing computations, dynamic modeling, and study of structures' behavior against wind, waves, and earthquake. In addition, time studies and project management, project measurement and assessment, provision of status list, etc, are activities which are facilitated by using computer software.

In short, technology of virtual reality, as a form of transparent communication medium, provides the opportunity of a complete immersion of senses in another reality. Virtual technology, a simulation of reality as a collection of interactive information, creates a medium which gives the designers the capability of direct manipulation of an object, placing the designer in a virtual world equipped with all of the senses present in the real world. Therefore boundaries between reality and imagination melt away, and buildings become inhabitable in the virtual world before their construction.

Virtual Architecture: Imagination of a New Space-Time in the Era of Multimedia

If we allusively accept the Heideggerian doctrine that adequate thinking about the essence of technology not only enables thinking about art but also requires it, we can conclude that an instrument for visualization of architectural ideas is not merely a tool, but rather a method towards an openness which presents totally different aspects of the essence of the subject investigated (Giedion, 1971). Although it is impossible to imagine Brunelleschi and Alberti without perspective, Loos and Le Corbusier without film and train, and Venturi

and postmodernism without television and automobile, still the simulation technology of the 1980s and the technology of virtual reality of the 1990s can be considered a turning point in the application of the instrument and its ascendancy.

Siegfried Giedion believes that a new image of architectural space is a byproduct of optical revolution and an increasing interaction between exterior and interior spaces. He claims that the concept of motion is a new phenomenon fundamentally rooted in modern conception of space (Tanaka, 2000). Although a conception of space-time dates back at least a hundred years, it was only during the past two decades that the visualization of this dimension has broadened the horizons of human knowledge about the universe. While Giedion speaks about the phenomenon of motion as an effective force for shaping a new tradition in architecture, only fifty years later, architects and artists of the age of virtual reality have to deal with an experimental area where multiple forces alternatively and continuously cut each other.

Cyberspace is a multidimensional field of forces. For this reason, the metaphor of space and spatiality seems inadequate, because cyberspace and virtual realities which exist in it create a kind of complexity of a network, understanding of which through exclusively spatial images and pictures seems too difficult. Hence two new concepts of hyperspace and topology are employed to facilitate understanding of the inner logic of cyberspace. While it is impossible to explain the two concepts themselves completely, they help to percept the complexity of networks. They are all the

more efficient as instruments to understanding artworks connected with cyberspace and virtual reality (Jourabchi, 2003).

Aesthetics of New Space-Time

The constitution of space and time in computer-based environments may be imagined as cutting, folding, bending, and stretching the procedure and current of time and continuity of Euclidean space. Such an experience can be considered as a machine-made topological experiment which leads us towards a type of emerging machine-made aesthetics. The main characteristics of machine-made creative works in cyberspace are multifarious states of intervention, operation and production which emerge in sequence. Here machine is not merely a technical set but is a collection of heterogeneous elements relating a generative imbalance to a structure.

Presence and connectedness can be identified as two main categories of computer-based art in cyberspace. By changing the vertical presentation paradigm and moving toward the horizontal paradigm of connectedness and distribution, they trigger a dreamlike state which allows a telepresence of an artwork – a great step against a classic modernist tradition at the area of cybernetic art. With this in mind, and considering such concepts as data storage, the creation of defocusing, changeable identity, and interactive forms, a dialogue between the aesthetic and social requirements of cybernetic art opens endless horizons for artistic and communicative forms. Because each happening is a unique event which is shaped through the cooperation between an artist and an audience in a certain performance, formal

strategies, which usually appear in the form of non-linear expressive happenings and driven from abovementioned concepts, are difficult to be defined. Therefore a cybernetic artwork as a continuously reproducing object, by coaxing immediate and motivating interactions via an amazing combination of people, things, events, and narrations through the audience's active cooperation, attempts at expanding our consciousness about new space-time. So, cybernetic art is first and foremost a dynamic and fluids becoming, in which an artist and an audience form, perform, and interpret, while affecting each other in a changing environment. Further on we will try to explain some of the essential aesthetical concepts of cybernetic art.

Approaches to Mixed Reality

There has been a growing interest in techniques for combining real and virtual environments to create mixed realities – spatial environments where participants can interact with physical and digital information in an integrated way (Milgram et al, 94). Mixed realities may be shared, enabling people who are distributed across multiple physical and virtual spaces to communicate with one another. A variety of approaches to creating shared mixed realities have been demonstrated, including augmented reality, augmented virtuality, tangible bits and Mixed Reality boundaries (Fleischmann et al, 1999).

Augmented reality involves overlaying and registering digital information (e.g., text and graphics) onto a real world scene in such a way that the digital information appears to be attached to physical objects, even as they

move about. The physical scene might be the local environment, with the digital information being introduced via a see-through head-mounted display (HMD). Alternatively, it might be remote, being viewed on a video display that is then enhanced with digital information. Early examples of collaborative augmented reality include the Shared Space system (Billinghurst & Kato, 1999) in which users share virtual objects across a physical table top and Studiers tube (Fuhrmann, 1998), in which virtual objects are also displayed in a physical space between multiple users. Both of these systems utilize see-through head-mounted displays. Systems based on video views of remote scenes are inherently sharable as the video display is usually located in a shared physical space.

Another approach to a shared augmented environment using a physical table displaying virtual objects that can be manipulated by data glove or stylus, is the Responsive Workbench. Unlike Shared Space and Studierstube, the Responsive Workbench uses shutter glasses rather than HMDs, the table itself being a screen for stereoscopic back-projection. In contrast, augmented virtuality (Milgram et al, 1994) starts from a virtual world and then embeds representations of physical objects within it. These might take the form of textured video views, for example views of participants' faces on their avatars as in the Free-walk system (Nakanishi et al, 1996), or views of remote physical locations as in the 3-D media-space interface of (Reynard et al, 1998). The projection of live video data of participants in a shared virtual environment into a virtual space was also used in the ACTS project DVP. Several CAVETM and Responsive Work-bench TM systems were linked via a transatlantic ATM

connection in a shared virtual prototyping environment (Kindratenko et al, 1998).

An alternative approach to embedding video views is to construct graphical, textual and aural representation of telemetry data that has been captured by remote physical sensors. The approach of tangible bits (Ishii et al, 1997) involves the use of graspable physical objects called phicons to interact with digital information, for example moving physical models across a table top in order to access a digital map that is projected onto it. This may be coupled with the use of ambient display media such as sound, light and airflow to provide more peripheral awareness of background information, for example, by showing the volume of network traffic as reflections of water ripples on the ceiling. A similar approach was presented earlier (Strauss et al, 1999) in the Cyber-city system, where one could navigate through a wall projection of a 3D city model by moving a "virtual finger" through the streets of a map projected on a table.

The approach of Mixed Reality boundaries involves joining distinct virtual and physical spaces by creating a transparent boundary between them (Benford et al, 1996). With this approach, the spaces are not overlaid. Instead they are distinct but adjacent. The occupants of the shared physical space can see into the next-door virtual space and can communicate with its occupants (e.g. avatars within a collaborative virtual environment). In turn, the occupants of the virtual space can see back into the physical space. A distinguishing feature of this approach is that it places equal weight on physical and virtual environments, considering how each can be accessed from

the other. It also offers the potential to use multiple Mixed Reality boundaries to bring together many physical and virtual spaces into a larger Mixed Reality environment in the same way that everyday boundaries such as doors, walls and windows are used to structure physical buildings.

A related, yet differently oriented system is the Communication Wall (Breiteneder et al, 1996) where two (spatially separated) halves of a room are joined by augmented reality and Virtual Studio techniques. Participants in a shared session can communicate like sitting face-to-face at different sides of a table, while the remote part is projected on a wall-size display, giving the illusion of a continuing room, respectively.

Mixed Reality may also be applied (or defined) as an extension to video conferencing systems through CSCW (Computer Supported Co-operative Work) and HCI (Human Computer Interaction) techniques (Pekkola et al, 1997). According to the specific requirements and technical facilities of a particular teleconferencing scenario, a variety of communication channels may be integrated, ranging from real face-to-face communication over VR to Internet contacts and multimedia components. Similarly, one may approach Mixed Reality concepts with respect to application context, e.g. in collaborative interior design (Kliner et al, 1997), where the concept of augmented reality is understood primarily as a paradigm for user interaction and information visualization.

Freeing the user from being tied to a stationary system is yet another way of understanding

Mixed Reality With “Wearable Computing” Systems, one becomes mobile, remaining free to move and act in a real environment while staying informed via a wearable display system that stimulates one or both eyes (Mann, 1998). There is a system developed by Sony (Rekimoto et al, 1997) that combines wearable as well as stationary computers to interactively create and store/retrieve virtual annotations to real objects.

Following Milgram’s approach to define taxonomy of Mixed Reality (MR) visual displays (Milgram & Kishino, 1994), there are six different classes of MR interfaces, ordered by increasing virtual component influence (Fleischmann et al, 1999):

1. non-immersive, monitor-based video displays with overlaid virtual image components
2. immersive HMD-based video displays
3. see-through HMD video displays
4. virtual see-through HMDs via integrated video camera
5. primarily virtual display environments with overlaid video “reality”
6. completely virtual projection-based environments immersing user and surrounding reality as a whole.

Besides the ordering scheme used above, other means of distinction have been suggested, such as direct/indirect viewing of real/virtual objects (where “real” means “directly related to some physical existence” opposed to “virtual” as based on a computer generated model), producing real/virtual images (i.e. images that do/do not occlude other images further down the viewing axis, respectively). Including the

world of Virtual Studios (VS), which can also be regarded as a type of Mixed Reality, another, two-dimensional, classification could be made, based on the degree of immersion (or better: impression of reality) for (a) the person acting in the virtual environment and (b) an external spectator.

Using this classification scheme, digital video post-production and virtual TV-Studio production can easily be integrated with Milgram’s Mixed Reality classes, placing postproduction in one corner (least actor immersion, maximum spectator reality; changing but rather minimal virtual part), and completely immersive VR systems (using nontransparent HMDs) in the opposite one.

Common to all different approaches to the term “Mixed Reality” are two points (Fleischmann et al, 1999):

1. The existence of a combined pair of a real and a virtual space (Comris, 1998)
2. Employing the visual as the dominant mode of perception and integration of real and virtual space.

All the different approaches described in the section basically differ in the ratio between those two spaces, and the type of interface between them. While these investigations do research into complex problems such as 3D data retrieval, geometric data of layering provided by complicated tracking systems, special problems of video techniques, etc, there is less work on networking issues. In the meantime much work has been done in this field, e.g. the development of VRML and interaction synchronization and behavior

models in distributed virtual environments. At the technical level, contemporary research in Mixed Reality technologies for the broad public must focus on extending the open questions related to the VRML concept, especially in terms of multi-user communication and extension of computer graphic features provided by Java.

A Review of Shared Space Technologies

Current approaches to technologies which enable simultaneous presence of multiple geographically distant participants in a shared space can be classified into five categories (Fleischmann et al, 1999):

1. Media spaces,
2. Spatial video conferencing,
3. Collaborative virtual environments,
4. Tele-presence systems,
5. Collaborative augmented environments.

The notion of media spaces is used to refer to the "enhancement of existing workspaces with integrated audio and video communication". This differs from multimedia conferencing systems in supporting social browsing, peripheral awareness and the establishment and maintenance of long-term working relationships between physically separated people.

The term "spatial video conferencing" refers to video conferencing systems that attempt to introduce support for determining gaze direction. That means providing a way for participants to distinguish at whom one is gazing, which is normally indistinguishable when several people are presented with the image of someone looking at the camera. The key

concept of collaborative virtual environments (CVEs) is summarized as that of computer generated spaces in which each participant has his graphical representation and can control his own viewpoint and interact with other participants or various representations of data. Such spaces are usually referred to as shared virtual worlds.

Typically nominated fields of applications are training, co-operative visualization, simulation, design and entertainment. The concept of telepresence is understood as "allowing remote users to experience a remote physical space through computer and communications technologies". Experiencing the space is understood as the ability to view the space, to navigate the space and to interact with objects in the space. A scenario where the remote participant controls a robot which in turn explores the physical space is nominated as a typical application.

The notion of augmented reality is understood as overlaying the views of a real world scene and the virtual scene with some level of dynamic linking between them. Besides using see through head-mounted displays or overlaying graphics onto conventional video screens, some approaches explore the use of ambient display media such as sound, light and airflow for peripheral awareness (Ishii et al, 1997). The latter is claimed to aim at providing "natural integration of digital and physical information and providing rich and multi-sensory experiences for users" (Figure 2).



Figure 2: Mixed Reality Environments: Virtual Presence in Physical space and Vice Versa.
(Source: VR Media Lab, Aalborg University, Denmark)

Relating the notion of interactive environments to the above classification places it across several categories: it involves and examines the concepts of media space, telepresence and collaborative environments. In terms of the classification, interactive environments are media spaces which may provide elements of telepresence for multiple participants in a shared space. A major difference is that the notion of telepresence is concerned foremost with allowing remote participants to experience each other - not a remote physical space.

Regarding media spaces, the approach of interactive environments is not constrained to a particular scenario and is actually more interested in exploring public space than workspace contexts. It also departs with a much

relaxed understanding of "communication", and doesn't necessarily assume geographically separate participants.

The term media space is understood as enhancement of physical space with different, most often computer-based, audio-visual media but also the "spaces" created through communication between participants using different computer-based media. As to the idea of "shared virtual worlds", the notion of the interactive environment emphasizes the idea of a shared world as a world of shared experiences through interaction of participants with each other, mediated by the situation that is created by the environment. Rather than interacting with objects in a computer-generated world, the focus is on different forms

of interaction between participants or between a participant and his "inner self". The latter refers to the recognition that the responses or actions that the situation provokes us to be motivated or determined by who we are as human beings and persons that cannot be parameterized and described as yet another "object" of the system.

The Mixed Reality Stage: The Basic Concept: A Room Filled With Data

The basic concept of the Mixed Reality stage (Fleischmann et al, 1999) is that of a room filled with data. The "room" stands for physical interaction space but the furniture of data is virtual and stands for an information space. It is a spatially organized information space in which data is revealed through users' movement in the combined real-virtual space, and through interaction with other users (Figure 3.). The physical space is filled with virtual space and extended with virtual space.

Levels of Linking the Real and the Virtual

The concept of the Mixed Reality stage (Fleischmann et al, 1999) considers connecting the real and the virtual at three complementary levels:

1. linking audio-visual manifestations of physical and virtual space,
2. linking physical and virtual space through movement and bodily awareness of space,
3. linking internal construction of individual experience with externalization of experiences of others.

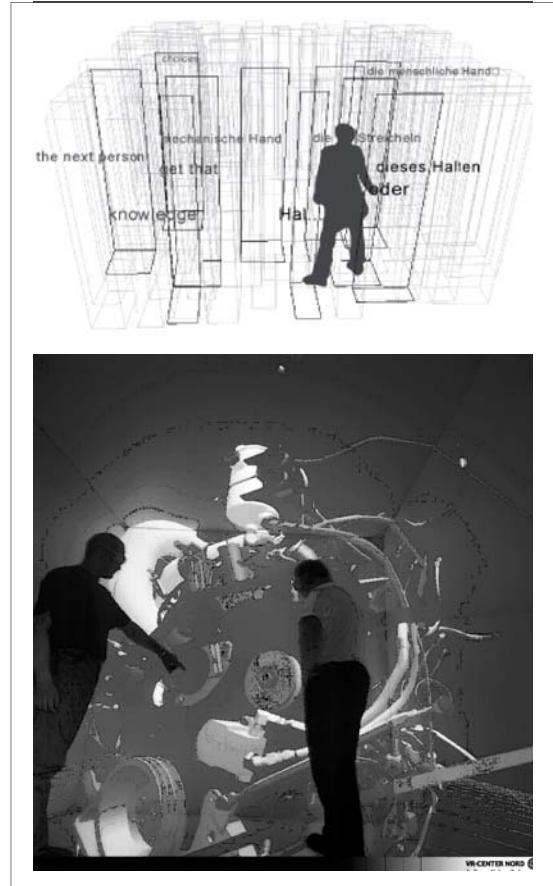


Figure 3: A Room Filled with Data
(Source: <http://www.vrmedialab.dk/pr/img/galleri/cave/index.htm>)

Movement reveals data from virtual space as if it were in the physical space. In this concept, the virtual space is realized as an interactive field of sounds which are triggered by users' movement and emitted into the physical space. As it is the movement in physical space that causes the sounds, and as the sounds are heard in the physical space, the resulting impression for the users is that of an invisible field of sounds existing in the physical space and revealed through their actions. If sounds are understood as data of an information space, this illustrates the realization of the basic idea of using virtual data for filling real, physical space.

This is different from the approaches of augmented reality and augmented virtuality because they operate strictly in the image plane - overlaying images of real and virtual space on a video display. It is also different from the mixed-reality boundary approach where the real and the virtual space are not layered, but distinct and adjacent. Linking real and virtual space through movement builds on the recognition that movement is an essential means of perception of physical space. Hence, in order to make the perception of virtual space function at the same level as that of the real space, we make movement the basic condition for perceivable manifestations of virtual space. This is why audio-visual elements of the virtual space are invoked only through user's movement in physical space.

The presence of users in the physical space is effected through their bodies, and the movement of bodies describes the spatiality of physical space. Each individual user perceives this in a twofold manner: 1) as a bodily awareness of one's own movement in space, 2) through visual and bodily awareness of the movement of other users' bodies.

Connecting this level of real space perception with users' perception of virtual space is the reason why we annotate users' movement in real space with an audio-visual trace of movement in the virtual space. The resulting manifestations of virtual space, the audio-visual traces of users' movement, and the movement of their physical bodies, provide an externalization of the users' experience of the shared situation. The mental processes of individual users, such as interpretation, construction and imagination, are externalized

and connected to their perception of the jointly constructed reality. As a result, the nature of the created situation transcends that of a "space" understood in strictly physical terms of the word. What is produced is a new reality of perception as a framework for the communication of different, individual realities of the "same" situation - a situation of mixed realities.

Conclusion

Can developed virtual environments offer hope in supporting new arenas for public discourse in cities, which are more inclusionary, equitable, and interactive than the 'consumer-model' 'information superhighways, dominated by global, commodifying corporations, which seem likely to dominate virtual space in the future? Can such initiatives help overcome the economic, geographical, social and cultural fragmentation so characteristic of contemporary cities, by tying together the urban fragments together? Does the 'urban planning' of electronic spaces offer a new arena within which progressive, imaginative urban futures might be shaped? Is the city "to be replaced with a virtual urbanity, a city of the mind, enabled by telematics?" providing "channels" through which knowledge and information can be democratized, dispersed around the diversity of relational webs in urban regions" (Heath & Luff, 1991).

By using architectural methodologies to create a process where each of the required components (audiovisual, supercomputing, networking, broadcasting, virtual reality, and systems support) is synthesized, complete unified design of an efficient, working, virtual environment can be created. A lead architect

can meet individually with all these disparate groups and incorporate their needs into a master plan for building the ideal space. It is the inherent nature of the architectural profession to analyze and perform such functions. The architectural profession will also be able to guide the design plan through the rigors of build out and construction phases. However, developing spaces for virtual environments is very new. Architects will need to learn how to communicate with people from very different cultures and need to be able to reach out for help in this area when needed. Architects will also need to think in terms of traffic flow and how groups of people interact with these environments so the lessons learned from the entertainment industry should also be incorporated into this design process.

The components for creating a dynamic space for enabling virtual environments lay all around us. It requires an open minded architect to bridge the many disciplines and create a plan which can efficiently incorporate all the needs and functions demanded by such an environment. Virtual environments demand the synthesis of multiple professions into a single real space. By using an architectural methodology as a binding mechanism, a comprehensive design can be developed and the end goal of creating presence can be achieved.

The unprecedented dynamic of contemporary technological (r)evolution has created a completely new comprehension of space-time relations, communication and symbolical perception. Through global networks and their nodes, redefined symbolism influences our everyday life and its main purpose becomes transmission of proclaimed global values.

Being an important resource for the global competition and recognition, urban space develops, recreates and regenerates its numerous fragments that should represent a spectacular testimony to its global initiation (real or projected), urban identity (cultural, ethnical, historical, national) and excitation or inhibition of its citizens and visitors. At the same time, technological and informational infrastructure becomes a fundamentum of the globalization process that radiates a complex message of the majestic present and promising future of a city that should be reached somewhere at the global horizon.

However, the final result of this process is not easy to predict - the future shaped by globalizing contradictions will remain an enigma whose clue lies well hidden inside the evolution labyrinth. Therefore, the basic problem of our epoch is a choice of the right direction on our way to the global challenge. The only question is - are we capable to begin this search?

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AIRFLOW PATTERNS AND STACK PRESSURE SIMULATION IN A HIGH RISE RESIDENTIAL BUILDING LOCATED IN SEOUL

Khoukhi Maatouk

Abstract

Buoyancy forces due to air density difference between outdoor air and indoor air cause stack effect in high-rise buildings in cold climates. This stack effect occurs mainly at the core of the building such as the stairway and elevator shafts and causes many problems such as the energy loss caused by air flow, the blocked elevator door and discomfort due to inflowing of strong outdoor air. The main purpose of this work is to model the airflow pattern in a high-rise building during the winter period by mean of COMIS. The presented building which is situated in Korea contains 30 floors above the ground level and 5 basement floors. Using COMIS, the simulation has been carried out for the entire building. However, the simulation failed due to the huge number of zones and interactions between them. Therefore, a model of building which contains 14 floors with 5 floors in the basement has been considered; and a simplified model based on the considered one has been constructed and compared with the 14 floors model. The simplified model consists on reducing the number of floors by combining a certain number of stories into one so that to enable the simulation to be carried on with a minimum number of zones and links. The result of the simulation shows that this approach could be used with accuracy still being satisfied. Therefore, the simplified procedure has been extended and applied to the high rise building model with 30 stories above the ground level and 5 stories in the

basement. The effect of the exterior wall air-tightness of the building with 30 stories on the stack pressure and airflow by infiltration and/or by exfiltration has been investigated. The result shows that the total air by infiltration and/or exfiltration within the elevator shafts increases with the decrease of the level of the air-tightness of the exterior wall of the building. It has been also shown that a huge amount of air infiltrates through the shuttle and emergency elevator shafts from the basement.

Keywords

Stack pressure; airflow; COMIS, simulation; air-tightness of exterior wall.

Introduction

Recently many tall buildings have been constructed in Korea. These buildings comprise of over 40 floors. Due to this height, they form a tall air column inside the building and another one outside. The normal stack effect occurs because the air in the building is warmer and less dense than outside. When the outside air is warmer than the building air, there is a natural tendency for downward air flow, or reverse stack effect, in shaft (Khoukhi et al.,

All diagrams were developed by the author unless otherwise noted

2007). Problems caused by this stack effect are the energy loss caused by air flow, the sticky elevator doors, and the loud noise at the lobby entrance (Yu et al., 2004).

Several works discussing the stack effect in medium and high-rise buildings have been investigated by numerous authors. Recently, Khoukhi et al. (2007) have investigated the effect of the wind speed and its direction on the stack pressure in medium-rise building in cold region of China. J. Yu et al (2004) have evaluated the stack effect according to the shape and the window area ratio of lobby in high-rise building. The investigation of the air quality in newly-constructed high-rise multi-family houses and the improvement of the indoor air quality have been carried out by Hyung et al (2004). The influence of architectural elements on stack effect problems in tall residential buildings has been studied by Koo et al. (2004). Some problems about the stack effect have been studied and partial solutions were proposed (Tamura and Wilson, 1967 and Lovatt, 1994). For the stack effect, mechanical ventilation systems were used to control pressure differences (Tamblyn, 1991 and 1993). Nevertheless, this may lead to other problems with regard to the system efficiency (Yu et al., 2004).

We have little understanding about the stack effect phenomena that occurs in buildings since it is affected by the envelope. Those parameters vary strongly from one building to another which led to the study of the stack effect case by case. However, the plan to solve the problem should be made on the schematic design stage.

The main purpose of this work is to model the

airflow pattern in a high-rise building by means of COMIS. The present building which is situated in Korea contains 30 floors above the ground level and 5 basement floors (B5F+30F+Roof). Using COMIS, the simulation has been carried out for the entire building. However, the simulation failed due to the huge number of zones and interactions between them, since the COMIS model presents some limitations with regards to parameters such as the number of zones and links, the number of pollutants, the number of wind pressure points, the number of façade elements, and so on. Therefore, a building model which contains 14 floors with 5 floors in the basement (B5F+14F+Roof) has been considered. This model has been decided with a maximum of zones and links regarding the number of the zones and links that can allow carrying the simulation using COMIS. A simplified model (B5F+14F+Roof-simplified) based on the decided one has been constructed and compared with B5F+14F+Roof model. The simplified model focuses on reducing the number of floors by gathering a certain number of stories into one so that to enable to carry on the simulation with a minimum number of zones and links. The simplified proposed model has been validated compared to the original one in order to extend this approach to the high-rise building with more than 30 stories.

Building Description -- Climate Conditions

The selected tall residential building was built recently. This building, which is situated in Seoul (latitude= 37.1 N, longitude= 126.6 E), contains 30 floors above the ground level and 5 floors in the basement and a roof. Figure 1 shows the layout of the building model. The floor area is

900 m².

The three levels B5F, B4F and B3F are intended for car parking. B2F and B1F are the commercial zones. The first floor area is divided into two zones which have independent access from the outside. However, only the building occupants can access the lobby from the commercial zone and vice versa. From 2F to 30F, each story contains 4 apartments with the central core serving as a corridor. Four different elevators, namely, a shuttle elevator, shown by EV.3, serves the basement floors and the first floor; two elevators, shown by EV.5 and EV.6, serve 30 floors from 1F to 30F; and the emergency elevator (EV.2) serves the entire building. The access to the roof is through the stairway which serves the entire building as well.

The total building volume is 48860.78 m³. The car parking floors (B5F-B3F) are not heated. The temperature of the commercial zones is 18°C. The lobby and the apartments are assumed to be at a constant temperature of 22°C. The stairway and shafts temperatures are uniform at 18°C. The mean outside temperature during the winter period in Seoul is assumed -11.9°C.

Multizone Infiltration Model-- Simulation Procedure

Multizone Infiltration Model

In the presented study the simulations have been carried out using the multizone model COMIS. This code allows solving the non-linear system of equations representing the airflow distribution in multizone buildings (Fundamentals, 1990). In COMIS, the building is modeled as a system of interconnected zones, each at a constant

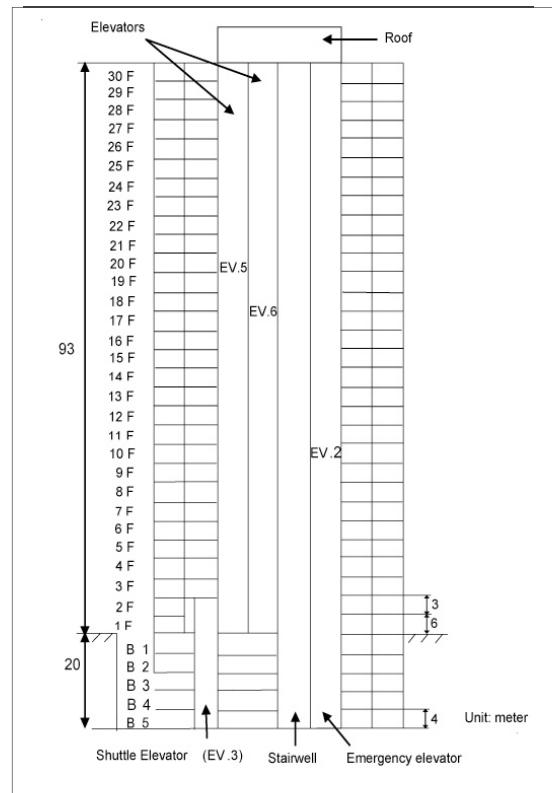


Figure 1: Layout of the Building Model.

temperature and contaminant concentration. Some relevant parameters such as airflow paths between zones and outdoor weather must be specified in the input file. Multizone buildings can be either single-room structure, single family houses or large building complexes. The COMIS model has been extensively validated by Roulet et al. (1996) and uses experimental data by Bossaer et al. (1999).

Simulation Procedure

As it has been mentioned in the introduction the main target of this paper is to model the airflow pattern and stack pressure in high-rise buildings by means of COMIS. The present building which is situated in Korea contains 30 floors above the ground level and 5 basement floors (B5F+30F+Roof). Using COMIS, the simulation has been performed using the entire building. However, the simulation failed due to the huge number of zones and interactions between them, since the COMIS model presents some limitations with regards to some parameters such as the number of zones and links, the number of pollutants, the number of wind pressure points, the number of façade elements, and so on. Therefore, a building model containing a total of 14 floors including 5 floors in the basement (B5F+14F+Roof) has been considered. This model has been decided with a maximum of zones and links with regards to the number of zones and links that can allow carrying the simulation using COMIS.

A simplified model (B5F+14F+Roof-simplified) based on the decided one has been constructed and compared with B5F+14F+Roof. The simplified model focuses on reducing the number of floors by gathering a certain number of stories into one in order to enable

the simulation to be carried out with a minimum number of zones and links. The simplified procedure has been extended to the high rise building model with 30 stories above the ground level and 5 stories in the basement.

The simulation of the simplified model with 30 stories has been carried out considering three levels of air-tightness of the exterior wall of the building. The amount of the leakage was uniformly distributed over the entire exterior wall. The leakage of each wall was assumed to be concentrated at two heights: half of the leakage occurs at 0.25 of the wall height above the floor level and the other half at 0.75 of the wall height above the floor. During the simulation all the doors were assumed to be closed. The cracks of all the doors were concentrated at the bottom and the top of each door. The equivalent areas are assumed as 0.036 m², 0.2 m², 0.015 m² and 0.02 m² for the main entrances (lobby side and commercial zone side) in the first floor, elevator door, door between the machine room in the roof and outside and other doors, respectively. Three levels of air-tightness of the exterior wall have been considered: 0.5 cm²/m² (tight), 1 cm²/m² (average), and 2 cm²/m² (loose).

Results of the Simulation

The airflow patterns through the elevator shafts are shown in Figures 2 and 3 for the considered model with 14 floors and simplified model based on considered one, respectively. There is a general upward movement of air inside the building, with air flowing into vertical shafts from the lower floors and out to the upper ones. This general pattern causes a variation in the heating and humidification load from floor to

floor, and therefore has implications for the maintenance of uniform temperatures and humidities through the building. It is also a factor in the spread of odors and other contaminants.

The airflow rates between the combined volumes in the merged model are very similar to the sum of the corresponding flow rates in the original one (14 floors). The relative deviations between the corresponding flow rates are less than 5%. It can be concluded that the simplified model could well represent the original one. Therefore, such procedure may be extended to the high-rise building with the accuracy still being satisfactory. The airflow patterns through the elevator shafts for the average exterior wall air-tightness of the B5F+30F+Roof simplified model are shown in Figure 4.

Figure 5 shows the airflow patterns at 1st, 2nd, 16th and 30th floors respectively. These figures illustrate the patterns of the air both by infiltration and exfiltration. It can be seen that from the first floor to the fifteenth floor the air enters the apartments through their exterior wall and reach the core space, while, from the fifteenth floor the air escapes from the core space to the exterior through the apartments' walls. Therefore, it can be seen that the neutral pressure plane is situated around the mid-height (16th floor) of the building.

Three levels of exterior wall air-tightness of the building have been considered: 0.5 cm²/m² (tight), 1 cm²/m² (average) and 2 cm²/m² (loose). Figures 6 and 7 show the airflow patterns through the elevator shafts with tight and loose exterior wall air-tightness, respectively. It is obvious that the total air by infiltration/exfiltration increases for the loose configuration. Moreover, a huge amount of airflow penetrates the shuttle and

emergency elevator shafts from the basements. Therefore, very tight doors should be set in these zones to avoid such huge infiltration.

The total air change rate increases with the increases of the leakage of the exterior walls of the building as shown in Figure 8. Nevertheless, 2.0 cm²/m² can be considered as a very low air-tightness level but the total air infiltration increases by 123 % compared to the tight configuration. Therefore, the level of the air-tightness of the exterior wall of the building affects strongly the total air change either by infiltration or exfiltration and then consequently the indoor air quality and the heating and cooling loads are also affected.

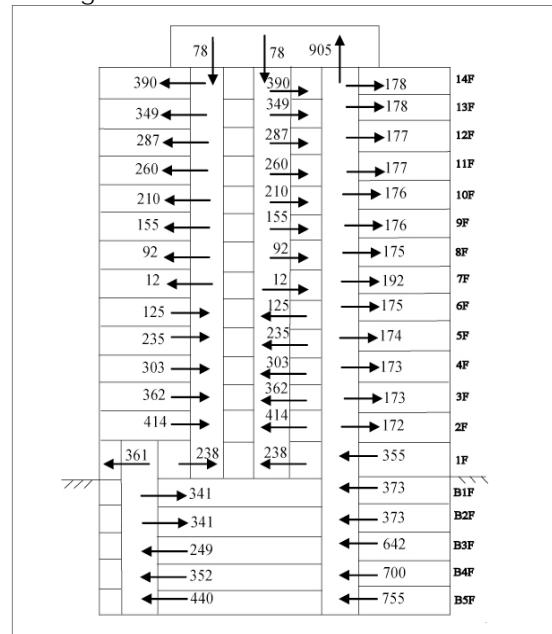


Figure 2: Airflow Patterns and Amounts [m³/h] through the Elevator Shafts for the B5F+14F+Roof Model with Average Exterior Wall Air-Tightness.

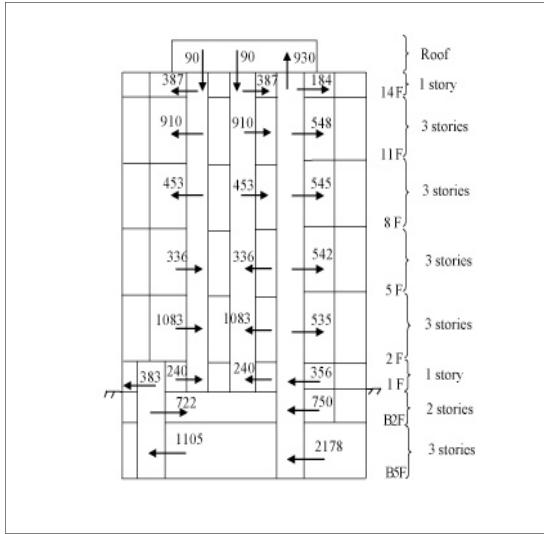


Figure 3: Airflow Patterns and Amounts [m³/h] through the Elevator Shafts for the B5F+14F+Roof Simplified Model with Average Exterior Wall Air-Tightness.

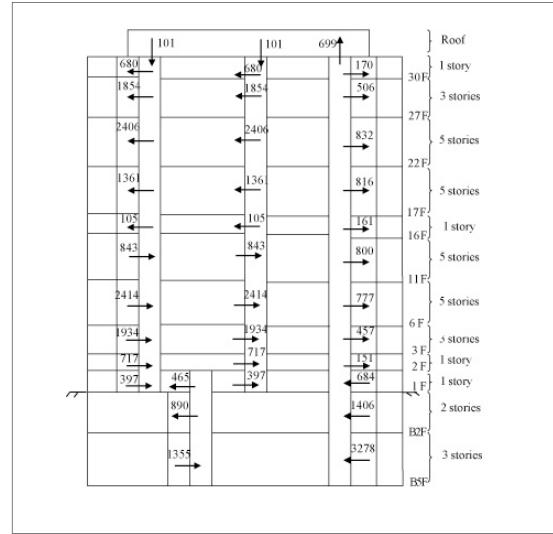


Figure 4: Airflow Patterns and Amounts [m³/h] through the Elevator Shafts for the B5F+30F+Roof Simplified Model with Average Exterior Wall Air-Tightness.

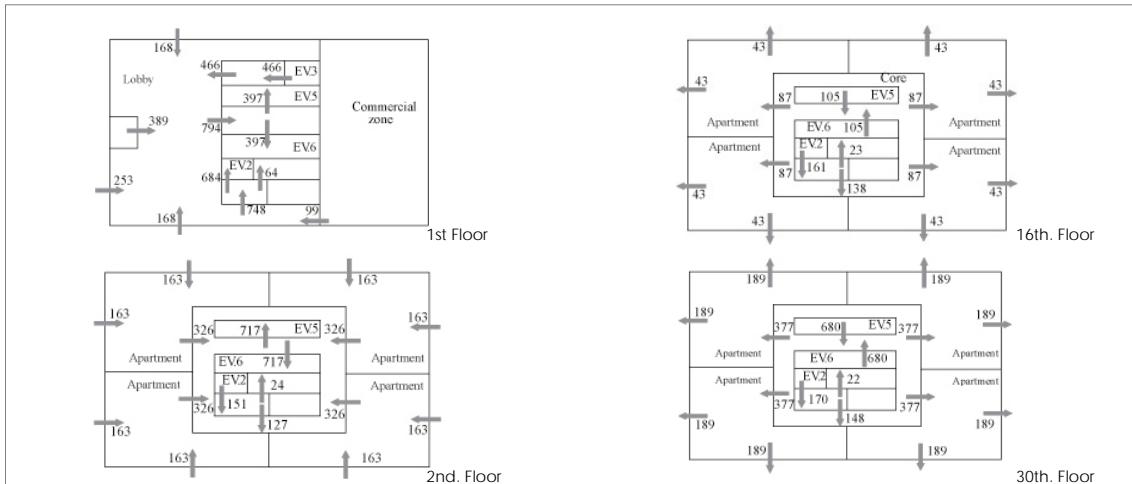


Figure 5: Airflow Patterns at Different Floor Levels

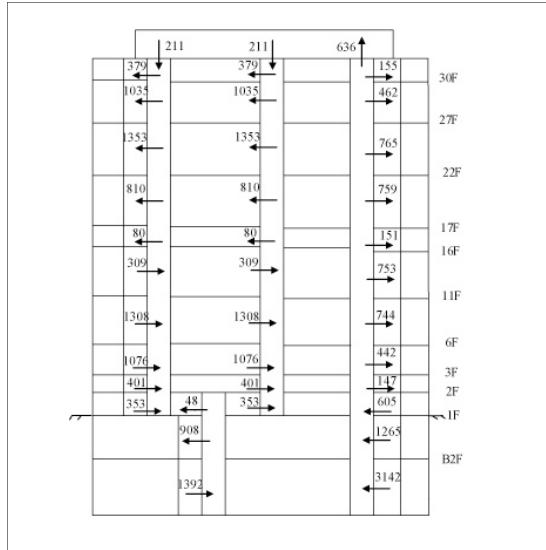


Figure 6: Airflow Patterns and Amounts [m^3/h] through the Elevator Shafts for the B5F+30F+Roof Simplified Model with Tight Exterior Wall Air-Tightness.

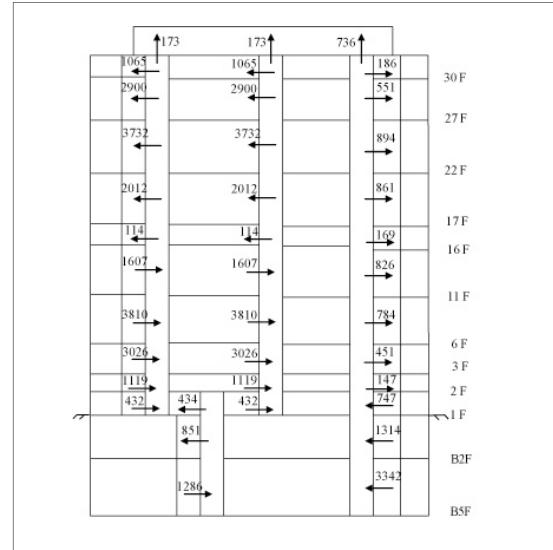


Figure 7: Airflow Patterns and Amounts [m^3/h] through the Elevator Shafts for the B5F+30F+Roof Simplified Model with Loose Exterior Wall Air-Tightness.

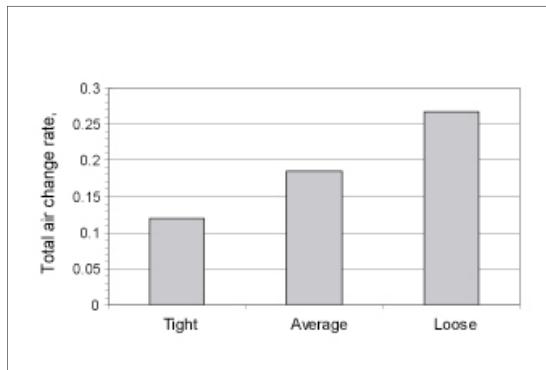


Figure 8: Total Air Change Rate vs. Exterior Wall Tightness.

Conclusion

Numerical modeling and simulation with regard to the airflow patterns of high-rise building situated in Korea by mean of COMIS software during the winter period has been carried out. The effect of exterior wall air-tightness on the stack pressure in the elevator shafts has been investigated. The conclusions of this study are as follows:

- A simplified model based on the original one which consists on gathering few stories into one has been constructed shows that the simplified model could more accurately represent the original one.

- There is a general upward movement of air inside the building under outside cold conditions with air flowing into vertical shafts from the lower floors and out to the upper ones.
- The total air by infiltration and/or exfiltration within the elevator shafts increases with the decrease of the level of the air-tightness of the exterior wall of the building.
- As soon as there is substantial leakage, through the exterior walls, the infiltration air flow "shortcuts" the stack and therefore decreases the pressure difference between indoor and outdoor.
- The required air total change cannot be provided by only infiltration even for poor level of air-tightness of the exterior walls. Therefore, mechanical ventilation is required to compensate for the lack of it.
- It has been shown that a huge amount of air infiltrates through the shuttle and emergency elevators from the basement, particularly from B5F to B3F. This causes the pressures increase in the neighboring zones of these shafts.

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HAKIM'S WORK ON TRADITIONAL ISLAMIC AND MEDITERRANEAN URBANISM

Besim S. Hakim

My primary motivation in undertaking research on traditional Islamic environments was to derive principles and lessons from the past which can be used today to improve the quality of our contemporary built environment, regardless of location; and to learn how to develop the framework and mechanisms necessary to allow a culture's identity to be reflected in its architecture and overall built environment, using Islamic culture as a case study. I attempted to identify the lessons available from my research in the form of lectures given since 1978, related publications, pedagogy, and projects.¹

Since completing the research and writing for the book *Arabic-Islamic Cities: Building and Planning Principles* in 1979, published in early 1986, a number of dissertations have appeared on various aspects of this area of study, in addition to several books and articles. I am happy to report the present work was instrumental in influencing the direction of some of those studies.² Reviews of the book have appeared in numerous languages, several authors have made extensive use of material from the book, and a Japanese and

Farsi translations have also been published.³ Yet only few of those works have addressed the processes and the system of rules that were followed in making decisions affecting various levels of the built environment. One of the reasons for the rarity of such studies might be the difficulty in finding reliable original sources; the language barrier and difficulties in reading handwritten manuscripts might be another. Yet without employing such sources and meticulous research, nothing of significance can be achieved. Happily more original manuscripts are being verified, edited, and published in their original Arabic, which should make it much easier for future researchers to use this material.⁴

One of the objectives of my work, mentioned in the Introduction of the book, is the challenge of recycling and testing traditional principles in contemporary and future urban design and architecture. This is an issue of cultural continuity in the built environment. I took this matter up again in early 1981 and have continued to examine it since then in a number of published studies.⁵

This article has several links to other articles of Besim S. Hakim. Readers may select to click a link which leads to an article, or copy the link to their browser to download an article of interest.

I have used the essential material and core arguments presented in the book in a number of articles.⁶ Other aspects of this field of study were not covered in the book; I have subsequently published complementary material, such as the role of customary practices (*Urf*) and their impact on the identity of towns and cities.⁷ Other important aspects of research related to the Islamic city await study; I have published an annotated list of studies that are needed to develop a comprehensive theory of urban form in traditional Islamic cultures.⁸

As my research has progressed in this field, it has become increasingly evident that the *processes* underlying the traditional system are the level from which to draw meaningful and practical insights. We should not place undue priority on typologies of the traditional system, as most people involved in the field of architecture and urban design tend to do, since those are in turn controlled and configured by the process and rule system governing decisions in space design and building activities. Thus if we recycle the essence of the process, we can apply it to any typological system and achieve the high quality results associated with the traditional system.⁹ For example, the typology utilized in the Hadramaut region in southern Yemen, as well as in the northern part of the country (as at San'a) and in the architecture found in the major Hijazi cities of western Saudi Arabia, is dramatically different from the predominant typology found in most other parts of the Islamic world, as illustrated by the examples in my book. Yet in all these locations the underlying process and its mechanisms were similar, resulting in the same high quality and sophistication found elsewhere. In other words the process is flexible and dynamic and not tied

to a specific typology.¹⁰

During the mid-1990s I allocated time to uncover the rule system related to the built environment in the early centuries of the Byzantine era, so as to provide an intelligent basis for studying the built environment of Greece before independence in the early nineteenth century.¹¹ The knowledge gained from such an investigation will assist in the further formulation of theory, because the case of Greece represents high-quality achievement in the traditional built environment of a non-Islamic society. The similarities and differences between the two cultures will sharpen our tools for constructing theory and for developing techniques for maintaining the cultural continuity of built environments, with lessons useful for other cultures.¹²

After completing that work in 1998, I embarked on a three-year research project with Zubair Ahmed for uncovering the rules and construction processes that were predominant in Northern Nigeria during the 19th century (see endnote 10). The findings from that work demonstrated how versatile are the rules and processes for construction that were developed by the earlier cultures of the Near East and later by Islamic culture. Muslim scholars in Northern Nigeria and elsewhere in sub-Saharan Africa based their work on sources from North Africa and on earlier sources from al-Andalus in the Iberian Peninsula.

In October 2002 I was invited by the Congress for the New Urbanism to make a presentation at their annual Council conference on Byzantine and Islamic Codes, which was held that year in Santa Fe, New Mexico. My presentation

was transcribed and is available online. It was revised for publication and appeared six months later in the *Council Report III/IV*, 2003.¹³

In a keynote address to the *First International Conference on Heritage, Globalization and the Built Environment*, held in Bahrain on 6-8 December 2004, I addressed the issues of ecology, sustainability and learning from tradition. There the emphasis was on integrating the knowledge from science, particularly ecological principles, with principles derived from traditional urbanism practice and the policies that are needed for our cities to achieve sustainability.¹⁴

I intend to continue with these efforts and sharpen my findings to make them more and more suitable and applicable to current and future practice. My continued work as a consultant for various projects, especially those located in historic towns and heritage districts of cities, will help achieve those goals. I hope others will join me in these efforts. The world will be a much richer place for it.

Notes

¹ Various publications are cited in the endnotes below. In addition there are also the following: "The contemporary benefits of traditional mid-east urbanism", *Proceedings of First National Conference in Urban Design*, New York, October 1978; B. Hakim (ed.) *Sidi Bou Sa'id, Tunisia: A Study in Structure and Form*, Technical University of Nova Scotia, Halifax, Canada, 1978 (high quality reprints are available from Books on Demand, from this link: <http://www.lib.umi.com/bod>. *Arabic-Islamic Cities: Building and Planning Principles*, 2nd Ed, 1988 is also available

from the same source). On incorporating the insight gained from this research in architectural pedagogy, see "Teaching history by searching for Emics and Etics", *Design Studies*, 12/1 (1991): 19-29. For using that insight in practice, I have written a forthcoming article titled: "Generative processes for revitalizing historic towns or heritage districts". Two cases are discussed there: Albuquerque, New Mexico from 1983, and Muharraq & Manama, Bahrain from early 2006.

² My lectures and personal interaction with academics and their students during the period 1977-1986 have influenced the content and outcome of a number of Ph.D. dissertations. The earliest that I am aware of, which cited a 1977 draft of chapter one of *Arabic-Islamic Cities*, is by Mahmoud Daza dated 1982 from the University of Pennsylvania. A brief history of events associated with the research and preparation of this book was published in Arabic in the Saudi engineer's magazine *al-Muhandis*, no. 8, (Dhu al-Hijja 1408/ July 1988): 67. Additional details can be found in the "Communication" published in *MESA Bulletin*, 26/1 (1992): 150-52.

³ Some of the reviews in English were published in the following journals: *Housing and Planning Review*, 41/4 (1986); *Mimar* 22 (1986); *Third World Planning Review*, 8/4 (1986); *Progressive Architecture*, 68/1 (1987); *The Geographical Review*, 77/2 (1987); *Cities*, 4/2 (1987); *MESA Bulletin*, 21/1 (1987); *Journal of Architectural Education*, 41/2 (1988); and *Journal of Architectural and Planning Research*, 6/1 (1989). At least two books, that I am aware of, have used extensive material from the book: A.E.J. Morris, *History of Urban Form*, 3rd Edition,

1994; and G. Broadbent, *Emerging Concepts in Urban Space Design*, 1990. A Japanese edition was published in Tokyo, December 1990, and a Farsi edition was published in Tehran, 2002.

⁴ For example: Ibn al-Rami's manuscript was not available in published form when I worked with it. The first unverified edition was published in Morocco by *Majallat al-Fiqh al-Maliki wa al-Turath al-Qada'i bil-Maghrib*, 2/ 2,3,4 (1982): 259-490. This was followed by a reliable scholarly verified edition by Abdul-Rahman al-Atram in 2 volumes, *al-Illan bi Ahkam al-Buryan* (Riyadh, 1995). A more recent edition using the same title was published by Ferid ben Slimane (Tunis, 1999). Another important manuscript by Ibn al-Imam, Isa ben Mousa al-Tutaili, was verified and published in Saudi Arabia by Ibrahim ben Mohammad al-Fayez, *Kitab al-Jidar*, (Riyadh, 1996). It was also verified by Muhammad al-Numainij and published by ISESCO, (Rabat, 1999), and four years later by Ferid ben Slimane and al-Mukhtar al-Tulaili (Tunis, 2003).

⁵ A framework suggesting how to learn from the past was first published in the *Proceedings of the conference on the Preservation of Architectural Heritage of Islamic Cities*, Istanbul, Turkey, 1985, published in Riyadh, 1988, pp. 305-17. It was further developed and published in *Al-Muhandis* (Ibid. note 2, pp. 2-6, in English), and then further refined and presented at the *Second International Conference on Urbanism in Islam*, November 1990, Tokyo, Japan, available in the proceedings volume (1994), pp. 377-84. Its final form was published in *Cities*, 8/4 (1991): 274-77, which also includes detailed citations of my other published work in this field. (to download, click here>> http://archnet.org/file-storage/download/1.+Hakim_1991-RecyclingSuccesses.pdf?inode=348108).

The components of the framework were further elaborated with examples in the encyclopedia article (cited in note 6 below). The rules and design guidelines that were developed for the Muslim community in Abiquiu, New Mexico, in early 1981 were published in *Proceedings of the 74th Annual Meeting of the Association of Collegiate Schools of Architecture*, New Orleans, March 1986, pp. 109-19. An expanded version followed in *Review 86*, UPM, Dhahran, Saudi Arabia, November 1986, pp. 11-28. (to download, click here>> http://archnet.org/file-storage/download/2.+Hakim_1986-AbiquiuGuidelines.pdf?inode=348109). That project represented an attempt to recycle the rules and know-how of the traditional system and adapt it to contemporary conditions on location in Abiquiu, New Mexico.

⁶ "Arab-Islamic urban structure," *The Arabian Journal of Science and Engineering*, 7/2 (1982): 69-79; (to download, click here>> http://archnet.org/file-storage/download/3.+Hakim_1982-ArabUrbStructure.pdf?inode=348110), "The representation of values in traditional and contemporary Islamic cities," *Journal of Architectural Education*, 36/4 (1983): 22-28; (to download, click here>> http://archnet.org/file-storage/download/4.+Hakim_1983-JAE?inode=348111), and the article "Islamic Architecture and Urbanism," *Encyclopedia of Architecture*, vol.3 (New York, 1989): 86-103. (to download, click here>> http://archnet.org/file-storage/download/5.+Hakim_1989-EncyArch.pdf?inode=348112). The case study of Saudi Arabia is used in this encyclopedia article to analyze the changes that occurred due to the abandonment of the system that created the traditional built environment

and the consequent adoption of imported Western values and techniques to create new settlements and cities in that country. This was followed by "Rule systems: Islamic," *Encyclopedia of Vernacular Architecture of the World*, vol. 1 (Cambridge, UK, 1997): 566-68. (to download, click here>> http://archnet.org/file-storage/download/6.+Hakim_1997-EncyVernArch.pdf?inode=348113). All of these articles summarize and/or elaborate on the essential findings in the book and also address contemporary and future issues of cities in the Arab and wider Islamic worlds.

⁷ The results of my research on the *Urf* were first published in the *Proceedings of the International Conference on Urbanism in Islam*, Tokyo, Japan, October 1989, vol. 2 (Tokyo, Japan), pp.113-38. A revised version was subsequently published as chapter 7 of the book *Islam and Public Law*, ed. by C. Mallat (London, 1993). A further revised, expanded, and illustrated version titled "The 'Urf' and its role in diversifying the architecture of traditional Islamic cities" was published in *Journal of Architectural and Planning Research*, 11/2 (1994):108-27. (to download, click here>> http://archnet.org/file-storage/download/7.+Hakim_1994-JAPR?inode=348128). Due to the importance of this topic, it should be viewed as an extension of the book.

⁸ See B. S. Hakim "Urban form in traditional Islamic cultures: further studies needed for formulating theory," *Cities*, 16/1 (1999): 51-55. (to download, click here>> http://archnet.org/file-storage/download/8.+Hakim_1999-FurtherStudies_.pdf?inode=348129). Of the fifteen topics suggested in that article, there are three that I would like to see investigated very soon. They all deal with the processes of

land demarcation and subdivision in the early formation of Islamic cities: the study of the principles and workings of land allotment (*Iqta*), the revivification of land (*Ihya*) within and on the fringes of settlements, and the processes of territorialisation of land (*Ikhtilat*), particularly at the neighborhood and building cluster levels. For my views on the state of scholarship concerning the Islamic city and its architecture to the early 1980s, see my review essay in *Third World Planning Review*, 12/1 (1990): 75-89. (to download, click here>> http://archnet.org/file-storage/download/9.+Hakim_1990-TWPR?inode=348130).

⁹ For suggestions on how the traditional rule system can be revived and used as a mechanism to revitalize and preserve the character of the traditional sectors of towns and cities in the Maghrib countries of Libya, Tunisia, Algeria, and Morocco, see my article: "Reviving the Rule System: An approach for revitalizing traditional towns in Maghrib," *Cities*, 18/2 (2001): 87-92. (to download, click here>> [http://archnet.org/file-storage/download/10.+Hakim_2001\(b\)-RevivingRuleSystem_.pdf?inode=348131](http://archnet.org/file-storage/download/10.+Hakim_2001(b)-RevivingRuleSystem_.pdf?inode=348131)). The substance of this article was first presented in Tangiers, Morocco, June 1996, at the conference entitled: "The Living Medina: The walled Arab city in architecture, literature, and history," sponsored by the American Institute of Maghribi Studies. The same approach suggested there could be used in other regional / cultural contexts.

¹⁰ This is corroborated by the findings of a recent study I undertook with Zubair Ahmed of the traditional rules and their manifestation in the unique neighborhood clusters found in Northern Nigeria and illustrated by examples from Zaria.

The results of our work titled "Rules for the built environment in 19th century Northern Nigeria" is published in the *Journal of Architectural and Planning Research*, 23/1 (2006): 1-26. (to download, click here>> http://archnet.org/file-storage/download/11.+Hakim_2006-JAPR?inode=348132).

¹¹ See my extensive study published as "Julian of Ascalon's treatise of construction and design rules from sixth-century Palestine," *Journal of the Society of Architectural Historians*, 60/1 (2001): 4-25. (to download, click here>> [http://archnet.org/file-storage/download/12.+Hakim_2001\(a\)-JSAH?inode=348133](http://archnet.org/file-storage/download/12.+Hakim_2001(a)-JSAH?inode=348133)).

¹² For a comprehensive analysis of Byzantine and Islamic codes and how they influenced traditional developments as we observe in the vernacular towns and cities and their architecture surrounding the whole of the Mediterranean basin, including the lessons for contemporary practice-- see my forthcoming chapter: "Mediterranean Codes in History: Origins, Context, Impact, and Lessons for Contemporary Practice" in the book, edited by Stephen Marshall, titled *Urban Coding*, Routledge (forthcoming late 2008 or early 2009).

¹³ The full version of my transcribed presentation is available online at: <http://www.charrettecenter.net/Hakim>. A shorter version is also available online from that web site and from the publisher's web site: <http://www.tndtownpaper.com>. It is also available in published print form in the *Council Report III/IV*, published by The Town Paper, Gaithersburg, Maryland (2003): pages 42, 43, 63. The issue of learning from traditional Mediterranean codes

is discussed there. Since then I have further developed the parameters of this problem by integrating knowledge available from science, particularly the phenomenon of complexity, and the insight from the underlying processes of traditional urbanism. I have discussed aspects of this confluence in the Nigeria study (see note 10 above) and recently, in more detail, in a chapter in the forthcoming book on urban coding (see note 12 above).

¹⁴ The text of my presentation is available in the published proceedings of that conference, pages 17-28. (to download, click here>> http://archnet.org/file-storage/download/13.+Hakim_2004-BahrainKeynote.pdf?inode=348134).

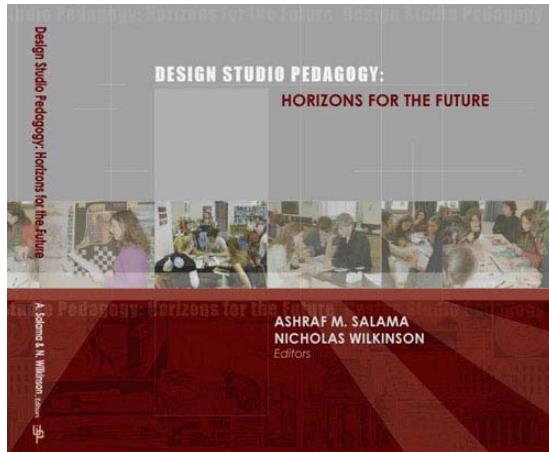
DESIGN STUDIO PEDAGOGY: HORIZONS FOR THE FUTURE

By: *Ashraf M. Salama and Nicholas Wilkinson*

(The Urban International Press, Gateshead, United Kingdom. 2007) ISBN 18728110904

ASSESSING ARCHITECTURAL EDUCATION'S 'CROWN JEWEL'

Michael J. Crosbie



The design studio has been the centerpiece of architectural education for more than a century and a half. It was inherited from an earlier method of educating architects, the *atelier*, where future designers studied under a master architect in his studio. The Ecole des Beaux Arts formalized this system of education, and contemporary architecture programs continue its use. The studio--as a place and as a

form of pedagogy--is so central to architectural education that most educators don't even begin to question its authority. For professors, students, and practitioners, the studio is like the air we breathe—it surrounds us, it gives us life as designers, and it is essential to our formulation as architects. In their pivotal examination of architectural education in the U.S. more than a decade ago, *Building Community: A New Future for Architecture Education and Practice*, Ernest Boyer and Lee Mitgang identified the studio as an educational paradigm that other disciplines, such as engineering and business, should consider in the education of their own professionals. For Boyer and Mitgang, the studio offered the ideal setting for integrating knowledge—a place where synthesis and application, reflection and action, occurred simultaneously, joining theory and praxis.

That, at least, is the ideal. But any architectural educator will admit to the design studio's shortcomings. It's often a mysterious business. At the beginning of the semester, students and their teachers fill the studio, anticipating the magic and mayhem that happens there. Students blossom in their architectural identities,

and professors gain new insights into the process of teaching and being taught. The studio seems to occupy a locus between home and prison, a place of salvation and damnation, the site of triumph and humiliation. Unlike any other forum for education, the studio takes on an independent life, with its rules, traditions, and revelations. Out of it, in ways that we don't fully understand, students become architects.

Over the years, especially during the last half of the last century, much has been written about the architecture studio and its pedagogy. The turbulence of much of that period was reflected in the studio and its changing role in training architects for a society in flux. The studio continues to be a focal point for experimentation, reflection, invention, and reaction. A new publication brings together some of the most thoughtful, helpful, and provocative ideas about the architecture studio and how it can be adapted. *Design Studio Pedagogy: Horizons for the Future*, edited by Ashraf M. Salama and Nicholas Wilkinson (both of whom are architects and architectural educators), brings under one cover 23 contemporary articles by 25 architectural educators from around the world who consider the special nature of the design studio, how it is changing, and how it might change in the future.

Salama and Wilkinson, both of whom have written extensively about architectural education, organize the collection under five chapters: 1. Theoretical Perspectives and Positions; 2. Critical Thinking and Decision Making in Studio Pedagogy; 3. Addressing Cognitive Styles in Studio Pedagogy; 4. Community, Place, and the Studio; 5. Digital Technologies and the

Studio. Each chapter opens with a helpful and insightful essay by Salama and Wilkinson on the articles that follow. The book commences with two special contributions, one each by N. John Habraken and Henry Sanoff (both giants in the field of architectural education) that provide historical context for the five chapters that follow. Underlying both essays is the question of power—in the studio, and in the profession at large—woven as a theme throughout the book.

Architectural design continues to be a problem-solving exercise. The types of problems addressed are known as “wicked”: they are not easily defined, they are not simple (not even the “simple” ones), and it is a challenge to declare when they have really been solved. Another helpful dichotomy is the difference between convergent and divergent problems. Convergent problems compile information that leads to a single, correct answer (math problems, for example). But studio design problems are divergent—the information collected, the reflection on that information, and the application of the student's analysis to the problem at hand will lead to many solutions, some better than others, but all applicable to some degree. The book offers examples of how such design studio problems have been approached at different schools, at different times, for a variety of reasons.

Design/build studio problems lend a hands-on experience that includes architecture's physical weight (in a way that paper solutions can never capture). Community-based projects by architecture students and faculty offer the possibility of an actual solution being adopted and realized. Projects pursued in virtual design

studios joined by the Internet, as collaborations of architecture students on different sides of the globe, contain the element of cross-cultural solutions. Research in the studio adds another dimension to its setting as a place for reflective action. And what about the psychology of the studio, and the emotional roller coaster that many students ride as projects wind their way through the semester? An article by Noam Austerlitz and Iris Aravot presents research into how interactions between professors and students, and the students' own perceptions of their place in the studio, shape the studio experience.

Some of the most provocative articles in this book take on the perennial problems of the studio—such as how knowledge gained in support classes can be incorporated in studio to achieve a truly integrative learning experience. Yassar Mahgoub's article about curriculum structure and positioning the design studio as a "capstone" instead of the "core" invites one to reconsider the very nature of the studio in education. Jeffery Haase presents a new paradigm—that of installation art—as a format for studio explorations. And Stephen Kendall calls for an approach to design that is open-ended and distributive, which he believes more faithfully reflects the role of the architect and the nature of how the built environment evolves.

The design studio's resilience amid social and educational tumult suggests that it will not soon disappear. But this valuable collection assembled by Salama and Wilkinson of observations, ideas, theories, and experiments centered on the design studio will surely provoke new discussions, patterns, and

paradigms concerning the crown jewel of architectural education.

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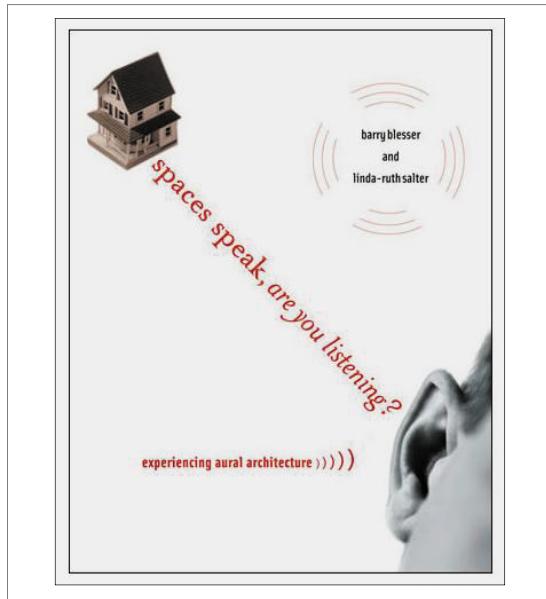
For a professional biography, see contributors to this issue, pages 7-10.

SPACES SPEAK, ARE YOU LISTENING?: EXPERIENCING AURAL ARCHITECTURE

By: *Barry Blesser and Linda-Ruth Salter*

(MIT Press, Cambridge, MA, USA. 2007) ISBN 0262026058

Abeer A. Hasanin



Intrigued by the arguments introduced in “Spaces Speak,” as an environmental graphic designer and a visual artist I find myself need a moment of reflection about the responsive arguments and the knowledge qualities

offered by Dr. Blesser and Dr. Salter. They are discussing some of the missing components that continued to receive little or no attention from those who are working in built environment related fields. Thus, soon when I knew about the book I decided to do this review for ArchNet-IJAR. However, because am not an architect or spatial designer, I also decided to rely on what was written about the book. In this sense, this review should be regarded as a collection of reviews.

“Spaces Speak, Are you Listening” is constituted in nine chapters that address critical issues of concern to the design community. The first chapter introduces issues that pertain to aural architecture and how it can contribute to a better experience of spaces. The second chapter introduces a number of issues under the heading of the auditory spatial awareness including hearing spaces, navigating spaces by listening, and the social components of aural architecture. In the third chapter a number of social and cultural issues are explored by reflecting on some evolutionary aspects of aural space from antiquity to modern times. It discusses how social forces influence the aural

experience of space while critically analyzing how emerging trends such as industrialization has a dramatic impact in terms of the way in which it can create new aural attitudes.

Chapters four, five and six introduce aural arts and musical spaces and inventing new virtual spaces for music while at the introducing some scientific perspectives on spatial acoustics. These three chapters can be seen in trans-disciplinary terms as while discussing spatial issues the cross the boundaries of different art and engineering disciplines. While chapter seven critically analyzes how social values may contribute to careers in the field of aural architecture, under the heading of spatial awareness as evolutionary artifact chapter eight argues for the notion of hearing as a means of navigating and communicating. Again, it can be seen in trans-disciplinary terms as it covers issues that pertain to the interdependence of biology, nature, and culture. Chapter nine offers highlights and concluding comments on how aural architecture can contribute to a better understanding of space. In fact, crossing the boundaries of disciplines is one the important qualities of "Spaces Speak ..."

I tend to see the book in terms of corresponding to the complexity that characterizes our current thinking and research when discussing, analyzing, or designing spaces. Now, we are witnessing a shift in the grounds of research in both the sciences and the arts from a concentration on disciplinary needs and history of things/issues, to an emphasis on how needs of one discipline are connected to knowledge goals and aspirations of other disciplines. In other words, it can be argued that no one theory will have the upper hand

is solving spatial problems and no discipline can make strong claims anymore about its own direction, value, and output in isolation from what is happening in other areas of research. In essence, the book does not take aural architectural in technical terms, but involves a trans-disciplinary thinking, where the study of auditory spatial awareness of aural architecture is introduced in a manner that covers concepts stemming from music, acoustics, perception, psychology, anthropology, engineering, theology, archeology, biology, neuroscience, history, and architecture. This is not all; a number of concepts are introduced to cover issues derived from the accumulated cultural traditions over the years.

In introducing aural architecture, the authors argue that "We experience spaces not only by seeing but also by listening." This means that there is a possibility to navigate a room in the dark, and "hear" the emptiness of a house without furniture. Our experience of music in a concert hall depends on whether we sit in the front row or under the balcony. The unique acoustics of religious spaces acquire symbolic meaning. This is evident in most religious buildings of various faith traditions including churches and mosques. Strikingly, the argument of the authors goes beyond the physical experiences of human beings in space but introduce the social component. They argue, and rightly so, that social relationships are strongly influenced by the way the sound is changing in space.

"The audible attributes of physical space have always contributed to the fabric of human culture, as demonstrated by prehistoric multimedia cave paintings, classical Greek

open-air theaters, Gothic cathedrals, acoustic geography of French villages, modern music reproduction, and virtual spaces in home theaters. Auditory spatial awareness is a prism that reveals a culture's attitudes toward hearing and space. Some listeners can learn to "see" objects with their ears, but even without training, we can all hear spatial geometry such as an open door or low ceiling. (Blesser and Salter, 2007)"

Based on the trans-disciplinary quality of the arguments of the book, it establishes the concepts and language of aural architecture. These concepts provide an interdisciplinary guide for anyone interested in gaining a better understanding of how space enhances our well-being. Aural architecture is not the exclusive domain of specialists.

Unlike pure psychological studies on hearing which are focusing only on the perceptual qualities of intensity, frequency, temporal effects, tonal attributes, this book places aural architecture in context. It critically views the components of aural architecture to include many types of spatiality. However, five of these are emphasized: social, musical, navigations, aesthetic, and symbolic, all of which enhance our understanding of how human hearing and the power of sound contribute to the experiential quality of space.

Discussing the ideas and concepts presented in this book with many academic and professional spatial designers I come into contact with, I would like to add my voice to those who have endorsed the book, and call for a rethinking of the introductory courses in schools of architecture and environmental

design. Beginning design students are typically introduced to the visual paradigm of space and only the visual, and this is apparent in design fundamentals or basic design courses. These courses are to develop students' abilities of articulating abstract visual principles, and comprehend design elements based on these principles, but the aural component is dramatically missing. As aural architecture should be seen as an indispensable component when discussing design fundamentals, these courses should benefit from such the book and the way in which sound and hearing influence the qualities of space design. As well, environment-behavior courses that are introduced in both undergraduate and graduate programs are focusing only on the human experience in visual, functional, and behavioral terms. Still, the aural component is missing. Therefore, I would suggest this book to all design educators who are either teaching basic design courses or environment-behavior courses. It is a must read as it covers one of the ignored or oversimplified issues in space design.

What Was Said about "Spaces Speak,..."

Endorsements of *Spaces Speak*:
Retrieved from *Spaces Speak Website*
(<http://www.blesser.net/index.html>)

"Blesser and Salter have thoughtfully synthesized a wide range of technical, aesthetic, and humanistic considerations of aural architecture to create a valuable interdisciplinary resource for anyone interested in thinking about sound, space, and society." **Emily Thompson**, Professor of History, Princeton University, and author of *The Soundscape*

of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900-1933

"This wide-ranging, articulate, and probing investigation of how humans listen helps us to appreciate the value of natural and constructed acoustics. It also shows that our sense of the space of sound has largely been lost in the vast library of recorded music. This book will change how you listen. Well done!" **Floyd Toole**, Vice President of Acoustical Engineering, Harman International Industries.

"The authors present a groundbreaking synthesis of auditory spatial awareness as it has developed from cave acoustics through the modern concert hall to digital simulations of virtual spaces. Drawing on numerous disciplines, they summarize the scientific and cultural knowledge of the subtleties of acoustic spaces in a clear and readable manner, while challenging our social values about the optimal design of those spaces. A must-read for every student of architecture and aural culture." **Barry Truax**, Professor and Composer, Simon Fraser University.

"At last, a book that reveals that spaces are meaningful beyond their acoustics! I was captivated by this impressively well-documented book, and recommend it to anyone with an interest in acoustics or architecture." **Jean-Dominique Polack**, Professor of Acoustics at the Université Pierre et Marie Curie, Paris.

"This book is a serious overview of aural architecture and its growing importance in our world. Its comprehensive range--from historical essay to technical and social aspects of the field--makes it an important addition to the existing literature on this subject." **Karen Van Lengen**, Dean and Edward E. Elson Professor, School of Architecture, University of Virginia.

Selected Resources

A lecture by Dr. Barry Blesser in Belmont library, Belmont, Massachusetts
http://www.blesser.net/downloads/Lecture_edited_64.mp3

Association of Integrative Studies – Newsletter (May 2007)
<http://www.blesser.net/downloads/AIS%20May07.pdf>

Research Design Connections (Winter 2007)
<http://www.blesser.net/downloads/RDC%20Review.pdf>

List of Published and Unpublished Articles
<http://www.blesser.net/Articles.html>

Glossary of Terms for Aural Architecture
<http://www.blesser.net/downloads/Glossary.pdf>

Who are the Authors of "Spaces Speak,..."

Biography of the authors as retrieved from Spaces Speak Website
<http://www.blesser.net/index.html>

Dr. Barry Blesser has spent the last 40 years exploring the influence of cognitive and perceptual psychology on the design and implementation of technology. His doctoral thesis, the perception of spectrally rotated speech, conclusively demonstrated the existence of a variety of cognitive strategies that are available for decoding speech. As one of the pioneers of digital audio technology during the 1970s, he transformed his fantasy of a portable concert hall into the first commercial

artificial reverberation system, which was used extensively in the creation of recorded and broadcast music. He demonstrated the relevance of perceptual strategies in his study of the diagnostic accuracy of medical radiologists. In the early 1980s, his research on how humans read handprint resulted in the creation of a startup company that developed an automated recognition system. While Dr. Blesser has focused on creating and implementing technology as a technical and management consultant, he also integrates the arts and social sciences into the design process. As an independent scholar, he has spent the last 5 years researching the new concept of aural architecture, which led to his current passion: the social consequences of functional deafness when in corrosive acoustic environments. Acoustics is an inseparable combination of the hard and soft sciences. See also his extended [biography](#) for more information.

Dr. Linda-Ruth Salter was a pioneer in crossing discipline boundaries when she obtained a Ph.D. degree in Interdisciplinary Studies from Boston University in 1984. Her doctoral dissertation examined the nature of sacred space in secular societies. Additional research showed the significance of place and spatial memory in maintaining group identity. Dr. Salter has consulted in the area of research and planning for a successful built environment in public housing, educational and business spaces, and has taught urban studies at Boston University. As a consequence of living in Asia, studying Sumi-ink painting, and her interest in the symbolic meaning of material culture, Dr. Salter created a specialty in promoting historic indigenous crafts by founding an international

Asian fine arts business. Recently, Dr. Salter co-authored the first scholarly article on Qing Dynasty belt ornaments, which emphasized their symbolic and social role in Chinese society. Presently she is Asst. Professor in the Humanities and Social Sciences at New England Institute of Technology, where she contributes to the fine and performing arts curriculum in a technology context. Fusing and integrating the fine arts, technology, and social science is her specialty.

Dr. Blesser and Salter, a husband and wife team of 35 years, fused their collective knowledge and experience of the physical and social sciences to create the concepts of auditory spatial awareness and its manifestation as aural architecture. *Spaces Speak* embodies their shared philosophic bias: technology changes the social and artistic aspects of culture, while at the same time, culture influences the properties.

NIKOS A. SALINGAROS: A NEW VITRUVIUS FOR 21st-CENTURY ARCHITECTURE AND URBANISM?

Ashraf M. Salama

Abstract

*This article adopts the premise that the work of Nikos A. Salingaros marks a true beginning for seriously regaining what cultures and societies have lost throughout the years through the work of many architects, urbanists, and decision makers. It explores the three monographs he has written and views them as a new "De Architectura" for 21st century architecture and urbanism. The article reflects on Vitruvius's *De Architectura* and sheds light on selected evolutionary aspects of architecture and the anti-vitruvian practices that continued for hundreds of years, but intensified over the last century. It reviews the attitudes of anti-vitruvian architects that contributed to severe socio-cultural and contextual problematics. The views adopted in this article are based on the conviction that the theories and writings of Salingaros are a reaction and a conscious positive response to these practices, and that these theories will invigorate the creation of humane and livable environments.*

Keywords

Nikos Salingaros; Vitruvius; Christopher Alexander; deconstructivism; anti-architecture; urban structure.

NOTE to Academics, Architectural Students, Critics, and Practitioners

This article should not be seen in a similar light to the typical practice of critics. It is by no means, and should not be interpreted as, propaganda or a publicity campaign for a new theory. It simply reflects on the work of a scientist, a mathematician, an architectural theorist and a concerned world citizen who felt the need for architects to start shaping a better world. Recognizing the current status of architecture, it views Salingaros' work as a great endeavor that is not bound to a time limitation or a geographical location.

Preamble: From Vitruvius to Salingaros

Frank Granger and Morris Hicky Morgan's translations of Vitruvius' *De Architectura* tell us much about the essence of architecture as a cultural artifact, and as one the most important professional and educational disciplines. *De Architectura* offers insights into issues on what constitutes architecture, how architecture should be practiced, and the bodies of knowledge required for a responsive and knowledgeable architect. After several centuries of many failures to address these

issues and to face the practical realities of architecture in satisfying the basic needs of people, Nikos A. Salingaros shines on the international architectural community. He brings to light his own theories in three manuscripts that I believe will shape the future of world architecture.

The three pieces of Salingaros titled “Anti-Architecture and Deconstruction,” “Principles of Urban Structure,” and “A Theory of Architecture” mark an important milestone in the history of architectural theories, where true scientific thinking coupled with the integration of natural and social sciences put architecture again into focus, and answer a series of critical questions. While offering harsh criticism on conventional practices, the manuscripts offer science-based theories and arguments, an aspect that remains missing from old and recent debates on architectural theory and criticism. It is my conviction that they will eventually penetrate the thick skin of traditional academics and the inherited practice norms of professionals, which are not equipped to face the complexity of architecture and urbanism in the 21st century.

On Vitruvius

While little is known about Vitruvius and his life, examining some of the available manuscripts (Granger, 1931; Morgan, 1960) reveals that he was born around 80 BC and died in 25 BC. He was a Roman architect as well as an engineer, admired and studied Greek philosophy and science in depth while gaining an intensive experience — in architecture and the technology of the time — throughout the course of his professional career. Vitruvius

was also a writer and can be seen as the first theorist of architecture in Western history. There were other earlier or contemporary known and unknown theorists in other cultures. In this respect, one would differentiate between Vitruvius and others by considering their work as “Volume 0 theories” while that of Vitruvius as “Volume 1 theory,” i.e. a recorded written theory.

According to Granger (1931), Marcus Vitruvius Pollio or “Vitruvius” was one of those appointed to oversee the design and manufacturing of the imperial artillery or military engines of the Roman Empire at that time. It is said that he was the architect of at least one unit of buildings for Augustus, “Gaius Julius Caesar Octavianus.” A few years before he died, Vitruvius completed his manuscript *De Architectura* which, after its re-discovery in the 15th century, became one of the most influential writings to be studied by architects from the early Renaissance until the present.

On De Architectura

Vitruvius adds to the tradition of Greek theories and practices the results of his own experience. *De Architectura* covers almost every aspect of Roman architecture. The books break down as follows: 1. Town planning, architecture in general, and the qualifications required of an architect; 2. Building materials; 3. Temples and the orders of architecture; 4. *continuation of book 3*; 5. Civil buildings; 6. Domestic buildings; 7. Pavements and decorative plasterwork; 8. Water supplies; 9. Sciences influencing architecture — geometry, mensuration, astronomy etc.; and 10. Use and construction of machines (Granger, 1931; Smith, 2004).

Roman architects were significantly different from their modern counterparts, acting as engineers, architects, artists, and craftsmen combined. Vitruvius was very much a professional of this type, a fact reflected in *De Architectura*. He covers a wide variety of subjects that he saw as touching on architecture. This included many aspects which would seem invisible to modern eyes, ranging from mathematics and astronomy, to meteorology and medicine. In the Roman conception, architecture needed to take into account everything that touched on the physical and intellectual life of a human being and his surroundings (Rowland & Howe, 1999).

In Vitruvius' *De Architectura*, known in contemporary history as "Vitruvius: Ten Books on Architecture," architecture was defined and theorized. However, it was re-stated in the 17th century by Sir William Wotton (Morgan, 1960). In theory, three complex criteria/phenomena constitute the definition of architecture: 1) Convenience/Commodity; 2) Durability/Firmness; and 3) Beauty/Delight. This means that a building or a portion of a designed/built environment must meet three standards to qualify as architecture. It must conveniently serve the purpose for which it was designed, built, and inhabited; it must be structurally sound; and it must be beautiful.

Each of these three criteria constitutes a number of subordinate complex phenomena. For the purpose of simplifying these phenomena one would venture the development of a preliminary definition of each. Commodity or convenience expresses the functional aspects of architecture, the way buildings house human activities, how people live and how

societies operate in the physical environment, or simply the dialectic relationships between people and their environments. Firmness or durability on the other hand represents the technological aspects of architecture, since it is governed by the natural sciences, including the laws of physics, statics, and dynamics. Delight or beauty exemplifies the aesthetic component of architecture, and this is based on the very fact that architecture seeks to express ideal concepts of beauty that emerge from symbols embedded in a particular culture. Notably, each of these phenomena has an interdependent relationship with the other two (Salama, 1998).

On Anti-Vitruvian Practices

Throughout the recorded history of architecture, the balance among the preceding three criteria/phenomena and their interdependencies has been a continuous challenge, and one can confidently argue that they were never addressed in full. This is especially obvious when looking at how architecture has evolved as a profession and as a cultural product throughout the last century. Up to the modern era, architecture was — and was seen as — a cultural index that took different forms in different historical eras. These forms resulted from the intersection of contextual particularities of geography, economy, and socio-political settings. However, architecture was always concerned with producing individual works of art on individual sites, where designing buildings or built environments was intuitive. The design process relied heavily on the experience, judgment, and talent of the individual designer. While this approach to architecture has — in a few cases — resulted

in some of the most enduring achievements, today architecture faces severe challenges which threaten its traditional role that was dominant in pre-modern times, namely since beginning of the 20th century.

Although architects of the ancient world were generally associated with the rich and powerful, the king and royal institutes, their work had many merits that we still appreciate in recent times. With varying degrees of success it attempted to strike the balance between the three criteria/phenomena of architecture. Still, the poor and the middle class were never addressed by architects. On that basis, one can argue that while there were many excellent achievements in architecture, typical conventional practices throughout the pre-modern era were Anti-Vitruvian. Over the last three decades however, a few positive Vitruvian-based attempts emerged here and there around the world.

While having its roots in the beginning of the 19th century, the Modern movement reached the first half of the 20th century under the general title of “International Style” or “Modern Architecture,” though it did not live up to its name. The basic premise of the Modern movement was to integrate function, arts, and crafts to form universal ideas within the requirements of technology. This by default has led to the belief in certain principles that include a rejection of ornament and historical styles as a source of architectural form (historicism), while replacing this with a belief in machine aesthetics. However, the literature on architectural theories corroborates that the Modern movement failed to appreciate the distinction between conceptual abstract

designs, the realities of buildings, and the context within which they are designed and built. Throughout this last century, the continuous attempts to internationalize or universalize architecture have resulted in the subtle destruction of traditional cultures, and I believe many academics and theorists would agree on that (Salama, 1995).

The international Post-modern movement was a direct challenge to many of the premises upon which modern architecture was based. It advocated efforts ranging from historicism (including historical revivalism and historic eclecticism) to schizophrenic approaches of collage and elitist architecture. Based on some logical fundamentals and critical visions, it acknowledged the role of symbolism in architecture. It also regarded Modernism as lacking the premises to properly respond to the emotional and cultural needs of people while simultaneously expressing economic, scientific, and technological givens of the time. Post-modernists acknowledged the taste codes of the public as a source of design, in the belief that such a practice would help their work to communicate with the users of architecture (Mitchell, 1993; Salama, 2002 & 2007). While this might be seen as a good-intentioned practice, it trivialized the essence of architecture that eventually became very superficial. In this respect, the major weakness of Post-modernism lies in the fact that its disposition did not allow it to go far enough in its acknowledgment and understanding of its context. It did not address the shortcomings implicit in modernist architectural practices, but rather, it tacitly accepted them.

Despite any good intentions that might have

existed, Modern and Post-modern movements were anti-vitruvian in nature. The simple reason for this statement is that one criterion of architecture was always emphasized at the expense of the other two, or that a high value was placed upon two phenomena while the third was oversimplified or entirely ignored. In historic terms, as two developmental phases of architecture, they have culminated into architectural globalization with many underlying “isms” and trends that simply cut architecture from its roots, which are exemplified by socio-cultural and physical contexts.

Globalization generally refers to an economically driven process, whereby the politics, economics, and culture of one country penetrate other countries (Stiglitz, 2003). It is seen by those who believe they will benefit from it as a force that can unite economic forces, while at the same time causing social and cultural resistance. Under strong global economic and cultural impacts, world architecture witnessed the erosion of regional/local identities. It is concomitantly experiencing the loss of visual anchors into the soul of most cities, and even small towns and villages. The three very basic criteria of architecture were entirely forgotten, and were replaced by other factors that involve market economy and the establishment of transnational anti-vitruvian practices.

On Anti-Vitruvian Architects

Since architecture became an established profession, architects are always in a continuous search for recognition and fame. The reason is that throughout history they have wanted to be the intellectual and social peers of their elite clients. According to Kelbaugh

(2004), architects have established first local, then continental, and now global networks of criticism, critics’ circles, and publications in which awards, books, and magazines are the real medium of expressing their status. In such a medium, the photographs are privileged at the expense of the physical artifacts, and I would add here at the expense of the people who use them. The result is that “*Architecture has become the exclusive domain of the so-called “Star Architect” (starchitect in common usage), no longer operating as a conveyance, but as a usurper of culture and identity.*” (Salingaros & Masden, 2007:37).

Architects still believe that they are eligible to use the act of building — which buildings are however actually used by others — for personal exploration and expression. They are creating architecture that makes little reference to anything, only their creative impulses. Concomitantly, this sense of artistic entitlement empowered a few of them to design a few brilliant individual buildings. Yet, it has produced fragmented and illegible urbanism. Therefore, one can argue that, in generic terms, while some architects manage individual buildings well enough, the overall built environment is increasingly mismanaged.

Digging into the study of Dana Cuff (1989), the attitudes of anti-vitruvian architects become more obvious. Cuff was interested in exploring two issues through interviews with star architects. These were the notions of the individual and the image of the society, and the individual’s identity and the individual’s sense of others. Her interview resulted in a number of statements made by name architects that support the preceding argument. Richard

Meier states: "... the similarities among my works are because I am interested in certain things." Robert Kliment states: "... I make what I want to be ... architecture is a way to create order and logic in my own life ...". Eisenman states: "... I act through architecture, how else do I prove I am here ...". As Cuff commented, "... a building reveals a self portrait of its maker ..." (Cuff, 1989).

Strikingly, these architects see themselves as creative leaders and among the world's actors, but with special talents and unique responsibilities, emphasizing the cardinal contribution of the individual maker to the world of architecture. As a result, their buildings are seen as steps within their own lives. This illustrates that artistic originality and individual authorship are highly revered and seen as paramount, and thus the notion of "celebrity" continues to be a dominant aspect of international architectural circles. What does this tell us? An assertion can be made here: anti-vitruvian architects, the shapers of most cities in the developed and the developing worlds, are immersing themselves in a matter of self exploration and self expression, and thus the creation of architecture is based only on intrinsic feelings and beliefs rather than rational, logical, and contextual constraints (Salama, 1995).

In response to these syndromes the recent article of Salingaros and Masden (2007) raises critical questions *"How can anyone believe that a "Dutch Design Demigod" could know more about a place than the very people who were born and raised there? How can these starchitects espouse to know what is best for the rest of the world? More importantly, how do we combat the aesthetic authority that*

such individuals now exert over our place in the world?" (Salingaros & Masden, 2007:37). I would argue that someone, some organization, a professional body, an architectural club, a client group, or whatever responsible entity should take these questions and seriously try to answer them in an attempt to stop or minimize the severe damages to cultures and societies in which those anti-vitruvian architects practice.

The preceding reflection goes along with the architect role models identified by James Ackerman in his pioneering article: "Listening to Architecture" (Ackerman, 1969). The anti-vitruvian architect role models can be exemplified in two types of architects; the egoist, and the pragmatist role models. One should note in this context that other roles have been identified by several writers, for example Erber (1970), and Burgess (1983). Nevertheless, for the purpose of this discussion, the focus is on the egoist and the pragmatist as dominant models that continue to exist for centuries. Again, based on recent practices, one could see them as the only models now.

The egoist is attitudinally described as the "I-give-them-what-I-want" approach to practice. The pragmatist role, on the other hand, is attitudinally described as the "I-give-them-what-they-want" approach to practice. In terms of the attitudes underlying these two models one can argue that the tendency of the egoist is to deny or oversimplify (or superficially respond to) the system of values of a society, while the tendency of the pragmatist is to totally accept the system of values as is. Both these attitudes produce negative approaches to the creation of the built environment, and to the way in which architecture is practiced. The

egoist is paternalistic and his/her role is to create abstract forms based on subjective feelings, whereas the pragmatist is entrepreneurial and his/her role is to manipulate forms based on accepting the values of others. In this context, one should emphasize "her" as star architects now include female architects (2). The anti-vitruvian practices and the attitudes of anti-vitruvian architects have contributed to severe environmental and social problems. The cultural and visual identities of different localities in different parts of the world are completely lost because of the role models they adopt, as well as the naivety of the client groups who support them.

One should conclude this section by the following four wonders and one wish:

- I wonder if anti-vitruvian architects are able to deal with different segments of societies other than serving the rich and only the rich.
- I wonder if they have the ability to protect the tangible built heritage within the intangible cultural and societal contexts.
- I wonder if they can democratize design practices and if they know how to involve people affected by design decisions in the process of making those decisions.
- I wonder if they are able to deal with problems and paradoxes associated with different sub-cultures including the disabled, children, seniors, and the under-represented (Salama, 1999).
- I wish I could see anti-vitruvian architects able to solve a housing problem in a village or in a dense urban region, or able to introduce

change in a poor community, or a squatter settlement. While anti-vitruvian architects are immersing themselves in exploring new innovations to foster their fame, two thirds of the world's population lacks shelter or lives in substandard houses (adapted from Salama 2003).

On Salingaros

Reaching the global condition and the resulting ills of anti-vitruvian world architecture and urbanism, many architects came to terms with the facts of industry and economy, but typically at the cost of their ethical responsibilities as independent professionals. The ethics of the individual responsive architect or the small-scale architectural office were replaced by the ethics of the large consulting firms or real-estate companies. As a conscious reaction to this condition, Nikos Salingaros' work is emerging to offer new theories that if adopted, adapted, and practiced, will shape a better environment for the future. The question at this point is: Who is Nikos A. Salingaros?

Born in Perth, Australia of Greek parents, Nikos A. Salingaros is a mathematician and polymath popular for his work in urban theory, architectural theory, complexity theory, and design philosophy. Salingaros shares a harsh critical analysis of conventional modern architecture with the architect and computer software pioneer, Christopher Alexander, the prominent scholar and theorist. Salingaros, like Alexander, has proposed an alternative theoretical approach to architecture and urbanism that is more adaptive to human needs and cultural aspirations, combining rigorous scientific analyses with deep intuitive

experience (Wikipedia, 2007). He has collaborated with Alexander in the editing of Alexander's latest work, "The Nature of Order". Salingaros' three manuscripts and numerous articles have been published in, not only the mainstream conventional architectural magazines, but in responsive online and paper journals as well.

Prior to shifting his attention to architecture and urbanism, Salingaros published substantive research on Algebras, Mathematical Physics, Electromagnetic Fields, and Thermonuclear Fusion. Salingaros still teaches mathematics, and is Professor of Mathematics at the University of Texas at San Antonio. He is also on the Architecture faculties of universities in Italy, Mexico, and the Netherlands.

In 1995, Salingaros' first publication on architecture marked the beginning of an exciting new career, which quickly eclipsed his earlier one. His papers on architecture and urbanism have been translated into Catalan, Farsi, Finnish, French, German, Italian, Portuguese, Spanish, and Swedish. He was awarded a grant by the *Alfred P. Sloan Foundation* in 1997 for his pioneering efforts in building a scientific understanding of architecture and urbanism. He has appeared as a guest on *National Public Radio*, and has been interviewed by several magazines. He is a champion of the New Urbanism, combining it with new exigencies of the developing "network city". In an essay with James Howard Kunstler, Salingaros predicted the end of the skyscraper era, which expanded his popularity worldwide (Salingaros Home Page, 2007).

Salingaros and Alexander

In the context of reflecting on the work of Salingaros, one has to refer to the mutual and collegial relationship between him and Christopher Alexander. Both have contributed remarkable arguments and theories since Alexander's "Notes of the Synthesis of Form" in the 1960s to Salingaros' "A Theory of Architecture" in the 2000s.

Salingaros acknowledges a debt to Christopher Alexander for encouraging him to devote his energies to understanding architectural and urban form. Indeed, it was Salingaros' collaboration with Alexander, in editing Alexander's four-volume book "The Nature of Order," that precipitated Salingaros into architectural research. He credits Alexander for this inspiration: "*Working with him on his book The Nature of Order during the twenty years prior to its publication taught me much of what I know about architecture and urbanism. He has generously encouraged me over all these years. More than that, he provided a solid point of sanity in an architectural world driven by images, fashions, and opinions. My work utilizes and expands on his ideas in many ways. A full appreciation of the material presented here can only come from reading his monumental work.*" (Salingaros, 2006:25).

Alexander, in turn, gives Salingaros credit for his original ideas: "*In my view, the second person who began to explore the deep connection between science and architecture was Nikos Salingaros, one of the four Kataraxis editors. He had been working with me helping me edit material in The Nature of Order, for years, and at some point — in the mid-nineties I think — began writing papers looking at architectural*

problems in a scientific way. Then by the second half of the nineties he began making important contributions to the building of this bridge, and to scientific explorations in architecture which constituted a bridge." (Alexander, 2004, Kataraxis No. 3, online).

The fact that each is crediting the other in some form and out loudly is a rarity in recent academic and professional practices. Today, many theorists, academics, and practitioners are claiming territory or ownership over whatever they can. Another question here: what does this tell us? Simply, it tells us that professional ethics are explicitly integrated in the work of Salingaros.

From Vitruvius' Triad to Salingaros' Triad

Earlier I used the following terms: Commodity/Convenience, Firmness/Durability, Delight/Beauty. However, there are many interpretations in the literature expressing these three phenomena, and how they constitute a work of architecture or a building. Some authors refer to these phenomena as function, structure, and beauty, while others still prefer to use the original Latin terms *Utilitas*, *Firmitas*, and *Venustas*. According to O'Gorman (1997), we may think of the Vitruvian components as the corners of an equilateral triangle, or better still, the legs of a tripod called architecture. No one leg can stand alone; each is dependent upon the other two to form the work of architecture, and this fosters the earlier argument of this paper.

Many theorists argue (and rightly so) that this is an exquisite formulation; for all its antiquity it remains a useful framework for the initial thinking about architecture, and the

preliminary analysis of a building. However, one would tend to believe that this was not enough. The reason is that architects since the discovery of *De Architectura* needed more elaborate arguments; this is perhaps — in part — one of the reasons why many architects and practices became anti-vitruvian, and the results are really repelling. They needed more clarification and interpretation of phenomena that correspond to the changing nature of architecture and the societies it serves.

It would be very difficult in the 21st century to still think of the three criteria/phenomena introduced by Vitruvius as a panacea to the ills of world architecture and the built environment in general. This is especially true in light of population growth, increased urbanization, technological advancement, and the dramatic changes in the structure of contemporary societies. Those major forces are coupled with housing problems and the continuous emergence of squatter settlements, the deterioration of the built heritage, and the emergence of new building types and large structures.

Undoubtedly, Vitruvius gave us the ABC of architecture, but someone should have continued the alphabet of architectural theories. It is my conviction that Nikos Salingaros offers a new alphabet that corresponds to the demands placed upon the profession by contemporary societies. His work meets the requirements of architecture and urbanism in the 21st century. As a critic of modernist, postmodernist, and deconstructivist styles of building and thought, Salingaros' triad is emerging to replace these styles with a humanistic architecture for the future. His

work is seen by many as forging a crucial interface between innovative ideas for a new architecture, and the timeless content of traditional architectures (Salingaros Home Page, 2007). To some, and to eventually many academics and practitioners, Salingaros' role will be the responsive theoretician whose aim is to reconnect humanity with so much that was lost over the past several decades.

Introducing a new alphabet, Salingaros has written three manuscripts that can be interpreted as forming the new triad. These are "Anti-Architecture and Deconstruction" (2004), "Principles of Urban Structure" (2005), and "A Theory of Architecture" (2006). Similar to that of Vitruvius, but differing in content and comprehensiveness, the triad can be explained in terms of how each manuscript and its underlying critical theories lead to the next. "Anti-Architecture and Deconstruction" comes on the top angle or corner of the equilateral triangle, as it introduces critical analyses of 20th century architecture, and offers a prelude to the successive theories. As one moves clockwise, the second manuscript "Principles of Urban Structure" comes on the right corner of the triangle as Salingaros' theories are introduced at the urban scale. Continuing to move clockwise, one reaches the third angle of the triangle where the latest manuscript, "A Theory of Architecture" comes to introduce scientific and mathematics based theories on architecture. Moving clockwise again to the first angle in order not to forget the critical analyses, one thus keeps remembering the ills that resulted from the anti-vitruvian architects and their practices, and the move continues (Figure 1).

I would agree that such a triad could change, as the future writings of Salingaros may evolve the equilateral triangle into something else. However, at the present moment in the history of architectural theory, it is a triad and will continue to be so until a new round of Salingaros' work emerges. The triad offers the foundation for a completely new approach to the built environment. As stated in Salingaros' Website, his work "*derives rules that underlie a living architecture ...*" These rules do not simply clone great architectures of the past, but they re-interpret them; they go against copying-pasting elements and symbols from the past, an aspect promoted by anti-vitruvian architects and critics.

Two striking aspects are evident in Salingaros' triad. They can both be classified under the heading of "integration." The first is an integration of two different but complementary types of knowledge in architecture. The second is an integration of the two extremes of architectural theory, the hard facts and the soft values. It is believed that there are two types of knowledge in architecture. The first comprises knowledge resulting from research that seeks to understand the future through a better understanding of the past — research and reflection that explores accepted ideas. The second comprises knowledge resulting from research that probes new ideas, principles, and theories which will shape the future — research that develops new hypotheses and epistemics. While "Anti-Architecture and Deconstruction" falls within the first type, "Principles of Urban Structure" and "A Theory of Architecture" constitute the second type.

Some architectural scholars and thinkers may argue that what we have accumulated throughout the years within the scope of “architectural theory” are simply expressions of ideas and experiences which have concomitantly been identified as “theory.” (Ozkan, 1999). While this argument is in part valid, an architectural theory should address three components: the scientific, the artistic, and the professional, while the three components should range from hard facts to soft values. However, if a theory claims to be scientific it has to search for the truth, if it claims to be artistic it has to be original, and if it claims

to be professional it must be ethical and valid. Again, Salingaros’ triad incorporates these components into an objectively and logically accepted philosophical system that is based on critical visions, scientific understandings, and well articulated arguments. These two characteristics of Salingaros’ triad are a concomitant reason that his triad has generated controversial debate in the architectural media. Unlike mainstream architectural theories developed during the past century, Salingaros’ theories are verifiable because they stem from mathematics and science.

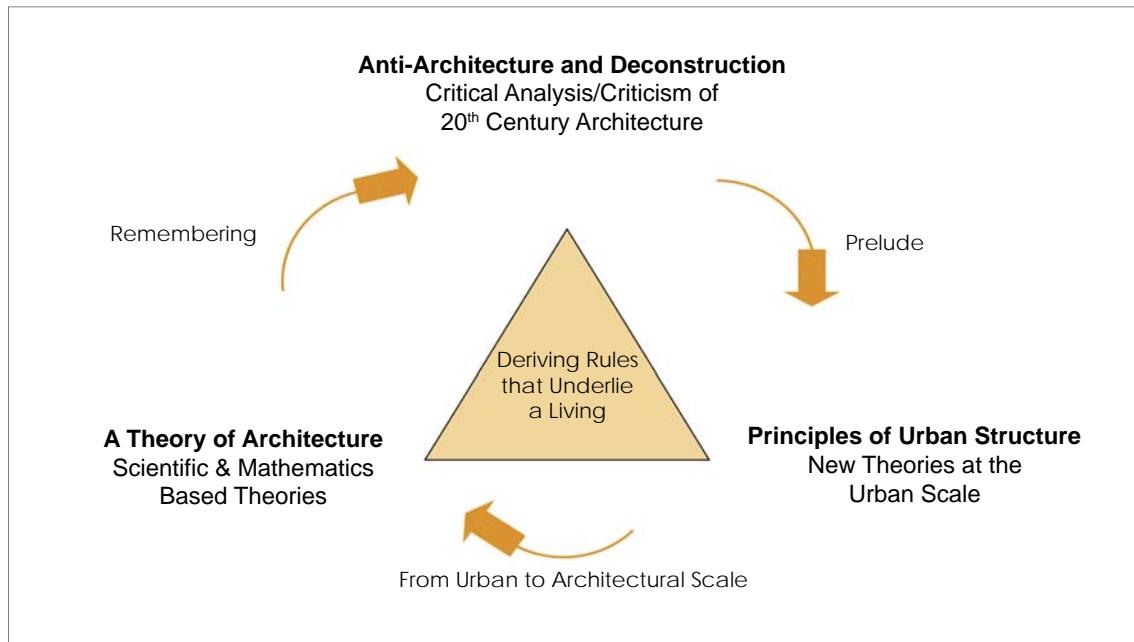


Figure 1: Salingaros’ Triad: Deriving Rules that Underlie a Living Architecture.

Anti-Architecture and Deconstruction

“Anti-Architecture and Deconstruction” is at the top of the triad. The manuscript appears as if Salingaros was setting the stage for his future writings. He established the scene through a collection of twelve essays in the form of a compilation that critically analyzes evolutionary aspects of modernism and post-Modernism, while heavily criticizing the resulting end-style of these two movements: Deconstructivism. *Anti-Architecture and Deconstruction* encompasses an interview with Christopher Alexander, and contributions and comments from well-known writers and scholars including James Stevens Curl, Michael Mehaffy, and Lucien Steil, among others.

The main argument of this manuscript lies in Salingaros’ belief that architectural deconstruction is not a new thing. It has started since the 1920s from the Bauhaus, the international style, and modernism, going through new brutalism and late and post modernism. Each of these “ISMS” is regarded as a cult that had tremendous negative impacts on they way in which we think about or approach architecture in pedagogy and practice. Salingaros argues, and rightly so, that deconstructivists have disassociated themselves from the lessons derived from history and precedents, while distancing themselves from basic human needs and cultural contexts.

While many critical statements are made by Salingaros in different parts of the manuscript, one should note his criticism of the critics, the articulate and fancy rhetoric and writings of Charles Jencks and Bernard Tschumi. In this respect, in two important essays, Salingaros

made valid arguments where the manuscript refers to Jencks as a “phrase maker and style tracker.” He points out that Jencks’ understanding and use of scientific concepts to justify and celebrate deconstructivist architecture is simply superficial (2). On the other hand, Bernard Tschumi’s two major writings titled “The Manhattan Transcripts” and “Architecture and Disjunction” were closely examined by Salingaros. He concluded that Tschumi’s work is a collection of meaningless images that resembles advertising and a false claim of knowledge of mathematics in analogizing it to architectural form.

The other ten essays offer eloquent and convincing arguments against such a destructive attitude of deconstructivism and deconstructivists. However, three of these should be highlighted. The essays titled “Derrida Virus,” “Background Material for the Derrida Virus,” and “Death, Life and Libeskind” eloquently show how Derrida’s notion of deconstructivism became a dangerous virus which keep reproducing itself infinitely. Derrida, an Algerian-born French philosopher founded such a notion in literary criticism, and described it as “a method for analyzing texts based on the idea that language is inherently unstable and shifting, and that the reader rather than author is central in determining the meaning” (Derrida, 1973). While his work was heavily criticized by prominent linguists and philosophers including Noam Chomsky, it found listening receptive ears in the architectural community, a typical habit of many name architects who run after slogans and strange notions that help them to philosophize and theorize in order to justify their work.

Metaphorically, the virus has killed almost all connections to the past, to humanity, and to context. The resulting ills are manifested in many cities, but the trauma is well articulated in the work of Daniel Libeskind in the Ground Zero Proposal, the Seattle Public Library, and the Berlin Holocaust Museum. Salingaros shows how the rhetoric surrounding the claims of Libeskind on the emotional experience of the Ground Zero proposal are nothing but negative. In this respect, a reference needs to be made to university campuses which are supposed to convey constructive messages about the future of learning, research, and humanity; they are calling deconstructivists to destruct their learning environments. This is clearly evident in the work of Antoine Predock in the McNamara Alumni Center of the University of Minnesota, and the work of Frank Gehry's Wiseman Art Museum of the same University. Notably, Gehry's work is invading many university campuses including Case Western Reserve University through its School of Business, and the University of Cincinnati through its Center for Molecular Studies. University campuses are intentionally conveying "deconstructive" messages.

While the manuscript was criticized by a few readers for having some redundancy, that issues and concepts introduced say the same thing in several chapters, one should respond by arguing that in many instances, in order for a writer to make his message clear, it has to be repeated, stated, elaborated, and articulated in different contexts and in different manners. This is one of the most important qualities of those who believe in their message. Undoubtedly, this manuscript is a voice of logic and reason against anti-architecture norms, and the destructive attitudes of their followers.

I would add my voice to other reviewers of this manuscript: that it must be a mandatory reading in schools of architecture worldwide. Salingaros' call for going against those attitudes and regaining our interest in solutions to human problems needs to be adopted. The manuscript's thrust for re-associating ourselves to the near and distant past — depending on who we are and the cultural context in which we operate — deserves special attention by both academics and practitioners.

Principles of Urban Structure

The right angle of Salingaros' triad is "Principles of Urban Structure." The manuscript moves beyond criticism, and incorporates critical analyses into philosophical interpretations. The result is to form new visions through which we may understand the city as a mixture of phenomena. A preliminary examination of this manuscript reveals that it is based on the view that a city with its physical, socio-economic, institutional, and cultural presence produces and re-produces, transmits and represents much, if not all, of what counts as politics, knowledge, and culture. One should be definite in this respect and argue that for thousands of years, many cities have been, among other things, centers of culture, politics, and the arts. Therefore, the knowledge of what a city is and what it is that makes its buildings, neighborhoods, districts, streets, and the spaces within it alive needs to be subjected to new interpretations and visionary arguments. This is the essence of this manuscript. In this respect, Salingaros argues that *"different types of urban systems overlap to build up urban complexity in a living city. This raises the need for using concepts such as coherence, emergence,*

information, self-organization and adaptivity." (Salingaros, 2006).

Constituted in ten chapters, "Principles of Urban Structure" accommodates a number of theories and discussions that Salingaros has developed since the mid 1990s. It introduces the unifying notion of the network city to understand urban phenomena as components of a complex system. As another Greek, Constantine Doxiades, introduced the Science of Human Settlements — *Ekistics* several decades back, one tends to see this work as having a Greek origin. Salingaros is describing a beginning of a real urban science that complements scientific approaches to urbanism currently undertaken by several academics and scholars. However, as stated in the introduction of the manuscript, it examines the unproven principles adopted for many years, which were taken for granted. It calls for a fresh look on our needs to re-shape, re-structure, revitalize, and repair cities based on some proven logical understandings.

In the context of outlining this manuscript as an integral part of Salingaros' triad, it is important to cover selected crucial issues. It provides a different way of thinking about an urban area or a portion of a city. Overall, the theory is not about geometrical forms, it is about activity nodes and the physical paths that connect them. It offers planning principles based on a mathematical understanding of what generates the urban web. On that basis, Salingaros argues that the current system of breaking down neighborhoods has already alienated and segregated communities, while at the same increasing crime. He complements his theory of the urban web by two other theories that pertain to the relationship between urban

space and its information field, on one hand, and the distribution of sizes, on the other.

Based on information theory and the laws of optics, Salingaros concludes that successful urban spaces are bounded by concave surfaces. The spaces reinforce paths and the paths are reinforced by the spaces. Insufficient information that people need to define spatial boundaries causes psychological discomfort. In terms of the distribution of sizes, and based on empirical research, a link is established between certain ordering mechanisms inherent in the human mind and the designed environment. This reflects the understanding that the design of an environment is not arbitrary, but should satisfy a set of constraints. While this conclusion may seem to be revealing what is already known, the organization of mechanisms underlying design were developed by Salingaros in light of several analogies with complex systems in biology, physics, and physiology.

The manuscript is dense in terms of introducing science-based concepts, ideas, and visions, while linking them to the physical environment. On the one hand, a number of other ideas are presented to address critical issues that pertain to complexity and urban coherence, such as connecting the fractal city, and the role of information architecture and human intelligence in shaping the urban environment. On the other hand, the influence of Alexander is present in Salingaros' work. While Alexander's *Pattern Language* had and continues to have a great impact on the minds of many people, Salingaros investigates the *Pattern Language* further, as two chapters are exclusively dedicated to root the pattern language into the soil of recent debates on architecture and urbanism.

A Theory of Architecture

This manuscript represents the third angle of the Salingaros triad. While capitalizing on recent efforts to develop interpretations of socio-cultural phenomena by means of scientific models, it builds on the four-decades-long effort of Christopher Alexander. While having his own theories and distinct thinking for approaching and introducing issues, Salingaros refers in several chapters in one form or another to the work of Alexander, as he sees him as a mentor and views his work as a source of inspiration. Those who read and study the work of Alexander would immediately realize this fact.

Preceded by a preface written by Prince Charles, and a foreword by Kenneth Masden II, "A Theory of Architecture" accommodates twelve different but related chapters. Some of them were jointly written with other scholars including Debora Tejada, Hing-Sing Yu, Michael Mehaffy, and Terry Mikiten. Among a number of aims Salingaros has identified for this work, two critical ones are noted. These are based on my belief that they contribute to a new understanding of architecture, its theoretical base, its education, and its practice. As stated by Salingaros, these two aims are: *"Derive laws for how matter comes together to define buildings that give pleasure to human beings,"* and, *"Explain, using scientific arguments, why people derive pleasure and satisfaction from some forms but not from others"*. This is based on his conviction that the architectural community has ignored for years logical thinking and empirical or experimental verification. Thus, this manuscript, in Salingaros' words, is developed to correct this condition.

"A Theory of Architecture" is in fact not about one theory, but several complementary ones that together contribute to a new vision about architecture. Concepts that pertain to complexity, emergence, and evidence-based design, pattern languages, the fractal mind, geometrical fundamentalism, and meme encapsulation, while presented in different chapters, are all integrated to shape such a vision. Highlights on these concepts reveal the message of the manuscript. In addressing complexity, Salingaros uses a model of organized complexity to estimate the degree of life in a building and measures the organization of visual information. In evidence-based design, he introduces the concept of adaptivity as a characteristic phenomenon of emergence. As a reaction to the fact that contemporary architectural theory has degenerated architecture into a narrow meaning by oversimplifying the relationship between spaces and their meanings, he proposes a broader discourse that involves evidence-based design, an aspect that is being addressed by responsive architects in creating healing, work, and learning environments. Building on Christopher Alexander's work, Salingaros incorporates a pattern language and a form language into an adaptive design method. Geometrical fundamentalism is another concept coined and explored by Michael Mehaffy and Salingaros to express the dominance of monolithic forms of modern architecture that led to a "tunnel vision" understanding of space.

This manuscript is of great value to architectural educators. It helps them correct some of the misconceptions inherited in architectural education. These include the fact that educators tend to present knowledge as a

body of facts and theories and as a process of scientific criticism. The processes that led up to this product are always hidden and internalized. Salingaros offers explanations of how such processes occur, and uncovers their hidden qualities. Also, in pedagogy, knowledge is usually presented to students in a retrospective way where abstract and symbolic generalizations used to describe research results do not convey the feel of the behavior of the phenomena they describe; the late Donald Schon emphasized this view in 1988. The term “retrospective” here means extensive exhibition of the performance of the work of an architect over time. In essence, the analysis of precedents as part of the curriculum should be introduced. Salingaros derives his concepts and theories from precedents, historical or scientific. Rather than giving students ready-made interpretations about the work of star architects, Salingaros offers a deeper insight into the understanding of the true essence of architecture. This is a marvelous piece and it should be a required reading in theory courses introduced in both undergraduate and graduate programs of architecture worldwide.

Epilogue or Prologue for 21st – Architecture and Urbanism

In ending this article, one tends to think of this discussion not in terms of a conclusion or an epilogue, but as a prologue for the future of architecture and urbanism in the 21st century. Vitruvius’ triad was the beginning of the dictionary on architecture, while Salingaros’ triad completed that dictionary after two millennia. While Vitruvius’ triad maintains its presence in discussions nowadays, Salingaros’

triad is apparently admired and adopted by Western Classical architects. The reason is that it validates new classical and traditional buildings by means of scientific arguments, although his work is not about classical architecture at all.

Implicitly and explicitly, Salingaros’ writings within the triad and also other writings favor the architecture of indigenous populations, and especially those of traditional Islamic architecture. It is here that the greatest degree of “life” can be found through form and artificial materials. Because his writings have a broad scope that addresses these specifics, they are being translated into Persian and several European languages. However, they have not been circulated within the Arab world as one would expect. Therefore, this is a call for Arab scholars, who should also join the movement of creating responsive architecture, that is an architecture based upon science, society, culture, and logic. They should embark on a translation effort so that these theories can reach their target population, especially architecture students. In fact, Salingaros’ triad validates centuries of traditional architecture, which is being ridiculed and despised by anti-vitruvian architects and practices, in Salingaros’ words: “by a certain ignorant class of Western architects.” Unfortunately, younger architects in many parts of the world and especially in the Arab and Muslim world have picked up these prejudices and are currently looking down on their tradition as a “step backward”, and as something to avoid. Actually, they are assaulting their culture and its underlying traditions.

Evidently, we are living in a time of confusion, and in a world in which no one theory will have the upper hand in solving the contemporary

needs of society in the field of architecture and urbanism. This requires redefining architecture to be ultimately a social act, and a scientific/intuitive art. It is crucial for current theory and practice to question once again the fundamental values embodied in traditional architecture and urbanism in a scientific manner, and to look for ways in which such values can contribute to the creation of livable environments. Now, one should pose questions that were repeatedly posed by others: 1) Is architecture nothing more than a mask of authority and power? 2) Is it a means of hiding hardship and the harsh realities of ugliness, poverty, inequity, and injustice that plague world societies as a result of Globalization? 3) Is it a camouflage that covers up the epidemics of anti-vitruvian architects and their followers? 4) Is it a veil that simply hides the symptoms of the ills that characterize current urban environments? In the context of efforts attempting to find thoughtful answers, and in the midst of the recent social, political and cultural turmoil, Nikos A. Salingaros declares the beginning of a visionary thinking paradigm. In my view, this is a new *De Architectura* for 21st-century architecture and urbanism.

Notes

(1) *Female architect celebrities are showing off: During the World Congress of Architects (2005) of the International Union of Architects-UIA, I recall the vast entry lobby of the Convention Center in Istanbul, Turkey filled with hundreds of students, young and old architects, journalists, critics and writers, who came from different part so the world. This was because all were waiting for Zaha Hadid to give one of the congress keynote speeches. Like Rock or Heavy Metal stars, she came in trousers, blouse, and light jacket, all in black, surrounded by a number of body guards, and those waiting screamed as soon as she appeared*

on the escalator on her way to the auditorium. People were dying to get autograph signatures from her. Strikingly, when I attended the lecture I found a less than appealing presentation, not much to say about the work presented, not even the typical rhetoric one generally hears from deconstructivists.

(2) *I have reached a similar conclusion during the Architectural Public Sessions of Al Azhar Engineering 5th International Conference in 1997, AEIC-97, where Charles Jencks gave a speech in Le-Meridien , Cairo. Egypt. He was very articulate and his lecture was influential to many because of the big words he used. Students and faculty from around the Arab world were intrigued by his arguments. Strikingly, again, no single word of criticism from the part of architects including myself was said. However, some social scientists and linguists were present, and noted a superficiality in the arguments he introduced on "Architecture of the Jumping Universe."*

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COMMENTS ON ASHRAF SALAMA'S ARTICLE: "...A NEW VITRUVIUS...?"

Nikos A. Salingaros

While immensely flattered (and also not a little embarrassed) by this attention given to my work, I feel I must try to set the record straight on one matter. I am very grateful for Dr. Salama's efforts to acquaint readers with my books, which they might hopefully find useful for design. But if anyone ought to be named the New Vitruvius, it is surely Christopher Alexander, not myself. I came into the architectural arena relatively late. Christopher was already making ground-breaking contributions with his first book "Notes on the Synthesis of Form" (1964). He followed that with the classic "A Pattern Language" (1977), and the monumental "The Nature of Order" (2002-2005), which proved such a turning point for my own career. My earliest paper on architecture dates from 1995, and is directly inspired by "The Nature of Order", on which I was working with Christopher at the time, helping him with editing.

Moreover, perhaps instead of singling out an individual to give credit for a new awakening of architecture — and I do believe there is indeed such a new awakening — it is more accurate to describe this as a group effort. Actually, we are seeing the convergence of

several group efforts, up until now isolated from each other. Christopher Alexander without any doubt represents a major branch of that effort, and his own work has been widely influential in many fields besides architecture, notably computer software. Another branch of the architectural movement I am talking about includes the growing efforts supporting vernacular architecture as it is found around the world. Yet another branch is the group of prominent Classical Architects as well as those designing in a traditional style, in the West and elsewhere. There is a very good reason these forms of building have endured for thousands of years: they are highly adaptive!

Each one of these branches has numerous names associated with it, and together all these people support a new, more humane architecture. Their unifying characteristic is a primary concern for the human being: as user, or as observer. Joining this already substantial group of persons is the Biophilic design movement, whose practitioners argue for an innate, genetic basis for human response to architectural forms. Coming from science, those arguments tie things together in a powerful way.

It is important to understand that this is not a single-minded "school" of architects and writers, since their immediate focus is very different in each case. A contemporary architect working in the Islamic world who wishes to use some elements of tradition in new buildings is not likely to be very interested in Classical Architecture. A Neoclassical architect working in Europe will not be interested in the mathematics of fractals. A biophilic architect may not be too interested in local socio-cultural traditions. And yet, there is a common goal, generating sharable lessons: the primacy of the user's experience. Whatever the focus, and whatever style one uses, we wish above all to create a healthy environment for human beings from the physiological, psychological, and spiritual aspects. The artistic expressiveness must take its place within this discipline.

Unfortunately, this is not the norm today. All of these diverse groups comprising a new, human architecture stand apart from the architectural mainstream. Western architectural institutions continue to concentrate on outdated images of modernity, even as they move into ever more inhuman expressions of artistic egotism. Ordinary people become confused, because they see a small but monolithic group of established power players praised by the magazines and media, awarding each other prizes and commissions. The very broad movement to which I belong is marginalized away from the central sources of architectural influence, and that is why it is difficult for the ordinary person to get a good picture of where architecture is moving.

But it is clear that there is a wider convergence going on. In the field of urbanism, we have other

distinct groups that are now designing cities for human use rather than purely for occupation by machines. More thoughtful investigators are moving away from the disastrous modernist planning that erased tightly-knit urban fabric in order to build monstrous high-rises set in vast parking lots.

Again, by all accounts, Christopher Alexander played a seminal role in this process (together with the great urban scholar Jane Jacobs) with his seminal paper "A City is Not a Tree" (1965). By virtue of incredible serendipity, I happened to get interested in urban structure just as remarkable investigators like Michael Batty, Paul Drewe, Pierre Frankhauser, and Bill Hillier were already working out models of a city that try to understand (instead of stubbornly ignoring) its complexity. New Urbanists Léon Krier and Andrés Duany made impressive advances (sometimes criticized for uneven results, but remarkably effective nonetheless) in implementing the ideas of human-scale neighborhoods, in a world that had all but forgotten urbanism. At the same time, we saw a convergence of scientific results such as small-world networks, inverse power-law scaling, and fractal structure coming out in the literature. These could be used to explain how cities can be alive in a mathematical sense.

Most recently, a broad group of these investigators has come together to conduct research and exchange ideas. The "Environmental Structure Research Group" includes urban scholars, leading practitioners, scientists such as myself, and others from a wide range of disciplines: biology, computer science, ecology, economics, medicine, and sociology. Even this group, diverse as it is, is but a

smaller representation of an even broader shift beginning to take place.

I am proud to belong to this broad group of innovative thinkers, and also excited to live in this time when the foundations of our conception of architecture and the built environment are shifting in a more positive direction. I agree with Christopher Alexander that this represents a drastic and revolutionary reversal of our view of the world. My own recent efforts have been directed towards educating the public to the possibility of such a change: and actually arguing forcefully for its implementation in our lifetimes.

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CONFERENCE / COMPETITION ANNOUNCEMENTS - IAHH 2008

10th Intl. Conference on Humane Habitat - IAHH 2008

6th IAHH International Student Design Competition

Akhtar Chauhan

10th INTERNATIONAL CONFERENCE ON HUMANE HABITAT (ICHH) 2008

January 25-27, 2008

Theme:

**Sustainable Humane Habitats:
Architectural Education, Research and
Practice**

Organizers:

International Association for Humane Habitats
(IAHH)

Hosts:

Rizvi College of Architecture, Off Carter Road,
Bandra West, Mumbai. 400 050, India.

Invitation

The International Association for Humane Habitat (IAHH) is pleased to announce the tenth International Conference on Humane Habitat (ICHH) 2008. It shall be hosted by Rizvi College of Architecture, Mumbai, India in association with The Council of Architecture, (COA); Brihan Mumbai Centre of the Indian Institute of Architects; Forum of Colleges of

Architecture, Mumbai Region; Maharashtra Association of Schools of Architecture (MASA); Indian Association of Schools of Architecture; and the Commonwealth Association of Architects (CAA). ICHH 2008 shall be held from January 25-27, 2008 in Mumbai, India.

We are pleased to invite educators, researchers, architects, planners, engineers, social scientists, environmentalists, policy makers, administrators, developers, managers, corporate associations, non-governmental organizations, concerned citizens and students interested in shaping sustainable and humane social, cultural and sacred places to actively participate in ICHH 2008.

Sub-themes:

Case studies and contextual analysis of existing architectural, urban design and planning graduate / post graduate and doctoral programmes in respective national and regional context.

Critical studies in architectural and planning theories, sustainable and humane

architectural studios and studies. Innovative and appropriate construction technologies for sustainable architecture and development.

Related studies programmes and research in humanities, including human, social and sustainable development.

Research in architecture, urban design and planning studies, Training programmes for faculty improvement, professional development.

Proposals for new and innovative programmes in sustainable and humane architecture, habitat studies and related disciplines.

Speakers

Prof. Peter G. Rowe, Harvard Univ, USA; Prof. Jamal Al Qawasmi, Jordon / Saudi Arabia; Ali Chengizkan, Turkey; Dr. Naima Chabbi-Chemrouk, Algeria; Prof. Ashraf Salama, Qatar / Egypt; Ar. Saodat Rustamovna Mukimova, Tajikistan; Dr. Wael Samhour, Syria; Ar. Budi Sukadi, Indonesia; Ar. Shiraz Allibhai, Switzerland; Prof . Peter Schreibmayer, Graz, Austria; Prof. Volker Giencke, Innsbruck, Austria; Dr. Donatella Mazzoleni, Italy; Prof. Christopher Benninger, USA / India; Prof. Frank Lyons, Plymouth, U.K.Prof. Rodney Harber, South Africa; Ar. Ludovic Jonard, Paris, France; Ar. Gunter Nest, Berlin, Germany; Dr. Parvin Ghaemaghani, Tehran, Iran, Prof. Khaleda Rashid, Dhaka, Bangladesh; Prof. Faud Mallick, Bangladesh; Ar. Akeel Bilgrami, Karachi; Ar. Shahab Gani Khan, Karachi; Ar. Silwat Afzal, Karachi, Ar. Ayesha Noorani, Lahore; Ar. Hammad Husain, Islamabad, Pakistan; Prof. Neelkanth Chhaya, Ahmedabad, Ar. Ashish Ganju, New Delhi; Dr. S. M. Akhtar, New Delhi;

Prof. Akhtar Chauhan, Mumbai and Ar. Anil Nagrath, Mumbai, India

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Abstracts (about 2000 words) by September 15, 2007 on A4 portrait format in Arial 10 font size along with brief curriculum vitae, passport details and a photograph of the speakers.

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Final papers (about 8000 words) by December 15, 2007 on A4 portrait format in Arial 10 font size along with illustrations, photographs, slides and detailed curriculum vitae of the speaker.

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For further particulars, please contact:
Prof. Akhtar Chauhan, Convener ICHH 2008

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Professor Akhtar Chauhan Speaking at the Opening Session of the 8th International IAHH Conference on Sustainable and Humane Work Places, January 2006

In addition to publishing the abstracts of all presentations in the conference proceedings, arrangements will be made to select a limited number of full papers to be published in the upcoming issues of "Archnet-IJAR" International Journal of Architectural Research.

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Planning and designing a micro-cosmic sustainable humane habitat.

Invitation

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IAHH has hosted five International Student Design Competitions since 2003 on various themes related to sustainable, affordable, appropriate humane habitats. On an average 50 entries are received from about 15 different countries.

IAHH is pleased to announce its sixth International Student Design Competition on the theme of planning and designing a micro-cosmic sustainable urban / rural humane habitat. The competition is open to students of architecture, planning, urban design,

landscape architecture and related disciplines of anthropology, sociology, economics, geography, social work etc.

Hosts and Associates

Rizvi College of Architecture is hosting the 10th International Conference on Humane Habitat at Mumbai, India. The ICHH 2008 is being organized in association with the Council of Architecture, India; Brihan Mumbai Centre of the Indian Institute of Architects; Maharashtra Association of Schools of Architecture; Indian Association of Schools of Architecture; the Forum of Colleges of Architecture, University of Mumbai and The Commonwealth Association of Architects, UK.

The Jury

The Jury shall consist of:

Prof. Peter Rowe,
Harvard University, USA.

Prof. Frank Lyons, Architect,
University of Plymouth, U.K.

Prof. Rodney Harber,
University of Natal, South Africa.

Prof. Dr. Ashraf Salama,
Qatar University, Qatar.

Prof. Neelkanth Chhaya,
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Theme

In the wake of globalization and liberalization of world economic order, the human settlements – cities and villages - are undergoing a rapid transformation. While the urban growth

continues guided by policies and programmes of urban development, there are vast areas in the urban core, periphery and hinterland, which have become economically and socially depressed, with dilapidated housing stock, congested work places and degraded environment.

It is the purpose of the sixth IAHH International Student Design Competition to investigate into this issue of rapid urbanization and resultant decay and degradation of human settlements in the urban core, periphery and hinterland in order to evolve a more enlightened approach to planning, design and management of humane habitats.

Site Selection and Analysis

The student competitors are required to identify such an area in a village / city / town / metropolis in their own country or in any other country anywhere in the world. The community may be about 1500 to 3000 people, with jobs for 500 or more people. The urban / rural area may admeasure about 5 to10 hectares or so. The student participants shall survey and study the area in depth to understand the complexity of social, economic and demographic issues involved and plan and design for its sustainable area development.

Planning and Design Brief

The design-brief requires planning and design for an urban or rural community of 500 to 1000 units of dwelling and about 250 to 500 or more jobs in different establishment suited to the location and context. The housing typology and nature of work places may vary as per the social, cultural, economic and environmental

context. The area and type of housing units and work places shall depend on the existing and proposed density, demand for housing and work- places in the area.

The proposed plans and designs shall aim to evolve a more humane community through sustainable and affordable development strategy, appropriate construction and technology, innovative planning, creative architectural and sustainable environmental design. These shall be the main criteria for evaluation of the projects.

Submission Requirements

The design submission shall be presented on 6 A1 drawings / 3 A0 drawings which shall include:

- ❖ 2 A1 panels for contextual, social, economic and environmental analysis, site analysis of the existing urban area admeasuring about 10 hectare showing its location in urban / rural context along with photographs.
- ❖ One A1 panel for proposed area development to the scale of 1:500 / 1: 1000, for a community of about 1500 to 3000 people.
- ❖ Three A1 panels for innovative designs for housing, work places and related shopping and supporting social, educational, health-care and recreational facilities to a scale of 1: 100 / 1:200
- ❖ A brief report identifying the context, analysis, concept, planning and design approach of the proposal

on not more than 10 A4 sheets in Arial 10 font size with illustrations and photographs.

- ❖ The participants may send CDs containing the drawing and report for publication purposes. These CDs may be used by the Jury for consideration of the Awards. However, the drawings must be submitted. It may be noted that CDs alone will not be accepted.

Eligibility

The competition is open to all registered undergraduate / post graduate / doctoral students of any nationally recognized school, college or institution of architecture, engineering, planning, urban design, landscape design, environmental design and related disciplines of anthropology, sociology, economics, geography, social work, etc. The student group shall be headed by a student of architecture. The participants may be individuals or a group of not more than 5 students. The students shall fill in the registration form and air-mail it along with supporting certificates from the head / director of the school / college / institution for each of the student participant.

Terms and Conditions

1. The participants shall assume a seven digit numerical code, which shall be written in right hand bottom corner of the drawing in a 9cm x 9 cm box.
2. A plain sealed envelope containing the copy of the registration form with the name/s of the participants and the institution shall be enclosed with the submission of entry. The seven-

- digit code shall be written on top of the copy of the form as well as on the envelope.
3. The drawing shall be in black and white or colour and they shall be prints of the Originals. The drawings may be hand drawn or computer out puts. No original drawing shall be sent.
 4. The documents shall be sent by airmail / courier and not by air-freight company. The participants shall bear the expenses for its transshipment. Including taxes if any.
 5. The drawing and design copyright shall be with the authors.
 6. The IAHH shall have the rights to its publication and exhibition.
 7. The drawings shall not be returned, as they shall be required for traveling exhibition and publication.
 8. IAHH may bring out a publication, documenting award winning projects and other significant projects. The winning projects may be published in professional and institutional journals.
 9. The jury shall have full freedom to decide on the awards and their decision shall be final and binding on all the participants.
 10. The IAHH guarantees a free and fair student design competition.

AWARDS

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| First Prize | INRs. 50,000/- |
| Second Prize | INRs. 25,000/- |
| Third Prize | INRs. 15,000/- |

Honorable Mentions :
No cash prizes

Deadline

Early Registration US \$ 25
Up to November 30, 2007

Late Registration US \$ 50
Up to January 15, 2008

Queries
December 30, 2007

Final date for submission
January 22, 2008

Jury
January 23-24, 2008

Awards Declaration
January 27, 2008

Publication of Document
June 15, 2008

For further particulars, please contact:

Prof. Akhtar Chauhan, Convener,
Prof. Anil Nagrath, Technical Co-ordinator,
Secretariat

IAHH International Student Design Competition

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