International Journal of Architectural Research

Architecture
Planning
Built Environment Studies

An International Fully Refereed Journal

Published three times a year
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Chief Editor
Ashraf M. Salama

Includes
Regular Refereed Papers
Review and Trigger Articles

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Regular Refereed Papers
Review and Trigger Articles

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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.

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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.

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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 wayfinding and signage systems.

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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.

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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)

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

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   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**
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   **Title page (page 1)**
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   **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.

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**Notes**
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**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.


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


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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.

All correspondence should be addressed to the chief editor.

Professor Ashraf M. Salama
IJAR@MIT.EDU
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CONFIGURATION OF CARVED COMPONENTS AND ITS LAYOUT PATTERNS IN MALAY TIMBER HOUSES.

Zumahiran Kamarudin and Ismail Said

Abstract
This paper aims to highlight the carving composition within a specific configuration of pattern formed according to the shape, size and layout of the carved components and its placement in the different forms of traditional houses of Kelantan and Terengganu, Malaysia. Archival research was used as the principal method of data collection, which includes an analytical review of measured drawings of the Kelantan and Terengganu timber houses from the Centre for the Study of Built Environment in the Malay World at the Universiti Teknologi Malaysia. Interviews with two prominent woodcarvers for insightful information on the art and craft of woodcarving were also conducted to augment the principal method. The study found that architectural components of the houses like walls, doors and windows, railings, roofs and gable ends were equipped with carvings in different layout of patterns with distinctive features and visual orders including horizontal, vertical and mixed arrangement. Inasmuch the patterns of layouts were in parallel with the functional aspects of various carved components fabricated as perforated ventilation panels of walls, doors and windows, railing panels, decorative wall panels and panels at gable ends. The patterns were in agreement with the nomenclature of their placements within the house fabric.

Keywords
Woodcarving; traditional timber house; architectural components; carving patterns and layouts.

Introduction
The Malay timber houses of Kelantan and Terengganu, located in the north-eastern part of Peninsular Malaysia, exhibit various forms of woodcarvings equipped with distinctive features of carving patterns. The specific arrangement of the carving pattern contributes to the individual character of the carved components. Pattern is defined as the repetition of a design element or varied elements in recurring arrangement within a composition (Wallschlaeger and Busic-Snyder, 1992). The use of pattern in carvings emphasizes visual form relationships through the repetition of one or more elements of motif in a specific arrangement. In the art of Malay woodcarving, the specific composition elements are arranged to fit the surface of a plank that serves as the carving medium where carved details like a motif, pattern and form of incision and perforation have been integrated and controlled within the pre-determined
shape, size and dimension. Malay woodcarvings are generally crafted in three different modes of incisions, namely relief, perforation or a combination of these (Ismail, 2001). In general, woodcarvings from Kelantan and Terengganu are formed by using a cut out technique on a thick plank with a specific design motif and different depths of incision (Norhaiza, 2008). These attributes are interconnected and are considered as important ingredients for aesthetic design and they are normally fashioned in harmony on a piece of carved panel. The most prominent and recurrent decorative patterns found in woodcarvings are derived from floral motifs (Ismail, 2002; Norhaiza, 2008; Muhaimin, 2008).

Woodcarving is an ornamental feature found in many Malay vernacular houses especially owned by prominent and wealthy residents. The placements of the carved components within the interior and exterior fabric of the houses signify the social and economic status of the residents of the houses (Muhammad, 1995; Farish and Eddin, 2003). The regional identity of the Malay houses is enriched by the carvings in a beautiful spectrum of ornamentation. The shape and techniques of carvings from Kelantan and Terengganu are the most refined and beautiful of all Malay woodwork which exhibit a degree of beautification not found elsewhere in Malaysia (Raja Bahrin, 1988; Syed Ahmad Jamal, 1994).

This paper aims to highlight the various types of carving patterns formed on differing types of carved components in relationship to their distribution within the traditional timber houses of Kelantan and Terengganu, in the northeastern region of Peninsular Malaysia. This study was formulated based on two research questions: (1) What are the distinctive characteristics of carving patterns within the architectural components of the houses? and (2) How are the carved components distributed within the house fabric relative to the specific functions of the carvings? The carving patterns studied here were identified in relation to their layouts in the carved components and their placement and functional aspects. This research involves the visual description and interpretation of the carved components pertaining to their different carving patterns within the context of their configuration and distribution in the interior and exterior settings of the houses. This paper explains the findings based on analyses conducted on the carved components of 15 timber houses that serve as the unit of analysis.

**Methods**

This study was conducted as an explorative and interpretive research for which a significant amount of relevant information was gathered from two main sources: (1) measured drawings and reports of Kelantan and Terengganu timber houses from the Centre for the Study of Built Environment in the Malay World (KALAM) at the Department of Architecture in the Universiti Teknologi Malaysia, and (2) personal communication with two prominent Malay woodcarvers on the art and craft of woodcarving. The data from the KALAM documents was augmented by the information gathered from the two woodcarvers. This information was required to substantiate the results obtained from an analytical review of the measured drawings.
Analytical Review on Archival Documents
The analytical review was conducted on 15 prominent Malay timber houses: 10 houses from the state of Kelantan and 5 houses from Terengganu. They were found in six different architectural dwelling forms including rumah perabung pecah lima (five-ridged roof house), rumah bujang berselasar (bachelor house with unroofed platform), rumah perabung lima (five-ridged house), rumah tiang dua belas (twelve-pillared house), rumah bujang bersembi (long-roofed house with verandah), and composite house forms. These vernacular houses existed in the periods between the 1850's and the 1930's. Houses with long roofs such as the twelve-pillared house, the long-roofed house with verandah and the bachelor house with selasar, an unroofed platform, were the earliest forms built among the six types of houses. These forms of house were no longer built after World War II and are considered as the heritage of traditional Malay architecture (Abdul Halim and Wan Hashim, 1996). The houses were built with the absence of any external influences. The information on the houses including the types of architectural forms and year of construction, owners and location of the houses is shown in Table 1. Three factors determine the selection of the houses: (1) type of dwelling architecture which originated from the east coast region of Peninsular Malaysia,

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of House</th>
<th>Year Built</th>
<th>Owner</th>
<th>Location of House</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rumah perabung pecah lima (Five-ridged roof house)</td>
<td>1920s</td>
<td>Hassan Mohd Amin</td>
<td>Jalan Pengkalan Chepa, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>2</td>
<td>Rumah bujang berselasar (bachelor house with selasar)</td>
<td>1850s</td>
<td>Tuan Mohamad Dobah</td>
<td>Jln. Post Office Lama, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>3</td>
<td>Rumah bujang berselasar (bachelor house with selasar)</td>
<td>1800s</td>
<td>Wan Aisyah</td>
<td>Jalan Sultanah Zanah, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>4</td>
<td>Rumah perabung lima (Five-ridged roof house)</td>
<td>1920s</td>
<td>Wan Ahmad Abdullah</td>
<td>Jalan Post Office Lama, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>5</td>
<td>Rumah perabung lima (Five-ridged roof house)</td>
<td>1930s</td>
<td>Yaakub Mohammad</td>
<td>Kampung Sireh, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>6</td>
<td>Rumah perabung lima (Five-ridged house)</td>
<td>1937</td>
<td>Wan Hussein Wan Abdul Rahman</td>
<td>Kampung Sireh, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>7</td>
<td>Rumah perabung lima (Five-ridged roof house)</td>
<td>1933</td>
<td>Hassan Yusof</td>
<td>Kampung Sireh, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>8</td>
<td>Rumah tiang dua belas (Twelve-pillared house)</td>
<td>1800s</td>
<td>Tok Yakub</td>
<td>Kampung Belongan, Bachok, Kelantan</td>
</tr>
<tr>
<td>9</td>
<td>Rumah tiang dua belas (Twelve-pillared house)</td>
<td>1920s</td>
<td>Wan Sulking</td>
<td>Jalan Sultanah Zanah, Kota Bharu, Kelantan</td>
</tr>
<tr>
<td>10</td>
<td>Rumah tiang dua belas (Twelve-pillared house)</td>
<td>1880s</td>
<td>Mariam Mat</td>
<td>Kampung Hiiran Masjid, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>11</td>
<td>Rumah tiang dua belas (Twelve-pillared house)</td>
<td>1850s</td>
<td>Awang</td>
<td>Kampung Losong Haji, Su, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>12</td>
<td>Mixed house form</td>
<td>1914</td>
<td>Dato’ Biji Sura</td>
<td>Kota Duyong, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>13</td>
<td>Rumah bujang berselasar (bachelor house with selasar)</td>
<td>1800s</td>
<td>Tok Ku Paich</td>
<td>Cabang Tiga, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>14</td>
<td>Rumah bujang berselasar (bachelor house with selasar)</td>
<td>1800s</td>
<td>Tok Ku Paich</td>
<td>Cabang Tiga, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>15</td>
<td>Rumah bujang berselasar (bachelor house with selasar)</td>
<td>1880s</td>
<td>Nik Salleh Wan Ahmad</td>
<td>Kampung Pulau Panjang, Kota Bharu, Kelantan</td>
</tr>
</tbody>
</table>

Table 1: The Kelantan and Terengganu timber houses selected for the study (Source: Authors).
(2) excellent carvings which were both regional and distinctive in character adorned these houses, (3) a collection of differing carved components found in the houses were relevant for the purpose of visual analysis.

A set of measured drawing reports which consist of plans and elevations of the 15 houses including cross-sectional and detailed drawings was referred to for the detailed descriptive analysis. The purpose of the analysis was to identify the types of carved components and to determine their physical attributes within the carvings including visual forms and the principles of composition. These reports were produced and documented by the students of an architectural program conducted at the Universiti Teknologi Malaysia. The reports were documented from 1976 to 2005. The documentation of Nik Salleh’s house (house No. 15) was the first report produced, which was followed by the rest of the houses in the consecutive years by students of different batches. Further drawings were produced based on photographs found in the documents to improve the visual quality and accuracy for the purpose of analysis and data display. “The objects which provide raw material for visual investigation were viewed, understood, or placed in some analytical framework before they can be regarded as data” (Emisson and Smith, 2000: 4).

The Interviews
Personal interviews were conducted with two prominent woodcarvers to obtain information on the art and craft of woodcarving. The first woodcarver interviewed was Norhaiza Nordin from Kampung Raja in Terengganu and the second one was Muhaimin Hasbullah from Temerloh in Pahang. Each interview was carried out for a period of approximately two hours with the adoption of standardized open-ended interview questions. This type of question allowed for supplemental information to be provided by the woodcarvers. A set of questions was posed to each woodcarver in the same order but without restricting them from offering the required information. The interview questions were categorized in relation to the research questions pertaining to the visual attributes of woodcarvings. Narration and interpretation from the woodcarvers on the design aspects and craftsmanship of the traditional woodcarving from the states of Terengganu and Kelantan were needed to support the main data gathered from the measured drawings. Their opinions and inferences served as verification of and supplementary information to the analyzed data.

Findings and Discussion

Types of Architectural Carved Components
The analysis of the 15 houses revealed 12 different types of carved components with specific carving forms, sizes and layouts including wall, door and window ventilation panels, railing panels at the windows, serambi (verandah) and staircase, wall, door leaf, gate leaf, roof eave, bracket and gable end panels (Table 2). These different carved panels with distinctive visual forms were juxtaposed on seven architectural components such as walls, doors, windows, railings, stairs, gates and the roof, which are apparent with respect to their placement and layout in the interior as well as exterior fabric of the timber houses of Kelantan and Terengganu. The carved components were classified as ventilation, periphery, infill and decorative
panels according to their specific location within the houses and utilitarian purposes. The ventilation panel is the principal group of carvings that dominated all the 15 houses. Carving in the form of wall ventilation panel was evident in most of the houses. Apparently, door leaf, gate leaf, roof eave and gable end panels were rare types of carving and each of them was only found in one particular house which was obviously owned by a nobleman.

**The Relationship of Carving Patterns with the Forms of Carved Component**

The study has identified seven types of carving patterns, namely complete, frame, single, stripe and band, linear, semi-radial and a combination of these which contribute to the visual attributes of the carved components found in the timber houses of Kelantan and Terengganu. House components like walls, doors and windows, railings, gates, roofs and gable ends were equipped with carvings, which illustrate the different configurations of patterns. Single, frame and complete are the three basic patterns found in the traditional Malay woodcarvings (Abdul Halim, 1987; Muhammad Afandi, 1995; Raja Fuziah and Abdul Rahman, 2000; Rahmah and Nor Azlin, 2002).

Single patterns represent an element of motif in a unitary form without continuous movement (Abdul Halim, 1987). For example, a decorative wall panel which is repeated on the left and right side of the front door of Tok Yaakub’s house in Kelantan represents a single design unit of a lotus in full-bloom enclosed by an angular border (Figure 1a). In sharp contrast with single pattern, frame pattern consist of simple elements that are formed in a less intertwined character within a specific movement and enclosed by a frame (Abdul Halim, 1987). A railing panel found at the rear staircase of Dato’ Biji Sura’s house as shown
in Figure 1b has carving in a frame pattern produced by the identical repetition of simple geometric and floral elements in a rhythmic flow. In most cases, a frame pattern portrays a similar motif repeatedly in a predictable order resulting in a sense of harmony. Complete patterns consist of combined elements forming one complete carving that usually gives more emphasis to plant elements because of its gentle character and could be easily arranged in a specific composition (Abdul Halim, 1987). For example, the perforated ventilation panel fitted on a wall of Mohamad Dobah’s house in Figure 1c consists of a complete pattern that combines various elements of plants with a central flower motif probably of bunga pecah lapan (an eight-segmented flower).

The central motif is encircled by the foliate motif of daun sayap (a wing-like leaf) also known as daun Langkasuka (Rosnawati, 2005) and leaved shoots and branches flowing in a spiraling and intertwined arrangement in a complex and intricate composition. The design of the motif in a carving is usually illustrated as natural elements like a growing plant, which emerges from a source or a seed, which serves as its origin (Rosnawati, 2005). A growing plant has been the important source for design patterns employed in Malay woodcarving (Farish and Eddin, 2003). This type of pattern represents the unending growth and movement of life in a natural plant (Norhaiza, 2008). It is perhaps rational for craftsmen to depict the motifs of living plants in their natural state for the sake of following a certain order and movement in plant life. Carvings with complete patterns could also be found in other shapes and layouts including semi-circular, vertical rectangular and horizontal rectangular layouts. In the most complete patterns, several elements of a plant including leaves, flowers, flower buds, stems and shoots are combined to form one complete carving.
Besides the three basic patterns, the study found that the compositions of the carved components were also in form of a stripe and band, semi-radial and linear patterns. Most carving elements in a stripe and band pattern were composed in well-articulated structures with specific orders, for example, a vertical panel fitted on top of an external wall of Mariam’s house (Figure 2a). In this panel, vertical motifs (series of stripes) were arranged lengthwise from top to bottom and flower-shaped motifs encircled by horizontal lines are incorporated within the linear pattern. The carved ventilation panel found in Hassan’s house shown in Figure 2b represents a semi-radial pattern that combined elements of different motifs such as calligraphy, geometry and stylized flower motifs, probably the Ipomea pea-caprae, that radiate within the semi-circular arrangement. Carving with linear pattern comprises a series of repetitive elements that are exactly alike in a continuous arrangement. This type of pattern is reflected in the carved components used for decorative friezes, for example, the roof eave elements found at the front façade of Hassan’s house (Figure 2c).

The study also found that a number of carved components represent a composition of motifs within a combination of various patterns in a single panel. This type of design could be associated with the varying shapes of composition in the fabrication of the component, which is apparent in a continuous horizontal panel fitted on top of a wall. For example, a perforated ventilation panel found in Wan Ahmad’s house (Figure 3) portrays the floral arrangement of the climbing legume motif in a series of horizontal layers. In this type of panel, apparently, the most usual application for this type of carving layout was fitted along the length of the wall. This panel exhibits a carving composed of a complimentary blend of complete and linear patterns in a balanced composition with a central axis of symmetry. The patterns of foliated design were formed in three different divisions within a continuous horizontal variation in composition. Each pattern was achieved through the arrangement of different motifs as border and central components that create the overall mixed pattern.

Another type of composition of motifs within a combination of various patterns is fashioned in the door ventilation panel fitted on top of a bedroom door at Wan Hussin’s house (Figure 4). This panel exhibits a type of perforated carving composed of a combination of complete and linear patterns in a complex compositional relationship and successful combination of foliated design embedded within a horizontal rectangular layout. It consists of Malay floral motifs, possibly the Leucas zeylanica (a weed with bright yellow flowers) and the Canagium odoratum flower (a fragrant flower), encircled by a semi-circle structural frame in a linear pattern resembling an eel bone embedded within the panel and simple calligraphy.
In short, the differences in the form of the carving patterns in relationship to the shape of the carved components bring out their individuality. Variations in composition were achieved through their different arrangements either as borders, central placement or a combination of these that create an overall layout pattern.

**Distribution of the Carved Components and Their Layout Patterns and Functions**

The analysis signified a certain pattern of distribution of different types of carved components in each house in relation to the architectural elements and the house forms. From the various carved components found in the 15 houses located in Terengganu and Kelantan, it was found that these carvings were...
Configured across the principal locations including the front and rear walls of guest areas like the rumah ibu (core house) and serambi (front verandah), main bedroom and above windows and doors. Rumah ibu is the primary and largest area in a Malay house that caters for most of customary activities such as sleeping, praying, entertaining guests or religious gatherings (Lim, 1987; Tajudin et al., 2005). Serambi is also known as selasar, which means the reception area (Raja Bahrin Shah, 1988). This area serves to receive guests and is usually situated next to rumah ibu. A range of carved panels was mostly found in the area of rumah ibu and serambi as apparent in Wan Sulong’s house in Kota Bharu, Kelantan (Figures 5a and 5b). The profuse distribution of components in horizontal layouts was fashioned in complete and frame patterns of perforated carvings with non-relief and relief motifs. These design qualities were usually specified for the carved panels that serve as fenestration and decoration (Norhaiza, 2008).

The layout patterns of various components seem to be well composed across the front wall to suit the architectural form of the house known as rumah tiang dua belas (twelve-pillared house). This type of house usually has a long roof with gable ends formed at the two sides of the roof. The timber house is equipped with convex walls and it is furnished with beautiful carving, thus reflecting the wealthy status of the house’s owner (Abdul Halim and Wan Hashim, 1996). Significantly, the differences in size and orientation of carved components suggest a specific order in placing them on the convex wall. Besides, these perforated carvings were positioned within the format to enhance the identifiable architectural components like walls, windows and gable ends whilst serving as fenestrations.
It appears that the carved components in the form of ventilation panels, especially those fitted on the upper part of the walls, were the most commonly found in the timber houses. For example, the perforated wall ventilation panels A and B found at the front elevation of Wan Aisyah’s house in Kelantan as shown in Figure 6a. The components fixed to the front wall of this five-ridged roof house were formed in continuous and repetitive patterns thus enhancing the horizontal layout, which runs across the facade. It appears that the position of panel A with a frame pattern on the left side is in contrast to panel B with the floral design, which was positioned on the right side of the building elevation. Both ventilation panels were fitted on the upper sections of the walls as well as on top of the doors and windows facing the front compound of the house.

Differences in the carving design were influenced by the functions of the two primary spaces allocated as guest reception areas as indicated in the floor layout (Figure 6b). There is a clear division of the house into various spaces including the male and female guest reception areas, a jemuran (unroofed passageway), a bedroom and a kitchen. Thus the allocation of the two separate areas designated for men and women in the house is in parallel with the Islamic practices. The division of the spaces visibly demonstrates the influence of the Islamic values on this Malay dwelling unit. It seems that the Islamic way of life has become a customary practice for the residents of the house who were Malay Muslims.

As seen in panel B, various parts of a plant including branches, flowers, leaves, flower buds and shoots were applied as motifs resulting in a complete pattern and it seems to be appropriate for the panel that adorns the section of the house reserved for womenfolk. The design is in contrast with panel A which comprises floral geometry in a less complex arrangement. Clearly, these types of carvings are functional architectural components with perforations for air movement and the entry of sunlight into the two sections of the house whilst providing aesthetic value to the building facades. From the analysis it is most common for the all five-ridged roof houses to be equipped with this type of wall ventilation panel where it is found with a similar positional layout and orientation.
Repetition of the same element along the length of a certain architectural component forms a layout pattern in a monotonous design. They are normally arranged lengthwise from top to bottom to produce a vertical pattern or if they are arranged from left to right or right to left, they become a horizontal pattern, for example, the periphery panel in a form of a house railing shown in Figure 7 found at the serambi (front verandah) of Dato’ Biji Sura’s house. This railing panel displays the repetition of a simple floral shape and geometric motif in a stripe and band pattern. A central motif possibly of a lotus fruit in cross-section was represented as the focal point. It is formed in the non-relief carving against perforations, which creates a negative and positive as well as solid and void relationship with the cut-through section being dominant. The carving looks two-dimensional in composition with a certain degree of complexity and intricacy. The layout of the railings at the serambi was the most dominant carving, which can be viewed easily from a distance and these components were featured as integrated elements to the front elevation of the house.

Apparently, the fabrication of the railing panel demonstrates how the design is related to its function. It suggests that the type of pattern and technique of carving used were determined by the function of this panel. The panel visually comprises a fully pierced or perforated technique to suit its functions for natural ventilation apart from being a safety screen and having a decorative function. The railing panel in the form of a vertical stripe pattern is also known as ‘pagar tinggalung’. According to Abdul Halim (1987), pagar means ‘fence’ or ‘border’ while tinggalung is derived from the Palembang-Malay word, tinggali, which means ‘sight’. The literal meaning of the word pagar tinggalung is, therefore, the border of sight. This form of fence serves to limit vision within a specific periphery. The serambi (verandah), which faces the front compound of the house, is fenced along the length of this area with this type of panel in pierced carvings. The perforation is probably to provide a view with a certain limit of sight or vision while allowing the natural flow of air.

In another mode of composition, the types of incision and perforation applied to the woodcarving highlight the forms of the pattern and the motifs in different features. It is apparent in the carved door and wall panels with delicate single patterns fitted on the side wall that is
located between rumah tengah (middle house) and the main bedroom of Dato’ Biji Sura’s house (Figure 8). The perforated or fully pierced carving, as shown here, portrays a clear-cut shape of abstract motifs with simple non-relief carvings, which gives a special ‘effect’. In order to break the monotonous look, a certain degree of incision on the motifs gives a touch of texture resulting in a more interesting feature and creates a sense of visual interest to the forms of infill panels. These two vertical rectangular panels were incised with two different types of delicate patterns with the non-carved section becoming a dominant surface. The non-carved section with the plain surface highlights the delicate carved elements. This creates a sense of positive and negative relationships and a sense of contrast.

Apparently, the carved panels with thin perforations was purposely meant for the adornment of the main door leading to Dato’ Biji Sura’s bedroom. The position of the decorative wall and door panels with the distinctive features is marked as a point of entry to a private and personal space, which is the bedroom. Among the 15 houses, this type of carving was only found in this house. It appears that the emphasis on the carving technique in relation to the function of the carved components was also given to both panels. Both panels were fabricated in different types of carving pattern with narrow incisions and thin perforations. This delicate incision was probably meant for visual control while allowing the natural flow of air. Since the panels were fitted on the wall that faced the main bedroom and were positioned parallel to normal eye level, the small perforation on the panels only allows for a limited visual access so as to secure visual privacy. Thus, this is another set of examples of carvings that express the concept of ‘pattern following form and function’. The design of the panels suggests that the fully pierced or perforated technique carving with narrow incisions was used in consonance with their purpose and location.

Because of the carving technique, most of the carved components have a certain degree of intricacy and complexity in design and these qualities were usually determined by their position and distribution within the house setting. The essence in these carvings was the knowledge of applying suitable techniques to produce the desired effect because the choice of techniques normally relates to the design of each carved component (Muhaimin, 2008; Norhaiza, 2008).

In short, the articulation of the carving pattern, the depiction of intricate motifs and the types of
perforation and incision could affect the degree of complexity and intricacy in the composition of the carved components. Likewise, the choice of carving patterns, motifs and techniques for the specific carved component was determined by its function, location and layout in the houses.

**Conclusion**

This study highlights the pattern of carved ornaments found at the 15 Kelantan and Terengganu houses that existed in the periods within 1800s to 1930s. At the spectrum of this architectural embellishment, the seven different types of carving patterns including complete, frame, single, stripe and band, linear, semi-radial and a combination of these became inextricably fused with the functional shape of the carved components and blended well into the different elements of the long-roofed and five-ridge roofed houses from Kelantan and Terengganu. The carved components that served as architectural ornaments were intrinsically essential parts of the house’s fabric although they were physically and visually secondary to the building’s overall form and the seven configurations of patterns seem to follow their forms and functions. These characters were discernible and subtle that made the carvings intricate and complex thus making it as exclusive components for special location like on the upper section of walls, doors and windows of rumah ibu, bedrooms and serambi. It is precisely a signification of the function of the past craftsmen to translate the utilitarian concept into an aesthetic language of forms and patterns that was exemplified in the architectural carved components of the Kelantan and Terengganu houses.

Today, the presence of this type of embellishment within the Malay modern houses could also give dazzling effect in the humble way and it could be used for the most conspicuous areas within the houses like guest reception areas, verandahs and bedrooms. This includes the uses of carved components for door and window leaves, ventilation panels of door, window and wall, window railings, partitions and screens, and carvings for wall decoration. A variety of elemental carved components especially in rectangular and continuous horizontal layouts could beautifully adorn the doors, windows and walls of these areas. Installation of rectangular ventilation components with the configuration of complete pattern that consist of motifs of growing plants in intertwining and overlapping characters are fitted above doors and windows of guest reception areas and bedrooms. These components with the characters of pattern in a higher level of intricacy and complexity in design are more appropriate for the major dwelling areas. Railing panels with stripe and band or linear patterns that are usually less complex carving in vertical upward could be reserved for the outdoor spaces like verandah and entry porch. Hence, the specialization of the carved components with different configuration of patterns is defined by their practical functions and reinforced by their beauty as architectural embellishments.

This mode of embellishment that had been practiced by the Malays since early 1800s especially among the wealthy and influential patrons should be continued in the present day of dwelling units owned either by Malays with low or high social status. Thus it gives a new perspective in recognizing the placement of carvings in the modern living forms. It certainly reflects the conscious attempt made by the present
craftsmen to relate the carvings with the modern house forms which were not only used as integral components but also placed as delineators of local identity. The carvings signify and reflect profound traditional craftsmanship with high levels of creativity, knowledge and skills of the past craftsmen, which should inspire the present generation of craftsmen to use these values for the present and future development. In view of this, with the help of technical innovation, the creative and skill craftsmen can lay a foundation from the old model of carving patterns in which traditional principles are sustained and yet could offer numerous possibilities of new ideas with fresh look design suitable for contemporary housing especially in urban areas. Such components, strong in definition of their attributes and functions, are suitable not only for the vernacular house type but also for modern houses.

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Zumahiran Kamarudin
Zumahiran Kamarudin is a lecturer attached to the Department of Applied Arts and Design, Kulliyyah of Architecture and Environmental Design (KAED), International Islamic University Malaysia (IIUM). She is currently furthering her study in PhD at the Universiti of Teknologi Malaysia (UTM) under the supervision of Associate Professor Dr. Ismail Said. Her research focuses on the placement of carved components in vernacular houses located in the northeastern states of Peninsular Malaysia.

Ismail Said
Ismail Said (PhD) is an associate professor and departmental head of Department of Landscape Architecture at Faculty of Built Environment, Universiti Teknologi Malaysia. He has been teaching at the university since 1985. His major research area is children behavior with outdoor environments including investigation on garden as restorative milieu in healthcare setting. He has published more than 65 papers in journals and conference proceedings and 5 books on materials of landscape architecture and architecture. And, his recent book is Garden as Restorative Environment for Hospitalised Children. Currently, he is supervising eleven PhD students studying a variety of topics including the impact of green infrastructure on urban residents’ wellbeing, urban morphology, place attachment on open spaces, walkable city environment, typology of landscape spaces in hospital setting, woodcarving, and children’s play plot ratio in residential setting. He can be contacted at ismailbinsaid@gmail.com
DESIGNING THE PROCESS: SCALE MODELS IN THE WORK OF KAZUYO SEJIMA AND SOU FUJIMOTO.

Marta Alonso Provencio and Jorge Almazán

Abstract
This paper attempts to clarify a design process that is being used by Kazuyo Sejima and Sou Fujimoto based on the use of scale models. Two typical cases are studied and represented graphically in order to map the workflow. The results reveal that the mutual influence between team members, the continuous process of production and selection are closer to an "editing process" rather than the conventional linear design process. The architectural quality and character of the work produced by Sejima and Fujimoto can be seen as a consequence of the process itself. The process based on the use of scale models becomes an object of design, and its advantages and disadvantages are discussed in this article. This systematical study is expected to offer new ideas to practitioners on how to integrate scale models in the design process and how to enhance creativity and collaborative teamwork.

Keywords
Scale models; process design; Kazuyo Sejima; Sou Fujimoto.

Introduction
This paper examines a particular process of architectural design based on scale models. The process will be documented through two recent projects by the offices of Kazuyo Sejima and Sou Fujimoto, but it can be found also in other Japanese offices. This article shows how the working process has been 'designed' in order to produce an architecture that, at least in the case of Sejima and Fujimoto, is broadly recognized by critics and the media. The aim here is to clarify their general way of working and how the scale model – an old and conventional technique of representation – is used in an innovative way, referred here to as editing process.

Scale models have been employed by architects and builders since antiquity. However, compared to the topic of architectural drawings, little specific research has been done about their meaning and relevance for design (Smith 2004). The reason might lay on the general understanding of the scale model as the most easily understood presentational technique (Hohauser, 1970, p. 06) and therefore they are
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often seen as lacking the suggestive potential of drawings.

Contrary to that view, this study explains the relevance of models in the design process, beyond their use as a presentation technique of the finished design. Smith (2004) does research in the same direction, but taking a philosophical point of view. The focus here is on the specific representational and thinking tools for contemporary architectural design. This paper supports the idea of a theory of process design, i.e. the possibility of designing creative protocols embedded in the process itself that will result in a better architecture. It is expected also that this study will contribute to a better understanding of the Sejima’s and Fujimoto’s work by examining their design process, which, as it will be argued, is intimately related to the character of their built works.

Bits and pieces of the ideas on process design contained in this paper can be found in different publications. However, there is a lack of specific academic research in order to systematically describe and shed light on its role in the design process in focus. This paper aims to overcome this lack of knowledge implementing in-depth study cases to quantify and define how the process takes place, its advantages and also disadvantages or difficulties to apply it in a non-Japanese working and cultural environment.

Background

Design Process vs. Process Design

The protocols shown here have been addressed as process designs instead of design methods. The literature on design methods can be seen as charged with deterministic connotations that many architects tend to refuse. The body of research on design methods was initially triggered by John Chris Jones’s 1950s article “A Systematic Design Method” and 1962 “Conference on Systematic and Intuitive Methods in Engineering, Industrial Design, Architecture and Communications” which he co-organized. But since the 1970s Chris Jones and Christopher Alexander, two pioneering leaders of design methodology, have criticized this line of research for having produced “deterministic” and “lifeless” methodologies (Bayazit, 2004, p. 24).

This paper assumes this critique on design methods and acknowledges the necessity of a creative interplay between logic and intuition. This kind of interplay is inherent in the creative connotations of the word design. This study makes the case for the possibility of non-deterministic procedures that facilitate design by enhancing both logic and intuition. Rather than as a method this approach is better understood as a way of designing the process.

The term “process design” establishes three clear distinctions. Firstly, by inverting the usual order of the well-established term “design process”, it recognizes the conceptual indebtedness to Peter Eisenman and his influential contribution to the theory of architectural design process, as explained below. Secondly, it differentiates itself from the deterministic connotations of the “methods”, by emphasizing the idea of “design”. Thirdly, the term describes more accurately the way of working found in the two offices in case, where, as documented here, most energy is invested in processing and editing multiple ideas rather than in the gradual refinement of a single design idea.
The creative potential that architects can find in the redefinition and exploration of design processes has been a major focus in Eisenman’s theoretical and professional work. However, in his work and in those architects influenced by his theories, the process is often used as both explanation and justification of the final results. A way of using the process that has become a commonplace in contemporary architecture, as Moneo (2004:151) has observed: “How many times have we heard that it is all about recording the process, to take into account these series of formal stages that are shown as a justification for the last and final stage?”

Eisenman’s works are presented as a series of spatial operations (turns, twists, overlappings, etc) whose accumulation produces the complexity of the final architectural object. The projects shown in this paper do not exhibit in their final configurations the complexity of the design process, which confirms the observations by Díaz, C. & García, E. on SANAA’s work (El Croquis, 2004, p. 30): “In contrast to other attempts to turn the process into a sort of new objectivity that makes the procedures omnipresent and the working protocols a sort of guarantee of objective, inter-subjective and universal legitimacy of the final product, in their projects there is not a trace of the rules of formation, nor a desire to feed in complexity”.

**Examples of historical scale models**

The way in which process design is implemented in Sejima’s and Fujimoto’s offices is intensively based on scale models, as this paper will show. Scale models have been tools for design as old as architecture and it is possible to find examples from almost every historical period. For instance, in Ancient Egypt there were funerary small-scale models of residences (like the one taken from the ninth dynasty tomb of Mehenkwetre found in Thebes), made of coniferous wood painted with gesso or clay (Bourriaud, 1988: 85). In ancient Greece the basic form of the temple was predefined, and thus scale models of the whole temple were of little importance. Instead they used paradeigma, study models of specific architectural elements, such as triglyphs or capitals that required a three-dimensional design (Smith, 2004, p. 10). In Imperial Rome, Vitruvius recommends the use of models (Bl. C. 1, Architecture in Ten Books, pp. 7-25).

The English term “model” stems from the Italian modello (plural modelli) (Harper, 2010), which meant a preparatory study or model, usually at a smaller scale, for a work of art or architecture, especially one produced for the approval of the commissioning patron. The term gained currency in art circles in Tuscany in the 14th century. Designs for the decorative details seem often to have been modelled in wax, a practice continued from Roman architects (Smith, 2004:25). During the Renaissance, most architects were also sculptors and they used chalk to build models for both disciplines. Alberti (1404-1472) in “De Re Aedificatoria” writes: “I will always recommend the time-honoured custom of preparing not only drawings and sketches but also models of wood or any other materials” (translated by Rykwert J., 1988, p. 33).

Examples of the 20th century abound. It is well documented that Gaudí relied on small-scale models like plaster devices, hanging wire or chain models to study complex geometric shapes and structures. Tatlin’s model of the Monument of the Third International became one of the centerpieces of Russian avant-garde
constructivism. El Lissitzky, who used models extensively, like those for the Meyerhold Theater and the House of Heavy Industry, wrote, “through working with models, we have the opportunity to become acquainted with the fundamental methods and systems of architectural ideas in drawing and the three dimensions” (Railing, 1990, p.14).

Contemporary models are taking advantage of 21st century materials, such as taskboard, plastics, wooden and wooden-plastic composites, foams and urethane compounds. Architectural publications show that, despite the widespread use of computer graphics techniques, models are still essential design tools for a considerable number of architects.

**Contemporary examples: Frank Gehry and OMA**

Frank Gehry and OMA can be mentioned as examples of prominent contemporary practices relying on models yet producing architecture of a very different character. In Gehry’s office models are the basic study tools, which must be transferred into plans and sections by sophisticated 3D-scanners. Gehry’s partner and software specialist Jim Glymph, explains that the design process is basically realized in model, and paper documents are mainly produced to “to feed building departments, inspectors, agencies, contractors and the legal system” (Pollack, 2006). Gehry’s office has elaborated a number of ways of scanning or digitalizing models to transform the information into computer data. This automated and direct translation from the three dimensional physical model to two-dimensional drawings has allowed Gehry to be more sculptural.

In the case of OMA, architecture publications often show the multiplicity of models produced during the design phase (clear examples are the Zeebrugge Terminal, the Netherlands Embassy in Berlin, the MAB-Tower, the Y2K house and the Casa da Musica). According to Giargiani one of the earliest examples of model usage strongly influencing the design process was the project submitted at the 1989 competition for the Maritime Terminal at Zeebrugge. The design problem was seemingly too complex to be analyzed in a rational manner and Giargini describes how OMA found itself judging whether one model shape was more beautiful than another (2008, p.165). This can be seen as an example of the interplay of logic and intuition that models facilitate thanks to their visual immediacy. Also in OMA’s work, even if only occasionally, they have a pre-established process design that we can hypothetically classify as relying on formal families or categories (as in Sejima’s office, as discussed in chapter 3). In the case of OMA Giargiani finds eight categories (2008, p.306): 1. Staggered boxes. 2. Boxes with platforms. 3. Transparent towers. 4. Foamy poché masses with inserted boxes. 5. Informal polyhedral solids. 6. Turreted prism with inclined vertical cuts at the base. 7. Folded planes. 8. Wrapped plane to form a continuous enclosure.

This paper contains two case studies. They are meant to gain insights into the specific details of the design process in Sejima’s and Fujimoto’s offices, and not to be the base for a general theory. The cases give specific details to enrich the understanding of the design process of both offices. The general conclusions contained in this paper stem from three sources (besides the two case-studies shown in this paper)
that give evidence of their systematic use of multiple models. The first source is based on the statements made by the architects in architectural publications:

“[…]. We build an enormous amount of models, but of course that is not our ultimate goal. The importance of this method is the effort to create the largest possible number of alternative schemes in order to see the different options from many different angles. We ask everybody in the office […] to produce as many options as we can find”. (Ryue Nishizawa interviewed by Díaz, C. & García, E., 2004, p.11).

“The process I follow at the beginning of a project is to make a large amount of study models. [...] From these introductory and uncertain solutions, we normally stick to the clearless and ambiguous ones. [...] It is true that we made many models and that only through them we can understand the meaning of the project”. (Sou Fujimoto, interviewed by Almazán J. & García T., 2009).

The second source is based on the photographic documents published in several magazines and exhibitions showing the design process. A clear example is the exhibition catalogue self-edited by SANAA (Kazuyo Sejima’s collaboration office with Ryue Nishizawa) on their own exhibition in Gallery MA in 2003. The book contains photos of large numbers of study models, laid out in rows or piled up in stacks, which have been produced as multiple alternatives in model. The third source is the authors’ experience, who visited both offices, worked for several projects in SANAA including Holcim Laboratories and Administration Center in Holderbank (2008), Madrid Rio (2006), City of Flamenco (2003), Extension of Tel Aviv Museum of Modern Art (2003); and have been involved since April 2009 in design studios taught in Keio University by Sejima and Fujimoto, where similar methodologies are applied. This personal experience has been reinforced by informal interviews that the authors had the chance to conduct among staff of both offices.

**Documentation Method**

Case studies have been carried out for the schematic design of two competitions. The first one is the Hokusai Museum in Sumida Ward (Tokyo) by the office of Kazuyo Sejima. This proposal won the competition and is currently being developed, for which further modifications might happen in later phases. The second one is the National Museum of Norway by Sou Fujimoto.

Every model produced for the schematic design phase was photographed (see Fig. 1), separately and placed into a context model (a 1:200 model, covering in both projects about 10 Ha of the area surrounding the site, see Fig. 2 and Fig.3). The record covers two periods of proposal production (21 days in Sejima’s office and 14 days in Fujimoto’s) and includes materials used, elaboration dates, and the date when meetings were held (weekly at the beginning and daily at the end). In Sejima’s office 5 meetings were held and 10 in Fujimoto’s office (see table 1).

The design process is explained graphically in Fig.5 and Fig.6. Columns show time, divided accordingly to the meetings dates. Rows show formal categories that have been introduced for the purpose of clarity by the authors of this paper. Other researchers also observed the use of a range of forms. For Sejima’s architecture Contreras (2009) mentions rectangles, circles, flowers and drops. This paper adds another
category, not found in previous projects: the diamond-carve shape. In the same way, Fujimoto’s models have been organized in rows according to formal similarity. The materials used in both cases are mostly fragile and easy to work with, and over 90% of the models are made of Styrofoam (other materials are indicated in Fig. 5 and Fig. 6).

**Reliability of the Documentation**

Sequences of models are often published in architectural magazines as an explanation...
Figure 2: Context large scale model from Sejima's study case (Source: Authors).

Figure 3: Context large scale model from Fujimoto’s study case (Source: Authors).
there could be the suspicion that the processes shown here have been modified for publication, especially because Sejima and Fujimoto have become architectural media celebrities. Therefore, it is necessary to stress the reliability of the documents compiled for this paper. The authors received direct approval from Sejima and Fujimoto, who understood the academic nature of this study and the necessity of accuracy.

The collection of data for the Hokusai Museum project started on April 10th 2009, and for the Museum of Norway on September 3rd 2009. The figures show the models in very small drawings that allow recognizing basic forms but do not compromise the confidentiality required by the offices (see Fig. 4 about the method of representation).

Results of Case Studies

Kazuyo Sejima’s Hokusai Museum

What follows is an explanation of the Hokusai Museum design process covering the final phase of the schematic design (fig. 5). There were two basic mandatory design constraints: the five-story height limit and the program size. The first step in the process was to build a 1:200 scale contextual model (fig. 2). This model, purely white in order to focus on volumes and proportions, is the base for testing every prototype into the urban context. As the design process progressed, the number of models did not decrease. On the contrary, for each meeting new models were produced. Some of them were completely new ideas, but others were a result of combining ideas found in different previous models. In Table 1, models counted as “directly related” to the final proposal are those whose combination and edition lead to the final one, as shown in fig. 5 and fig. 6 by the dotted lines.

Scale models influence each other by transferring their geometrical characteristics. These transfers and impacts between models culminating in the final proposal have been plotted in fig. 5 and 6. Model 9 is an edition of model 2 and so on.

For instance, model 37 tested in the meeting 4 is an edition of model 28 shown in meeting 2 but mixed with characteristics of the spine-shaped category. As the figure shows most of the models produced are different from the final chosen proposal, yet they can be considered essential for this way of designing as an object of discussion and comparison to make decisions.

Case Study on Fujimoto’s Museum of Norway

In Fujimoto’s project process (fig. 6) it is possible to observe the same transfers of influence among the vast amount of models. No option is discarded until the very end, for example: models with circular shapes keep being built through the development of the project even if the final chosen proposal belongs to a different

Figure 4: Method of representing scale models (Source: Authors).
Figure 5: Diagram of Hokusei Katsushika’s study case (Source: Authors).
Figure 6: Diagram of the Museum of Norway study case (Source: Authors).
formal category.

The mutual influence is again present in fig. 6. In model 4 appears the idea of addition and the pyramidal shape for the first time, as a pile of square prisms that together form a pyramid. The same pyramidal shape emerges again in model 26, but as a solid volume. The stacking of volumes of model 4 re-appears in model 52, as a stack of square prisms. Finally, this pile comes out again in the final proposal, as a way to arrange the program of the project. Simultaneously, the soft pyramidal shape with a leaning peak comes out for the first time in model 54, and it keeps developing and gaining importance in models dating from meetings 9 and 10. Finally, the pyramidal shape with a leaning peak becomes the exterior image for the project.

Concurrent influences from the idea of stacking volumes for the program and the pyramidal shape as an ideal exterior lead to the final shape in model 89. The idea of having an inside shape nested within a frame, springs from model 59 that has effect on the concluding model as a way of accommodating the concurrent influences from both models 52 and 54 in model 89.

Conclusions
Description of the Process Design in Sejima’s and Fujimoto’s Offices

According to the references examined and the authors’ experience, it is fair to say that the study cases shown in this paper are typical and not exceptional ways of working in Sejima’s and Fujimoto’s office. The following steps can be generalized as their typical workflow.

1) The objective constraints are clarified (required program, regulatory constraints, budget, etc).
2) A context model is built, showing the surroundings of the site, the urban fabric or landscape, not only the adjacent streets. This facilitates an understanding of the surroundings at a glance.
3) Within the given constraints, the team members start to make individually as many different models as they can imagine, all of them using the same scale as the context model. No previous indoctrination is imposed on the members about the direction to follow, except the objective constraints and the necessity to produce a vast number of options. All possible configurations of the program (e.g. distributed in detached volumes, compacted in a tower, extended in a mat configuration, etc) are systematically represented in model, but imaginative and unexpected approaches are also encouraged.
4) During meetings each member places his or her models on the context model. This allows checking the proportions and relationships with the surroundings and sharing ideas quickly. Almost only models are checked and abstract theoretical discussions are not encouraged.
5) The number of options increases gradually and all of them are kept until the last decision is taken. However, as the process progresses, some options start to capture more attention and different approaches are clarified showing the commonalities and differences among the multiple models.
6) At the very end, the final option is selected. Only then, the team starts to produce final
drawings for the schematic design, typically in the case of the competitions in only one week. Drawings tend to be simple and clear.

The process is characterized by a vast number of options represented in models, which are constructed in fragile and soft materials. As Sejima observed in an interview, in contrast with models seen in the West “the model materials used by Japanese students are very fragile, like sheets of paper or styrofoam panels. But US or European students use wood or plaster, and if they use paper, it is very solid, it is cardboard, which is not paper from a Japanese perspective” (Cortés, 2007). In this process, computers are understood as a mere help to make more models faster. As Nishizawa said in an interview (Cortés 2007), one of the important changes brought by computers is that, when they didn’t use computers, they could only do a few drawings and a few working models a day, but since they began to use computers, they have been able to produce 100 different study drawings on the computer and many study models every day, all very quickly.

Most of the time is invested in searching for the idea, an idea which typically is simple enough to be easily representable, powerful enough to solve many design problems at once and often unexpected and surprising. The activity that occupies most of the schematic design process is the production of multiple options and the development of selection criteria by comparison, a process analogous to the “editing” in the field of media publication. The process is far away from the lineal sequence of design that starts with the vision of the office leader and follows with his or her co-workers helping to achieve the vision, in a process to slowly come closer to the leading architect’s idea. In the “editing” process the design consists mainly in preparing, condensing and organizing options, most of which will be eliminated. There is no particular vision from the beginning of the particular details of the final project (at least overtly stated), but the particular conditions under which the editing process happens lead to certain coherent results.

Discussion on Disadvantages

Although this paper aims to stress the innovative potential of the process design documented, particular risks and difficulties have been also observed.

1) Manpower. To develop such amount of models, an equivalent huge amount of manpower must be mobilized. This process can be seen as only possible in large offices (as it is also the case in OMA). The particular working and cultural conditions in Japan could be also considered a cultural prerequisite difficult to transfer into the Western working environment.

2) Risk of reductivist anesthetization. The intangible social aspects of the built environment can be easily overlooked when the main tools of design are models. Also, by reduction to a scale model there is a risk to see architecture only as an object and to loose the human scale. This risk of aesthetization has also been noticed by Gehry: “I always work on two or three scales at once, it keeps me real […] it keeps me thinking of the real building, and I don’t get obsessed with the object, […] the model could become the object of desire, which I don’t want it.” (from “Sketches of Frank Gehry” Pollack, 2006). In OMA’s models, there are many human figures
for the same purpose: “The models [...] show a large number of small human figures. OMA uses them at different stages of the design in scales of 1:200, 1:100 and 1:50. [...] OMA believes that these figures are very useful for gauging the scale of space. (Tsukui, N. OMA@work, 2000, p. 74).

3) Excessive abstraction. In the particular case of Sejima and Fujimoto, most of the time is invested in the search of a simple, rotund and unexpected idea. Although the volumes are carefully studied to fit into the physical urban or natural context, the architectural expression tends to be abstract (white finishing, geometrical volumes, etc). This can be explained both as a consequence and as a cause of the process. In any case, the result is an architecture of clarity, sometimes called “diagram architecture” (Ito, 1996), which could be easily put under the criticism of postmodern theory for its limitations to convey meaning and express historical or symbolical contents.

Discussion on Advantages

1) Brainstorming. The fact that the largest amount of work is discarded could be seen as a waste of time, but the discarded models are valuable as a comparison to check the quality of the final one (development of selection criteria) and as a brainstorming technique. The “creative block” (i.e. the incapacity to think new ideas in a design process) is overcome by the simple emphasis on producing more and more in the hope that even randomly new ideas will emerge. Creativity as a quality in design seems to be achieved by the quantity of models. Also, in the long term many of the ideas discarded for one project are recycled for other projects. The office becomes a bank of architectural ideas waiting for the right project to be implemented.

3) Collaborative work. During the schematic design process, a large number of models are made and presented in each meeting. Models transmit architectural intentions beyond verbal communication and easily influence later models. The final proposal is a combination of editing and selecting a process in which the final model is a result of a collective and cooperative work and authorship of specific ideas is not discernible.

4) Prototype-like models. The models are built and checked as ‘prototypes’ or miniatures of the real project and not as an abstract representation. Often the chosen final model is almost a ready-to-be-built project. This means that models are already “prototypes”, in the sense of “a first scaled and usually functional form of a new type or design of a construction” (Webster, 2003). Typically, images for the final presentation panels are photographs of a scaled-up version of the final chosen model.

Summary and Prospects

This paper set the goal of clarifying a process design that is being used by Kazuyo Sejima and Sou Fujimoto based on the use of scale models. Two typical cases were studied and represented graphically for mapping the workflow. The non-linear mutual influence between team members, the continuous process of production and selections was found closer to an “editing process” rather than the conventional linear design process. The architectural quality and character of the work produced by Sejima and
Fujimoto can be seen as a consequence of the process itself. For them, the process becomes an object of design. This particular process-design has advantages and disadvantages and this paper does not claim to have found an optimal method applicable by every practitioner for every project. However, the systematic study presented in this paper is expected to offer new ideas to practitioners on how to integrate scale models in the design process in order to enhance creativity and collaborative teamwork.

References


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Marta Alonso-Provencio

Marta Alonso-Provencio, born in Madrid (Spain) graduated from Escuela Técnica Superior de Arquitectura de Madrid, ETSAM (DiplArch, 2009). She was a Research Student for two years at Kazuyo Sejima Lab, Department of System Design Engineering, Keio University, Japan. Currently, she is a PhD Candidate and a teaching assistant in Urban Studies at UNIL, Lausanne (Switzerland) where she is in charge of organizing the international workshop «Creating new urban spaces». Her research interests focus on the design processes and how their influences in the quality of the built environment. She can be contacted at martaalonsopr@hotmail.com.
Jorge Almazán

Jorge Almazán, born in Alicante (Spain), has studied at the Madrid School of Architecture and the Technische Universität Darmstadt. He completed his Doctoral Degree at the Tokyo Institute of Technology in 2007. Professional experience in Tokyo includes collaborations with SANAA (Sejima and Nishizawa Associates) and Atelier Bow-Wow. He has taught as Invited Professor at the University of Seoul and since 2009 he teaches and does research at Keio University (Tokyo). He can be contacted at almazan@sd.keio.ac.jp.
NEW ARCHITECTURE WITH OLD IDEAS: AN EGYPTIAN ACCULTURATION.

Khaled S. Asfour

Abstract
A product of any culture, such as architecture, becomes a travelling icon upon migrating to another culture. By the time the travelling icon reaches the host culture, it loses much of its original content keeping primarily its form. The host culture starts giving it new meanings and interpretations; and even working around its limitations through a process of acculturation.

I argue throughout the article that the travelling icon despite losing most of its original content still maintained its power to disseminate among the newly rising elite of Egypt. The power to disseminate was based on a consistent campaign carried out by Rifaa’ al-Tahtawi (and successive intellectuals) on issues of progress and modernity. al-Tahtawi devised a theory of progress that triggered a huge process of acculturation. This led to the evolution of the new villa so particular to the Egyptian society. It was not a mere copy of the Palladian villa but an acculturated one that had no precedence.

Keywords
Travelling icon; acculturation; theory of progress; Palladian villa; Tahtawi.

Introduction
The debate on how to accommodate progress within the local tradition started to materialize when Egyptians travelled to Europe for higher education in the nineteenth century. Since then, comparing local and foreign cultures became a common practice among Egyptian intellectuals of the nineteenth and early twentieth century. Their critical writings never doubted Western ideals as the source of progress for Egypt, yet those ideals had to reciprocate with their local counterparts to come up with a pairing situation suitable for the Egyptians.

The design of the 19th century villa in Cairo showed one facet of this pairing: local abstract ideas with a foreign physical form, traditional social behavior within a Palladian villa type. This pairing required compromise: the foreign type had to make concessions to local values.

The idea of borrowing from other cultures is a global mechanism. There are some critics who believe that the mechanism of borrowing must lead to misreading of the original, or contamination of the master model (Said,
1983, p. 39). Here the sense of misreading means degeneration in quality. There are other critics, such as Edward Said (1983, p. 236) and Mohamed al-Jabri (1985, pp. 51-52), believe that these misreadings are historic transfer of ideas from one setting to another and have the right to be judged on their own merit. They should not be seen as a continuous shadow of the original but another original. The borrowed idea do interact with different circumstance upon transfer, giving birth to interpretations so particular and so private to the new setting, that it would seem credible to give the outcome self-sustainable realization.

The term “worldliness” of Edward Said becomes important to the understanding of this point because it acknowledges the small world outside the borrowed idea as distinct from one setting to another, and which exerts different pressure and limitations on the borrowed idea in every new setting. The term in this way liberates the borrowed idea from its origins suggesting mutations (Said, 1983, pp. 25, 34-39, 237).

The theoretical position of Edward Said suggests that a product of any culture, such as architecture, becomes a travelling icon upon migrating to another culture. By the time the travelling icon reaches the host culture, it loses much of its original content keeping primarily its form. The host culture starts giving it new meanings and interpretations, and even working around its limitations through a process of acculturation.

The villa type that travelled to Egypt was a product of a long-standing tradition in Europe that could be traced to the sixteenth-century theoretician Andrea Palladio who practiced in the Venetian lands. Palladio (1570 / 1965) theorized his plan as follows:

The rooms ought to be distributed on each side of the entry and the hall, and it is to be observed that those on the right correspond with those on the left. (p. 31).

In his mind, there was a necessity to upgrade the status of the dwelling; hence symmetry perfectly served this ideal in both plan and façade. Palladio elaborated on this idea saying:

have made in all the villa buildings ... a pediment on columns for the front façade in which there are the principal portals. The reason is that these porches announce the entrance of houses and lend much to their grandeur and magnificence. (p. 53)

This rationale had a social meaning. The presence of a colonnaded loggia with a pediment on top in the context of a symmetric façade, clearly recalled religious buildings, and by this treatment his design became a hallmark of honorary status for residential architecture. (Constant, 1985, p. 4) Palladio (1570 / 1965) then regarded this whole setting in his treatise to be for a “great man” whose villa would impress those “who shall wait to salute or ask him [the master of the house] some favor” (p. 40).

This elevated status of the villa had never been idealized with such intensity before Palladio (Ackerman, 1967, p. 13). Since his time, the Palladio’s theory on villa architecture became an icon of wealth, power and prestige.

The country villa was usually set in the midst of large green fields (farming estates and gardens) where the family enjoyed the privileged sense
of repose from the dense fabric of the city (Ackerman, 1990, p. 10). It was a second house for the family that fulfilled their psychological need for a dolce vita (Muraro, 1986, p. 20). The sixteenth century villa continued over the centuries to act as a place for amusement but its farming aspect gradually diminished (Muraro, p. 90).

The sixteenth century villa continued over the centuries to act as a place for amusement but its farming aspect gradually diminished (Muraro, p. 90).

The nineteenth century, gave rise to a new social elite of industrial entrepreneurs, urban bureaucrats and commercial bourgeoisie. These groups, bent on acquiring fortunes, sought to create their own miniaturized version of aristocracy. The Palladian villa as an icon was no longer limited to the countryside. It was erected in suburban neighborhoods and even inside the urban fabric of the city.

The villa in its new format was a compacted version of what used to be found in large estates. The icon suggested that the past that used to belong to the “real” aristocracy was now idealized and revered by the new social elite (Olsen, 1986, p. 126). It cannot be reached nor entirely reconstructed, but perhaps it can be hinted at.

The villa type not only became an icon among the upper urban elites of Europe but also a formal source of inspiration to the Beaux Arts theoreticians. They sought the innovative organization of spaces, parti, suitable to every building program, after studying the relative works of the “masters” such as Vitruvius and Palladio (Levine, 1982, p. 102).

The Beaux Arts theory continued the antiquity’s tradition of deriving organizing principles from Nature such as symmetry, hierarchy and proportions (Panofsky, 1968, p.26). The notion of character could have metaphoric expressions such as “noble” and “severe” that could be derived from system of orders and styles that best suit the building program and the patron’s background (Levine, p. 102). Villa Rotunda of Palladio was an ideal prototype because of its double symmetry and choice of orders that gave the appropriate “noble” character to the building.

When the villa migrated to Cairo, much of those ideals pertaining to Palladio and later Beaux Arts were discarded. The villa in its originating culture represented a four-century-tradition of architectural theory. It also represented authentic aristocracy and later urban elites who understood the metaphorical expressions behind different orders and styles. All this was almost lost upon migration. The travelling icon only kept its formal look: the central hall flanked by symmetric arrangement of rooms with a projecting loggia.

Devoid from its content, the Palladian villa was ready for the process of acculturation. Instead of representing its original hefty baggage of traditions, the villa in the new setting represented modern thinking of the Egyptian rising elite. They were the upper classes that flourished after a law was passed in 1858 that allowed Egyptians (for the first time) to possess any amount of agricultural land, a privilege that used to be limited to the ruling Turks (Awad, 1980, pp. 326-336). Well-educated and high ranking officials in the government formed another elite class (Serageldin, 1972, pp. 90, 220). By the end of the century, both groups, still maintaining their traditional ethics, were still relatively newcomers to the world of aristocracy, and tried to enhance their position with status symbols that look new and modern; the Palladian villa was the icon to them.
In light of this presentation, I argue throughout the article that the travelling icon despite losing most of its original content still maintained its power to disseminate among the newly rising elite of the hosting culture. The power to disseminate was based on a consistent campaign carried out by local intellectuals on issues of progress and modernity. The final product was not a mere copy of the original model but an acculturated one that had no precedence.

Living in a Palladian villa assumed certain modes of living that did not exist in the traditional Egyptian lifestyle. These were necessary details that deal with arranging and using the spaces of the house. In traditional houses, the living room, locally called qa’a, in a family quarter was a space used not only for daily living but also for eating and sleeping. Beds and tables are packed away when not in use (Ibrahim, 1984). Those functions in a new dwelling type took place in separate rooms: a living room, a bedroom and a dining room, each with its own permanent set of furniture that was not ordinarily shifted about. How to manage this dwelling could no longer be passed from mothers to daughters by word-of-mouth, now it was through the printed word.

The manual Rabbat al-Dar (Mistress of the House) on how to housekeep a Palladian villa was introduced to the Egyptian market in 1915 as literature for women. The book came after almost three decades of introducing the new model of dwelling. It was a manual that instructed the housewife (or the potential one) on how to perform domestic tasks such as furnishing, cleaning, sewing; managing a house lived budget, and cooking.

Malaka Sa’d (1915), the author of Rabbat al-Dar, introduced the canons of each space by taking a medium-size house as a case study (p. 20). The central hall, according to her, represented the image of the house. On either sides of the hall, Indian chairs should be placed; in the center there should be a table. In the corner was a vase of flowers, near the doorway, a mirror, and a coat-rack (p. 21).

The reception room should have a wooden floor or be covered with a carpet. At the corners there are vases of flowers, on the wall pictures of the husband and wife, on another pictures painted by the wife herself. In the center is a table covered with an embroidered cloth with lace. Family or historical pictures can be displayed on the table. The room must contain a mirror and another three tables with ashtrays (p. 28). The windows should be covered with curtains. For the glass panes, the curtains are of lace, for the shutters they are of jute (p. 29).

The bedroom has one or two beds, a wardrobe with a mirror that contains formal clothes, washbasin (lavomano), drawers for underwear and linen, hangers for daily clothes, curtains of lace. It is possible to keep some of those items in the dressing room (pp. 21-22).

The study should be in a quiet corner of the house. It should contain a desk with drawers, an American revolving chair, some chairs made of leather, a grand clock facing the desk, a calendar, stationary, a cupboard for books, shelves for daily newspapers and frequently used books, lace curtains on glass windows, a thermometer, a waste basket and maps decorating the walls. The desk should be placed in such a way as to admit daylight from the left
side of its occupant (pp. 23-24).

This is a sample of how meticulous Malaka described the interior. She also discussed the etiquette that was associated with some rooms. In the dining room, for example, table manners ranged from how to fold a napkin to where the father should sit in relation to his son to how to make the guest feel at ease during the meal (pp. 33-38).

The book in this way represented the Palladian villa before travelling to its new destination and for this reason not every recipe was acceptable to the culture. There were two facets of the European lifestyle: one of which quickly became part of the social conventions such as table manners, furniture style and interior layout. The other facet that dealt with social relations was more difficult to accept.

There was not sufficient differentiation between the agreeable and disagreeable facets of European lifestyle. She recommended that the reception room should be as close as possible to the hall so the guest could be led inside passing through the hall. She also advised the housewife to keep some newspapers and magazines on the table in the hall for the visitor to browse while he was waiting for the master. In Malaka’s world, visitors are admitted first to a central hall then to a reception room. She was only reflecting the three-century-old Palladian theory of a guest being overwhelmed by the spaciousness and decoration of the central hall while waiting for the host to show up (Palladio, 1570 / 1965, p. 40). This image making that Palladio orchestrated in his design was dismantled when transferred to the Cairene community of the 19th century. Actual social conventions had to revise this segment of the travelling icon in order to accommodate a social value of the hosting culture. The housewife opened the shutters only during cleaning the room, then kept it closed for the rest of the day and night. Second-generation inhabitants of modern Cairene neighborhoods, remember that even ajar shutters were regarded as scandalous. Through the moving slats of the shutter women could view the outside world without being seen.

The construction detail of the shutter enabled the women to push a handle up and down which in turn caused the slats of the shutter to swing on a horizontal axes. With this detail, the woman saw a renewed segment of the outside world every time she turned the handle to a particular angle. (Fig.1).
The shutter was divided into at least two sections: The smaller portion was at the eye level and contained the rotating slats while the upper portion had the fixed ones. The shutter remained similar to a traditional latticed wooden screen, locally named mashrabiyya, which was also divided into two basic sections. In the lower section, smaller openings acted as a veil, permitting the woman to see the world without being seen.

The mashrabiyya and the shutter still maintained a fundamental difference: the first reflected established tradition, the second evolving tradition that offered choices. The mashrabiyya had fixed spaced interstices, no more than 3 cm wide thus resonating with centuries of unquestionable social traditions. It was a permanent architectural solution for a permanent cultural value. The shutter was a different case. It had the potential of being left wide open or firmly closed. Until the first two decades of this century, the society chose the last solution, disregarding advocates of the first option such as Malaka. With this choice they consciously decided on the demarcation line between traditional ideals that should continue and those that can change.

Ideals of constancy were further enhanced by the introduction of the shutter-screen to embrace terraces and balconies located in the upper stories where the family lived. (Fig. 2) The Palladian and later the Beaux Arts theory of placing the terrace in the center of symmetrically arranged façade in order to heighten the status of the patron when standing visible in this space had a weaker impact with this newly added screen. The formal look of the villa became diminutive. But this did not matter to the hosting culture, for the woman still enjoyed sitting in an open-air terrace, while shunning herself from the public eye.

To shy away from public eye was not part of the Palladian theory, nor was a parapet of shutters located over the terrace balustrade. The combination was quite stunning. (Fig.3) No attempt to suppress one at the expense of another, the terrace and the screen were equally needed; one satisfied a new social status, the other local social values. The combination had no precedents, but was an overwhelmingly positive solution for a society that gently acculturated a travelling icon. (Fig 4).
Malaka’s book was widely distributed in girls’ schools by orders of Ministry of Education (Baron, 1988, pp. 107-108) despite the discrepancy between theory and practice. Nevertheless, Egyptian families did not just read Malaka’s book then walk in to live a new form of dwelling. They were attentive to ideologies of social reformers who assessed local and foreign ideals together. The result was that in less than two decades it was the dream of every Egyptian to live in a modern dwelling eradicating in the process many centuries of traditional dwelling.

Reformers of this period almost had in common the tendency to avoid favoring completely one ideal over the other. They neither wanted to appear as foreigners to their local audience nor as antiquarians. The question then became what to keep from the local cultural systems and what to introduce from the foreign ones. The answer to this became a typical exercise for the intellectual of every theoretical discipline.

Figure 2: Villa façade showing additional screens on top of the balustrades of balconies that helped maintain the traditions of the society yet fulfilled their aspiration for modern living (Source: Author’s photography).
To pursue this exercise the intellectual had to pass through a cycle that started in the homeland, went to Europe and returned home again. In the first phase, the intellectual was young and inexperienced, and completed religious education in al-Azhar Mosque in his homeland. In the second phase, he was in Europe for a different education and in contact with the host culture primarily through Ideologies found in books (Larouï, 1976, p 117); yet he never failed to notice its tangible representations in built-form, social behavior and customs. In this phase, his intellect was in the making, his ideas and concepts were being formed according to current idiosyncrasies. By the end of this phase his mind was stocked with new ideas. He was now an intellectual ready to deliver manifestoes. In the third phase, he returned home full of hopes for reform. He deluged his society with his thoughts in the form of books, novels, and even legislations, depending on his government position.

In this cycle it was the middle stage that made him not only an intellectual but also a reformer. The trip to Europe did not always end with an academic degree but it still gave him the opportunity to be critical, which was the prime tool of a reformer. In this final phase, reformers felt obliged to come out with solutions that promised improvement to the usually unsatisfactory conditions at home. In doing this, they ended up dealing with the notion of duality that can be summarized as “us and them”.

The first and most famous intellectual who went through this cycle was Rifa’a al-Tahtawi. He was a prefect for a group of students who were officially sent to France between 1826 and 1831, during Muhammad Ali’s rule. Members of those state missions were seen as agents of modernization. The ruler expected them to learn Western science then return home to use it. Al-Tahtawi’s task was to master the French language and to become a translator.

After five years in Paris al-Tahtawi became

Figure 3: Detail of a balcony with a row of shutters to fulfill reformers ideal position on modernism (Source: Author’s photography).

Figure 4: House façade showing a screen of wooden shutters on a balustrade of a terrace (Source: Author’s photography).
more than just a translator. He returned with a theory that became a doctrine for successive generations. It became the worldliness that affected the Egyptian dwelling for the next century. It was the magic stick that was used to acculturate the travelling icon. Any civilized progress of a nation, al-Tahtawi told us, had to include simultaneously the material and the metaphysical spheres. The first included progress in public benefits (mana‘i ‘ama) such as agriculture, commerce, industry and communications. The second included progress in the morality, manners and customs governed by religion and jurisprudence (al-Tahtawi, 1870/1912, pp. 9-10). Progress cannot be achieved through one sphere alone.

Al-Tahtawi’s theory of progress must have come from his contact with authors of the French Enlightenment such as Montesquieu (al-Tahtawi, 1834/1849) p. 159; Hourani, 1962/1983, pp.70-71). However, this particular version of progress that combined the metaphysical and the material could not have come from his Paris experience. Al-Tahtawi saw Paris as an intellectual city dominated by the positivist movement of Saint-Simon and Comte who advocated the scientific reevaluation of traditional religions. Apostles for them were the bankers and industrialists (al-Tahtawi, 1834/1849, p. 57). They saw science as the sole generator of progress (Charlton, 1968; Manuel, 1962). There was no room in their ideas for the metaphysical sphere that deemed necessary in al-Tahtawi’s theory on progress.

In order to understand the origins of al-Tahtawi’s theory we need then to analyze the first phase of his intellectual cycle. Before leaving for Paris he studied eight years at al-Azhar Mosque (Higazi, 1974, p. 12) and became a jurisconsult (faqih). He even taught in this institution of learning for two years.

One of the Islamic sciences that al-Tahtawi had studied at al-Azhar was Legal Theory and Methodology (usul al-fiqh), which allowed the scholar to research the sources of Islamic Law (ijtihad) and issue legal opinions and prescriptions (fatwa) in religious and civil matters (Makdisi, 1981, pp. 276-277). These sources were arranged according to their importance: the Scripture, the sayings and precedents of the Prophet (sunna), then consensus (al-ijma‘). He should use the strongest source possible and only moved to the next one in hierarchy if he did not find enough evidence. If the jurisconsult did not find direct answers from these sources, he could apply analogical reasoning (qiyas) to measure an unknown case against another one whose verdict was known (Khallaf, 1978, pp. 20-22).

The idea was to allow a continuous interaction between jurisprudence and every new situation. To ensure custom-made prescriptions and to avoid stagnant interpretations, the jurisconsult might not follow precedent. He was encouraged to conduct his own research based on his own interpretation of the sources. If he disagreed from another opinion, of past or present times, both were equally valid and the layman could follow either or none of them (Maqdisi, 1990, p. 31). The jurisconsult had nothing to fear then, even if the problem at hand had no precedent (Maqdisi, p. 126).

With this in mind, al-Tahtawi went to Paris; to him it was the unknown world. Everything he saw was measured according to usul al-fiqh. All of French
culture he filed and indexed accordingly. Some facets clearly contradicted Islamic law, others coincided. There were also facets that fell in the grey area and which demanded ijtihad of the first degree. In the last case, al-Tahtawi did not find direct answers from any of the first three sources, he had to use analogical reasoning or even less direct sources, such as preference by assessment (istihsan) (al-Shawkani, [d. 1839] 1928, p. 5; Khallaf, 1978, pp. 14-20, 90) that require greater logical deduction (al-Tahtawi, 1870 / 1912, p. 441).

Azhar education had already faced the unknown West when Napoleon invaded Egypt at the end of the eighteenth century. Hasan al-Attar, an Azhar professor of al-Tahtawi, together with his peer Abdel Rahman al-Jabarti (1798 / 1975), practiced the rational techniques of usul al-fiqh on Napoleon’s proclamation that asked the local communities to revolt against the Ottoman government (p. 41). After scrutinizing the proclamation they came with a conclusion that Napoleon was not sincere in his words (pp. 42-47).

Usul al-Fiqh led the Azhar professors of al-Tahtawi to methodologically analyze the arguments of Napoleon. The degree of objectivity and step-by-step deduction in the midst of chaos were also reflected in their explicit admiration to their colonizers’ scientific advancements on visiting their laboratories and libraries (al-Jabarti , p. 117).

The ability to scrutinize under pressure in a foreign environment was passed to their student who had to cope with the center of modern civilization, Paris, while retaining his cultural identity. His Azhar education gave him the self-confidence and the critical mind to observe and filter the French culture. There was no antagonism in the process of screening rather tolerance, no polarization in thought but moderation.

Al Tahtawi’s theory of progress assumed that the acquisition of science was favored in Islam as long as it benefited people in terms of enhancing their quality of living. Beneficial science was not only religious but also secular, and practical such as mathematics and architecture (al-Tahtawi, p. 49). The theory also assumed that knowledge could be neutralized, or rather stripped of its original cultural content. Hence there was no package deal, as in the case of Malaka’s book, and because of this it was possible to practice the process of acculturation on the travelling icon. It was possible to empty the icon from its original content and to replace it with another that made sense to the hosting culture.

Al-Tahtawi’s theory became a genre in the intellectual history of Egypt. Successive thinkers such as Ali Mubarak presented the theory in a series of anecdotes that involve a dialogue between an Azhar sheikh and an English gentleman. The argument between the two ended with the message that “we had to scrutinize the West and only take what was good for us” (Shadhli, 1988, p. 25). Those simple-minded plots appealed to the public audience giving them reassurance that they can reshape the imported model according to their own prerogatives.

At the end of the nineteenth century, the theory was no longer a private matter seen only in books, but became a wide public debate that involved international participation of French
intellectuals. There was the debate between Ernest Renan and Jamal al-Din al-Afghani (Hourani, pp. 120-123; Stoddard, 1921, pp. 63-65), Gabriel Hanotaux (Adams, 1933 / 1968, p. 87) and Mohammad Abdu, Charles François le duc d’Harcourt (Jid’an, 1979 / 1988, p.472) and Qasem Amin (‘Emara, 1988, p. 220). Of the three debates, Hanotaux-Abdu had more than one round. It started by Hanotaux writing “Face to Face with Islam and the Muslim Question” in Journal de Paris, in early 1900. The article was translated into Arabic in al-Mu’ayyad, which also published a reply from Abdu. Al-Ahram (another local newspaper, opposing al-Mu’ayyad) wrote an article defending Hanotaux and published a reply by him as well as an interview. Abdu then replied in al-Mu’ayyad by three articles. This oscillating international debate, in local and foreign journals, clearly reflected that the process of acculturation was on the move and the topic was of a prime concern among the educated elite in Egypt (‘Emara, 1982, pp. 15-22).

Al-Tahtawi’s theory of progress was the center of all this debate. It was the worldliness in which the new domestic architecture had evolved. Its influence lay not only in preserving the society’s core values while allowing for innovation, but also in the fact that the lapse in time between introducing the theory and actually practicing was very short. In the case of al-Tahtawi, his book Takhlis al-Ibriz fi Talkhis Bariz (1834) (generally referred to as Journey to Paris) in which he presented his theory of progress was published shortly after his return and was distributed to all the state officials by order of Muhammad Ali, the ruler of Egypt. He then founded and headed a translation school in 1836 that contributed to the establishing of a cultural elite that valued both sides of his theory of progress (Dunne, 1939 / 1968, pp. 265-268).

Ali Mubarak held several ministries, one of them the Ministry of Education. He organized a college to train men as teachers of geometry, physics, geography, history, calligraphy and Islamic sciences such as jurisprudence and exegesis. The college also offered public lectures on a weekly basis in 1871. Seminars were conducted in a big lecture hall, located next to Hilmiya, in which both European and Egyptian teachers taught. The idea was new and attracted the educated elite that aspired to the new type of dwelling. Talks that were delivered to the public were on literature, astronomy, jurisprudence, physics, chemistry, railways, architecture, mechanics, botany and history. Either as teachers or students, turbaned sheikhs of al-Azhar sat side by side with Western-educated individuals exchanging thoughts and ideas (Dunne, pp. 376-378). In so doing, Mubarak practiced his character the Azhar sheikh who was open to the West and exchanged ideas with his respectable English gentleman about East and West civilizations.

The two reformers, among others, had the chance to practice the progress equation from a top official position. The result was overwhelming success. If an Egyptian family just lived in a villa with a central hall arrangement, this meant that the family was already satisfying half this theory, and would satisfy the other half if the dwelling mutated in response to their social habits.

The Palladian plan was welcomed in the Egyptian society along with notions of modernity and progress, yet it was not fully accepted because it seriously violated family privacy. Society rejected the arrangement of a central hall located behind the entrance porch and flanked by rooms with no intermediary space.
Consequently, the idea of a separate reception room locally called Salamlek was a novel addition to the Palladian plan. The combination allowed the visitor to be received in a room that still maintained its traditional importance without disrupting the privacy of the family. (Fig 5).

This architectural modification to the European plan showed that the tradition of excluding the visitor from familial life persisted in the new form of dwelling. The refusal to alter the central-hall plan was as strong as the insistence on having a salamlek. The attempt to include both ideals, one architectural, one social, resulted in the separation of the two domains. The salamlek was placed in the garden as a separate entity. (Fig. 6).

The separation of the salamlek from the house did not mean that it had an inferior status. It was raised from the ground by one flight of stairs to give it an honorary status. It was also located

Figure 5: Front garden of a villa showing the separate room (locally named salamlek) with a portico to received guests (Source: Author’s photography).
in the front yard, and the host could not notice its facade treatment being similar to that of the house. The interior was lavishly decorated and well furnished like any other reception room inside the house. Thus the locally added component of the new dwelling was equally appreciated. This appreciation was amplified if the land is large enough, for the house could have more than one salamlek (house No. 2 in Fig. 6). In some cases the salamlek was so large it had its own garden (house no 1 in Fig. 6).

The presence of a detached room in the garden suggested that visitors were screened into two distinct categories, relatives and strangers. More developed plans offered richer version of the acculturation process. In addition to the detached room, the visitor could be admitted from the entrance porch to flanking reception rooms without passing through the central hall. Once the plan offered more than one option for entertaining the guest, classification of visitors could be broadened. It was no longer limited to two main categories: relatives and non-relatives, but also intimate friends, professional peers and business associates. (Fig. 7).

When any of these three categories were admitted to the house the following design solutions were invented for the purpose of

Figure 6: The phenomenon of Salamlek was spreading throughout complete neighborhoods (Source: Portion of historic map from Cairo Survey Department, 1911).
privacy. The staircase that led to the upper storey was screened from the central hall by a wall or a corridor. Thus the wife could go to the kitchen and supervise her maids without passing through the central hall.

Neﬁsa, who was the grand daughter Rifai al-Tahtawi, had a house that overlooked two main streets. Thus the liability of having a visitor approaching the villa from both entrances was equal which prompted another layer of precaution. At the side of the family entrance was a reception room with two doorways: one opened onto the staircase, the other connected with the interior. The front reception halls could not be approached from the entrance porch. So, no male visitors were admitted through the main entrance. Instead they went to the salamlek on the left hand side of the garden gateway. (Fig. 7).

Other houses offered greater flexibility. The Zahwi brothers, who were merchants, had their salamleks integrated into their villas. Located at the entrance to an alley, the salamlek of the first house is approached from both a square and an alley. Another reception room directly approached from the entrance porch gave the owner another choice for entertaining his guests. Compared to a typical house with just one salamlek, the Zahwi residences reflect a worldliness full of reciprocity with the local milieu, after all they were merchants. (Fig. 8).

Acculturation of the original model suggested that a physician could have his professional practice as a family doctor inside his dwelling. Dr. Muhammad Nashid, had one section of his house as a clinic, with entrances at opposite ends, one for women, another for men patients. Another section of his house was the salamlek. A third section with a separate entrance led to the family quarters upstairs. (Fig. 9).

The last two examples are exceptional; nevertheless they show the extent by which the acculturation process developed, certainly not to the liking of the original theoreticians. In the central-hall plan, the ideals were focused on the overall scheme of organization of spaces.
The more symmetrical the arrangement was, the better it looked. Anything that offset the axially balanced form would shift the plan from ideal standards. Palladio (1570 / 1965) was very conscious of this dilemma.

But an architect is very often obliged, to conform more ... than to that which ought to be observed ... as most commonly in cities, either the neighbours walls, the streets, or public places, prescribe certain limits, which the architect cannot surpass, it is proper he should conform himself to the circumstances of the situation. (pp. 37-38).

Palladio, in one of his theoretical designs highlighted this attitude towards the less ideal situation. The notion of “conforming” to actual conditions rather than to what “ought to be” never suggested the discarding of ideals in response to less favorable conditions. On the contrary, the architect would proceed with his regular and symmetric arrangement of forms until they “run into” the irregular portion of the site. “Conforming” here means “colliding”. In this manner, the eye would read the ideal setting even when it was partially “hidden” by the actual condition of the site. This was precisely the effect experienced by a viewer walking from the main entrance to the chamfered courtyard in Palladio’s theoretical design (1570 / 1965, book 2, ch.17).

Once the central-hall plan migrated to Cairo, there was more of “what actually is” than “what ought to be.” The idea of conforming to irregular conditions meant engaging with cultural mechanisms such as the subdivision of the plan into more than one zone, private and public, thus creating multiple circulations. This required the offsetting of the axially balanced plan possibly to its farthest limit. Palladio’s

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Figure 8: Two merchants’ houses showing more developed model (Source: Surveyed and drawn by the author).
solution to the problem was not very effective for the situation did not just involve running into an irregular site. Thus for the plan to survive in its new environment, it could have constantly contained what defied its inner logic.

In the case of the physician’s house, putting his practice inside the house increased the circulation paths by two more, thus reducing the formal look of the house to a corner side overlooking the intersection of the two streets. In the case of merchants’ houses plenty of salamleks were inserted in the main buildings leading to a completely unbalanced plan with no clear arrangement. The result in both cases was the creation of a parti that could neither have existed under Paladian nor the Beaux Arts theories. Both cases show that even the form of the travelling icon was subject to changes not just the content.

Solution

In conclusion, the travelling icon had come a long way since the 16th century. Palladio could never have anticipated what would become of his architecture. In his treatise he consciously referred to Vitruvius. He wanted to show that his ideas were not new but a continuation of what Vitruvius had started. Acknowledging old masters authenticated his ideas and anchored them in the heritage of intellectual history. When the icon travelled to Egypt the notions of heritage and tradition were totally replaced by opposite notions, namely modernity and progress. The same parti embodied opposite notions upon migration, and yet proved to be successful in the new culture. This suggests the ability of Palladian villas to strongly engage with masses at the level of imagery. To have two cultures of different histories embrace his architecture was a testimony to its visual quality. Composed of solid masses embracing the central shaded space of the portico the façade was very attractive. This balanced solid to void ratio strongly satisfied the notion of hierarchy that was the prime tool for appreciating a classical facade. Such appreciation transcended the original culture to assume validity wherever it went.

Palladio was not alone in his search for authentication. The 19th century society sought to live in his miniaturized version of dwelling with their eyes open on authentic aristocracy of the Baroque period. Villa owners wanted to authenticate their social position by referring to this great past. Upon transfer to the hosting culture, the villa became a social aspiration for a modern life. To live in one of those new dwellings meant progress, better future, and enlightened
mind. To replace the content of the travelling icon required this enlightened mind. Mohamed Ali, the first ruler to modernize Egypt since the medieval times, never envisioned what would become of an Azhar Sheikh travelling to France to learn French. Al-Tahtawi came back and just spoke his mind out in simple terms. He was a moderate critic who wanted to have it all: his traditions together with the civilized progress. His mindset suddenly became the heartbeat of the nation. Everyone listened to what he was saying, triggering a massive acculturation process. Villa architecture of this period was evidence to such process. Complete neighborhoods were built accordingly. Those who lived in those neighborhoods never viewed themselves as westernized, but from within their own perspective, they just wanted to live a modern life according to their own terms.

References


of progress advocated by Islam intellectuals in the contemporary Arab world). Beirut: Dar al-Shuruk.


Khaled S. Asfour

At the age of 31 he completed Masters and PhD from MIT, specializing in theory and criticism of architecture. In next seven years, he taught in KFU of Saudi Arabia, and traveled in Gulf and North Africa searching for architectural excellence. He wrote intensively on the subject which qualified him to became the editor responsible for Arab entries in Dizionario della’ architettura del XX secolo (Turin) and in a world book on Architecture and Identity (TU Berlin). He was a research fellow at Harvard University for several months. He was one time a technical reviewer for Aga Khan Award for Architecture. He sat on international juries in American University of Sharja, Bahrain University, Liechtenstein University, Riyadh Development Authorities, and Hassan Fathy Award. On a professional level he was a consultant to projects such as Palm Hills Egypt developments and Mekka Expansion. He is currently teaching in MIU - Cairo and the university consultant for academic development.
LEED AND THE DESIGN/BUILD EXPERIENCE: A SHELTER FOR HOMELESS FAMILIES RETURNING TO POST-KATRINA NEW ORLEANS.

Stephen Verderber, Breeze Glazer, and Rodney Dionisio

Abstract
Hurricane Katrina displaced nearly one million citizens from the New Orleans metro region in 2005. Five years after the catastrophe, in August of 2010, more than 150,000 citizens remained scattered across the United States. Katrina was the largest Diaspora in the nation’s history. The number of homes damaged or destroyed by Katrina’s devastation numbered more than 125,000. An award-winning case study is presented of a unique partnership forged between academia, a local social service agency, professional architectural and engineering firms, and a national humanitarian aid organization whose mission is to provide affordable housing for homeless persons in transition. This collaboration resulted in a sustainable design/build project that originated in a research-based university design studio. The facility is a 38-bed family shelter for homeless mothers and their children seeking to rebuild their lives in post-Katrina New Orleans. The site for this 4,400 facility did not flood when the city’s federally built levee system failed in 2005. This case study is presented from its inception, to programming and design, construction, occupancy, and the post-occupancy assessment of the completed building. This facility is the first LEED certified (Silver) building in New Orleans. Project limitations, lessons learned, and recommendations for future initiatives of this type are discussed, particularly in the context of any inner urban community coping with the aftermath of an urban disaster.

Keywords
Design/build; homeless shelter; LEED; research case study.

Introduction
New Orleans’ housing crisis had been well underway prior to the morning Hurricane Katrina made landfall on the Louisiana coast near the mouth of the Pearl River, the border separating Louisiana from the state of Mississippi. It is a widely held misnomer that New Orleans’ housing crisis occurred only after Katrina. Prior to the unprecedented destruction inflicted by Katrina, when more than 125,000 homes were damaged or destroyed and 1,800 persons lost their lives in the Great Flood, nearly 16,000 housing units already sat in decay and abandonment across the city (Verderber, 2009a). This was despite a local homeless population in New Orleans that numbered in the thousands (Sturgis, 2006; Verderber, 2009b). Many could have been rehabilitated, however, had the city not been so thoroughly dysfunctional with regard to its poorly run housing reclamation program. Compounding
matters, many of the least inhabitable housing units had been federally built, rent-assisted housing projects dating from the 1930s through 1950s period. In Katrina’s aftermath the federal, state, and local governmental response was dysfunctional at best, with the response effort led by the ill-prepared Federal Emergency Management Agency (FEMA). Some returning families who had been homeless before the hurricane were placed in poorly built temporary travel trailers (Verderber, 2008). As of August of 2010, five years later, nearly 125,000 persons remained internally displaced within the United States.

The Design/Build Movement

In 2002, in the aftermath of 9/11, an entity called the Rapid Response Studio (RRS) had been initiated within the Tulane University’s School of Architecture (Verderber 2003; 2005). It consisted of a curricular structure whereby an upper level design studio was devoted annually to addressing pressing social problems in the local community. This community outreach studio had undertaken, prior to Katrina, a series of urban issues including transportable medical facilities for use in disaster mitigation contexts, and affordable pre-manufactured housing prototypes for application in post-disaster contexts. In 2005, a research-based design project to aid homeless women and their children in post-Katrina New Orleans was formulated. The initial project team consisted of fourteen architecture students working under the guidance of the first author. From the outset, this research-based design experience was to function as a vehicle for a design-build studio experience for architecture students in sustainable site planning and design. Its aim was to provide transitional housing for a segment of the city’s large, returning homeless population.

The RRS was inspired by the Rural Studio at Auburn University, founded by the late Samuel Mockbee in 1992 (Dean, et al., 2002). Numerous schools of architecture in recent years had carried out the design and construction of small-scale interventions in the name of social engagement. These include projects at the University of Arkansas (Hueter, 2005), the University of Newcastle in the UK (Kellett, 2006), and at MIT (Campbell, 2005). Byron Bell’s edited book on community engagement in architecture (2003) contained a number of case studies in schools of architecture. Sustainability would soon be added to the equation. The University of Kansas’ Studio 804 would be the first to complete a LEED certified private residence in the U.S. (University of Kansas, 2010). The Duke Home Depot Smart Home Project, completed in 2007, resulted in the construction of a 10-student dormitory that received LEED Platinum certification (USGBC, 2009). While the aforementioned interventions were small in scale, they symbolized a larger movement that captured the attention of the mainstream architectural press in the U.S. (Ivy, 2005). This attention was accompanied by the simultaneous appearance of more books on the topic of community engagement (Palleroni and Merkelbach, 2004; Sinclair and Stohr, 2006) and articles that appeared in the popular media, including on the work of the Architecture for Humanity organization (Hales, 2005).

The growing design/build movement in the U.S. countered, in effect, what Sarah Goldhagen (2003) had characterized only a few years earlier as the noticeable collective disinterest in any meaningful degree of social engagement. She
argued, persuasively, that most architects had been caught off guard in the aftermath of 9/11. Moreover, Goldhagen’s timely call to societal arms echoed that of a seminal 1996 report on the dubious overall condition and mission of U.S. based professional training programs in architecture precisely because they had become so disengaged from their constituencies and from the general public (Boyer and Mitgang, 1996).

**Research Objectives**

The three core research-based design objectives of the project reported were, first, to explore through the RRS the design-build educational model vis-à-vis a LEED-certifiable building. LEED stands for Leadership in Energy Efficient Environmental Design, and is operated under the aegis of the United States Green Building Council, a quasi-governmental organization based in Washington, D.C. LEED rates a building’s reduction in carbon dioxide emission, energy savings, improved environmental quality, and water efficiency. LEED certification can be earned at the silver level or higher (LEED buildings are silver, gold, or platinum, based on a predetermined point-based system of performance assessment with 100 the highest number of possible points). The second research objective was to carefully document every phase of the project from outset to the early post occupancy phase. This database would then be available to others seeking to replicate the research-based design protocol. The third objective was to construct a framework for working closely with professionals in the local community, in a genuine partnership.

**Methodology**

The New Orleans Mission’s (NOM) urgent need to provide a facility for returning homeless women and their children became the sole focus of the Rapid Response Studio in 2005. The NOM was the largest provider of services to the homeless in the city. The research-based design process consisted of the following six steps:

1. **Pre-design Site and Architectural Program Analysis.** This resulted in a detailed functional space/needs program. The Rapid Response Studio project team developed a detailed space program and site master plan for the campus (Davis, 2004). The campus consisted of a former store and warehouse on Dryades that had been converted in the 1970s to the aforementioned male-only shelter. No organization in the city provided emergency overnight beds for homeless women or children at the time. The project team worked pro bono from start to finish. The team met on (at least) a weekly basis for a year and half. A bi-weekly sustainability audit was conducted to assess project goals in direct relation to progress made.

2. **Interviews and Focus Groups.** These were conducted with the shelter administration, homeless individuals currently being served by the agency (referred to as clients), and shelter staff members. Team members met in the pre-design phase with the administration, interviewed thirty-two homeless persons at the existing NOM emergency shelter, whose capacity was 180 beds, and interviewed twenty-four day-to-day staff personnel responsible for its operation. This new, transitional facility was to house only homeless mothers and their children for up to six months. The existing emergency shelter was a male-only overnight facility.
3. Historic Resources Inventory. The Central City neighborhood contained a number of so-called “spot designations” of historic structures, many of which fell under the aegis of the city’s Historic District Landmarks Commission (HDLC) oversight review board. These buildings were scattered throughout the neighborhood. In recent decades the zoning in Central City had been converted to light industrial land uses. By contrast, immediately across the street from the men’s building sat a beautiful 19th century church, the St. John the Baptist Catholic Church (1839-1843). Its gleaming gold leafed spire served as a landmark and at once signified the traditional gateway between Central City and the Central Business District, on the other side of an expressway. In addition to the church, this transitional zone was home to a number of vacant, dilapidated structures that surrounded the NOM site, interspersed with a few buildings in the midst of historic restoration. 1

4. Architectural Design. Services provided by the student-based project team consisted of schematic design, design development, construction documents, materials specifications, and construction administration specifications. A New Orleans-based A/E firm provided expertise from the project’s inception. This firm served as the Architect of Record. It also provided much additional technical support, guidance, and functioned as the key liaison to the client(s), contractor, and subcontractors. This firm provided its technical expertise on a pro bono basis.

5. A NGO Sponsored the Construction. The project team worked closely with the core client (the homeless agency) and a national not-for-profit organization. Four weeks after the hurricane, HomeAid, a not-for profit non-governmental organization (NGO), based in Newport Beach, California, became a full partner in the project, joining forces with the New Orleans Homeless Mission. This NGO stepped in as an “angel” sponsor” when it appeared that the project would die for lack of funding. Home Aid pledged to provide funding to construct the architecture students’ vision for the homeless family shelter. The scope of the project had been significantly expanded and transformed, as the city’s housing needs for returning homeless families had grown exponentially in Katrina’s aftermath.

6. Post Occupancy Evaluation of Completed Facility. Members of the design/build team conducted an assessment of the completed building. This occurred three months after the building’s initial completion and occupancy. This step was deemed critical from the standpoint of future design/build projects of this type, particularly for those seeking LEED certification by the USGBC.

Urban Context

From a peak population of nearly 600,000 persons in 1960, New Orleans’ population had shrunk to 470,000 by 2005. This had been the result of the widespread suburban “white flight” experienced by cities across the U.S. in the post-WWII decades (Schein, 2006). In the case of New Orleans, residents, white and black alike, had abandoned inner urban neighborhoods that had previously been stable centers of commerce and civic life. Additionally, these communities tended to be situated along what has become known in the aftermath of Katrina as the “Sliver by the River”—the stretch of unflooded “high” land straddling the banks of the Mississippi River in a generally East-West direction and which resulted in an overall crescent shape. One such neighborhood
near to the banks of the river, Central City, had once been a thriving center of the city’s Jewish community. Its main commercial artery, Dryades Street, was a once-proud shopping district that catered to both African American and white residents of the surrounding neighborhoods (Campanella, 2006).

This street had been racially integrated as long ago as the 1930s, decades before the integration of the city’s main commercial district downtown, widely known as Canal Street. Central City had fallen on hard times—many blocks by the 1990s appeared to be “bombed out”—having been eviscerated though a combination of neglect (and theft) of their once-exquisite architectural inventory of commercial facades, residential Victorian ornamentation, and locally owned mom and pop businesses. Elegant commercial structures, many replete with gargoyles and terra cotta facades, once lined this shopping district. Katrina’s floodwaters, while inundating 80% of the city, stopped a few blocks shy of Dryades Street and the heart of this once-vital neighborhood. The residents of Central City fell on hard times in the post-WWII decades, in large part due to inaccess to educational opportunity, jobs, and progressive housing options, in a pattern endemic to many inner urban communities in large U.S. cities today (Sibley, 1995; Nossiter, 2006). Faith-based organizations and other volunteer organizations became directly involved in the city’s highly challenging rebuilding process (Silverstein, 2007).

**Results—The First LEED Certified Building in New Orleans**

From the outset, the design/build team was compelled to design and build a thoroughly green, i.e. carbon neutralized, building. At the same, this building would be viewed as an example for the future in the design and construction of homeless shelters in the United States. The shelter earned certification in 2010 by the U.S. Green Building Council’s (USGBC) Program in Leadership Through Energy Efficient Environmental Design (LEED) at the Silver Level (USGBC, 2010). The LEED certification process itself required an intensive learning curve from all members of the project team. No members of the team had had any prior experience with an actual LEED project that had been built. Despite the myriad obstacles encountered, the effort prevailed. The building’s performance—its 32 LEED points—were based on numerous “green” site strategies, materials, and building systems:

- Redevelopment of an historic, inner urban neighborhood.
- Bike rack on-site/close proximity to public transit.
- A sustainable site, i.e. the site did not flood in Hurricane Katrina.
- A geothermal system for the provision of heating and cooling.
- Bamboo flooring/recycled rubber tile flooring.
- Mold and mildew resistant wallboard and related building materials.
- Passive shading and cooling design features, i.e. natural ventilation, operable windows, generous overhangs/sun screens.
- Sustainable site management, i.e. site grading, fencing, materials storage.
- Energy efficient appliances and electrical...
system, i.e. kitchen, bathrooms.
• 3-Form panel system as re-locatable room partitions.
• Decay-resistant exterior cladding.
• Low maintenance landscaping/reflective roof surfaces.
• User activated-room HVAC control systems, i.e. smart house technology and low volume plumbing fixtures.

The completed two level shelter is 4,400 square feet, and contains 38 beds, full food service support facilities, a dining room, childrens’ activity room, administrative offices, storage, and an apartment. The apartment is occupied by the housemother who resides on-site on a 24/7 basis. Figure 1 illustrates the key site planning and design concepts embedded in the architectural vocabulary of the shelter. The 38 beds are deployed throughout six suites on the second level, with an ADA-compliant suite
provided on the first level. Each bedroom suite contains four to five beds (two bunk beds plus one or two single beds) and is equipped with its own “private” bathroom/shower. The second level suites open onto an open-air terrace that doubles as a space for social interaction among residents. This space contains a seating area and is semi-enclosed. To the rear of the site are a large yard and a side yard that contains a walking path and a garden. The kitchen includes an island and counter seating designed to allow for informal meals. This realm of the shelter also contains a walk-in pantry, stainless steel appliance and counters, tile floors, and track lighting. A laundry room is situated to the rear of facility, adjacent to a commercial-grade kitchen/food prep/pantry. These spaces are adjacent to a rear deck with steps leading to the rear play yard.

Residents are able to stay for up to ninety days. At that point the expectation is for families to relocate to more long term housing in the city as it becomes available. As for the case study itself, many building products were donated to the cause, as it was a case study in sustainable housing. Donors were recognized in all public relations activities during and subsequent to the facility’s completion. The New Orleans Mission Family Shelter was first occupied in November of 2007. This case study in sustainable design for the homeless was completed at a total cost of $1.2 million.

The RRS completed all site prep work, including the demolition of a dilapidated wood frame structure on the site. This work was expedited over a three-week period. This phase consisted of a small-scale archeological dig on the site. The purpose was to identify previous building on the site. It was learned that the first building was a horse stable. The foundation of this structure was encountered four feet below street grade. At two feet below street grade the remains of a private residence were uncovered. City records research by RRS team members indicated that this structure had been destroyed by fire in 1873. The site recognizance phase of the project occurred over a two-week period of intensive daily activity on the site. This stage of the project is illustrated in Figures 2 and 3.

Figure 2: Site Demolition and Assessment of Building Materials for Re-Use (Source: Authors).
A project schedule was established and subsequently modified as new issues emerged throughout the project’s duration. Construction commenced in the fall of 2005 and work at the project site was expedited to the maximum extent. Any movement forward was considered a significant step given the myriad uncertainties inherent in every construction project at the time in the hurricane-ravaged city. The design/build team was forced to cope with numerous labor and material shortages, the dramatically escalating costs of building materials, labor costs, skyrocketing insurance costs, and a vast assortment of seemingly insurmountable local regulations and related obstacles. Not surprisingly, this was the only new construction-taking
place in the entire Central City or downtown neighborhoods. Figure 4 and Figure 5 depict the shelter during the framing process. Serialized construction sequence photos were shot from pre-set camera angles over a five-month period in 2005-2006. In addition, the project was beset with periodic weather delays and work stoppage interruptions due to the fact that a total of five different project superintendents were involved across the project’s duration. Suffice to say, continuity and even the initial vision of any design/build project is difficult to maintain in such circumstances. These challenges were kept in check, however, due to the aforementioned weekly meetings of all key representatives of the design/build team—the RRS, the client’s funding sponsor (HomeAid), the client (New Orleans Homeless Mission), the A/E firm that served as the Architect of Record (Perez Architects), and the contractor.

From the adjacent Pontchartrain Expressway the structure is viewed within its urban context, and particularly in relation to an adjacent homeless men’s dormitory structure (Figure 6). In Figure 6, a pre-Katrina, 16-bed women’s shelter is shown. To the right in the Family Shelter is shown, and to the right of the Family Shelter is

Figure 4: Construction 1 (Source: Authors).
the men’s shelter and the organization’s main administrative and training center. At far right is the aforementioned, historic, St. John the Baptist Catholic Church.

The main arrival is inviting and consists of a staircase and adjoining access ramp. The entire facility is centered on universal design concepts, whereby all features can be readily accessed by children, midlife adults, and the aged, as well as spaces specially suited to persons with physical limitations, including wheelchair restrictiveness. Figure 7 depicts the main entry sequence and the stainless steel exterior handrail system in part donated by Foms+Surfaces, Inc. It is the first-time installation of this product in New Orleans. The exterior cladding on the first level is fiber composite wood siding; on the second level unpainted (albeit weather treated) corrugated metal cladding references the vocabulary on the exterior of the men’s shelter. From the bedrooms, large picture windows afford full views of the CBD and the nearby landmark church to the north of the site. Windows are operable in the bedrooms and in the social-activity areas.
The dormitory wing is illustrated in Figure 8. The kitchen and laundry room is situated on the main level. Above these spaces is situated the dormitory, consisting of five bedrooms and their bathrooms. The roof is a highly reflective color to minimize solar gain within the building envelope. The glazing on the commercial storefront curtain wall system on the main level is comprised of color tinted low-E tempered glass inset panels, creating a mosaic pattern activated by natural daylight. The corrugated cladding wraps around the second level of the dormitory wing. In order to make maximum use of assignable space, the underside of the stair landing houses trash receptacles and a bike rack (Figure 8). A commercial grade kitchen is equipped to provide three meals per day for the 16-bed women’s shelter next door as well as the 38-bed family shelter (Figure 9). All appliances are high quality stainless steel, with stainless steel countertops and high-grade cabinetry. Donated materials and building components consisted of all appliances, plumbing fixtures, framing wood, exterior frame siding, and landscaping.

The dormitory rooms are equipped with high quality bunk beds and large armoires. The rooms are designed to accommodate multiple bed furnishing layouts as occupancy needs change.
(Figure 10). The bedrooms have cathedral ceilings, evoking an increased perception of spaciousness to residents. The students conducted considerable prior research on homeless shelter bedroom configuration options when designing the dormitory spaces, and with respect to all exterior spaces, circulation, social activity spaces, and spaces for personal hygiene.

**Post Occupancy Evaluation**

At the project’s completion a post-occupancy evaluation was conducted to assess the shelter’s strengths, limitations, and opportunities for retrofit improvement. Six full time staff personnel, six volunteers, and fifteen residents were interviewed using a pre-set battery of
standardized questions presented in a four-page survey questionnaire. Questions on this 4-page survey questionnaire were listed as a series of short response items that followed a lead in statement: “These data were comparatively analyzed vis-à-vis descriptive statistical measures across the two cohorts: the staff respondent cohort (N=12), and the resident respondent cohort (N=15). Due to the relatively limited sample size, statistical measures were limited to means and standard deviations.

With respect to strengths identified, residents were highly satisfied with the shelter’s aesthetic appearance, its cleanliness, location within the city near to bus routes and its proximity within walking distance of the CBD, the size and layout of the bedrooms and adjoining bathrooms,
the exterior semi-enclosed porches, and the size and appearance of the exterior spaces. Limitations cited in the survey data centered on the need for noise abatement partitions to separate the children’s play area from the adjacent living/dayroom areas, the need for improved site security in the shelter’s immediate neighborhood environs, crime in the immediate neighborhood, and the need for improved outdoor lighting of the exterior stairways. Accordingly, opportunities for retrofit measures cited by residents in particular centered on the need for improved exterior lighting, better acoustical separation of the children’s play zone form the outdoor spaces for adult use, and the need to station a security guard on site during overnight hours and on weekends.

Building in Post-Katrina New Orleans

Despite a long and at times seemingly unattainable road to completion, the project’s initial educational and research objectives remained in harmony throughout with those of the local homeless agency and the national NGO sponsor. With this said, even prior to Katrina it had been a serious challenge to build any new building in New Orleans. This was because the city, being very old, therefore had accumulated over the decades (and over 300 years) many preexistent layers of tedious, Byzantine approval processes, oversight agencies, and review committees. This was particularly the case in the city’s oldest neighborhoods, including the Central City neighborhood where the shelter was built. On this unflooded site, and considering the rather derelict condition of the immediate neighborhood, the project benefited from a relative lack of NIMBY (not in my back yard) resistance on the part of the neighborhood. Regardless, even the minutest attempt to accelerate any facet in the building code and inspection approval process required maddening amounts of paperwork and tedious waiting periods for inspection approvals from the local Department of Safety and Permits.

Adding to these delays were complications caused by the contractor, who navigated through a chronic turnover of skilled workers, a lack of prior experience in sustainable architecture and building methods, and difficulty in dealing with the erratic practices of its subcontractors. Collectively, these factors caused the project to require twice as long to complete, and the students’ role in the actual construction, especially in the latter stages, became episodic. It had become a greatly modified version of the classic design-build studio model as in aforementioned the Rural Studio. In other words, what would have in “normal” conditions pre-Katrina been a six month construction timetable, with major construction assists from the students, became a nearly fourteen month undertaking. While building “green” remains a challenge anywhere in the U.S. (Sheehan, 2007; Jones, 2007), the situation in New Orleans remains uttering challenging. This struggle was aptly put by the former Mayor of Pittsburgh, Tom Murphy in an essay he authored in the journal Urban Land (2007): “Nothing gets built in New Orleans post-Katrina unless it is willed from the ground up.” In this case study, the students can take great pride in the fact that it was their design that was built, nearly verbatim—and was subsequently willed from the ground up.
Conclusion

The New Orleans Mission Family Shelter was the first LEED certified building in New Orleans and only 1 of 14 projects statewide that have been certified in Louisiana, at this writing. The project was a collective, collaborative effort of a University-based school of architecture, a partnership with a civic-oriented A/E team, a local not for profit provider of shelter and occupational and life training for the homeless, and a well-known national NGO. Upon it’s opening there was a two-year waiting list of mothers-with-children in “exile” who urgently sought to return to the city.

The difficulty in constructing this homeless shelter was matched only by the urgent need for housing of this type in a city that is painfully rebuilding from the most costly disaster in U.S. history (Goedert, 2008). New Orleans’ social and racial woes became an open book of sorts for the entire world to witness. At $48 billion and running, the effects of Hurricane Katrina will be felt for decades. It was at once a wake up call to the profound effects of global warming, of the importance of protecting America’s disappearing Mississippi Delta wetlands, on the social and racial inequities, which persist in America, and on the importance of rebuilding one of America’s most extraordinary cities.

The project team, under the direction of the first author, received the national Collaborative Practice Award from the Association of Collegiate Schools of Architecture in 2008 (ACSA, 2008). Case studies such as this can inspire schools of architecture, in alliance with local chapters of national professional organizations such as the American Institute of Architects (AIA). It was the students who first visualized LEED certification: their initiative, enthusiasm, and perseverance drove the entire project. In retrospect, frankly, many colleagues and observers saw the team’s goal of LEED Silver Certification as unattainable, a folly, even without the added obstacles created by the largest urban catastrophe in American history. On a cautionary note, it was good, in retrospect, to set such a high goal but it placed excessive pressure on the project team once the wheels were in motion. The combination of diverse organizations and their individual agendas and balkanized internal politics nearly doomed the project more than once. Regardless, the public and the private sectors must continue to search for ways to effectively work together to fund and construct affordable housing in a manner that promotes human dignity, opportunity, and self-empowerment. In this sense, this case study has furthered the track record—and therefore the argument for—further architecturally based social engagement on the part of the schools. This goal was at the center of the aforementioned report on architectural education in North America authored by Boyer and Mitgang more than a decade earlier (1996). 3

Homelessness remains an international concern (Laurence, 2007). Samuel Mockbee’s assertion that “the (American) architectural profession has an ethical responsibility to help improve living conditions for the poor” certainly rings true in the case of post-Katrina New Orleans, where the deplorable living conditions of the city’s poor were exposed to the world. The New Orleans-based activist organization ACORN has made it its mission to expose and assist in its grassroots community work in the Lower Ninth Ward and in other devastated neighborhoods.
the underlying class and race-based inequities exposed by Katrina (James, et al., 2007).

This has been further highlighted by the work of the Make it Right Foundation. Actor Brad Pitt founded this NGO in 2006 to counter the inactivity he witnessed firsthand in post-Katrina New Orleans. His efforts have been focused on the city’s devastated Lower Ninth Ward (Verderber, 2010). As of this writing, twenty houses have been completed. Many of these dwellings have received or are in the process of earning LEED certification by the USGBC. Meanwhile, day-to-day life for the city’s burgeoning homeless population continues to worsen (Goldberg, 2006; Philbin, 2007). 4 In the end, the public and private sectors can accomplish much by working together collaboratively to marshal time, expertise, and resources. The need continues to exist for affordable housing partnerships in the coming decade as New Orleans and other communities along the ravaged U.S. Gulf Coast continue to rebuild.

Notes

1. In 2005 this author was approached by the Board of Directors of the New Orleans Homeless Mission to assess the feasibility of building a homeless shelter for women and their children on its campus in the Central City neighborhood. Because of Katrina, communications were abruptly halted. In Katrina’s aftermath the aforementioned project team members became scattered across the U.S.

2. The New Orleans Mission Family Shelter earned the Silver rating (LEED NC 2.2). The Global Green Holy Cross Neighborhood Revitalization Plan was the first to earn a Silver rating (LEED ND 1.0). It was not for a building, however, as it consisted of a master plan. Available online. See http://www.usgbc.org/LEED/Project/Certified/ProjectList.aspx.html (accessed 25 October 2010).


4. Federal programs initiated in the aftermath of Katrina and Rita included the U.S. Department of Housing and Urban Development’s (HUD) Universities Rebuilding America Partnership (URAP), and the Community Outreach Partnerships Centers Program (COPC).

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Stephen Verderber

Stephen Verderber, Arch.D., is Professor of Architecture, and Adjunct Professor of Public Health Sciences at Clemson University, USA. He is a Registered Architect in the U.S. and a principal of R-2ARCH. His work focuses on the discipline and practice of architecture for health. He holds a doctorate in architecture and environmental psychology from the University of Michigan. He has authored more than seventy-five peer-reviewed professional and scholarly publications, received numerous national awards, served as a research-based design principal investigator, and has authored five books, including Delirious New Orleans: Manifesto for an Extraordinary American City (2009), and Innovations in Hospital Architecture (2010). Dr. Verderber has lectured and written extensively on architecture for health, evidence-based design, post-disaster urban reconstruction, and the rebuilding of New Orleans. He can be contacted at sverder@clemson.edu.

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Breeze Glazer

Breeze Glazer, M.Arch., is a member of the healthcare design studio at Perkins+Will Architects and Planners, New York City. His work focuses on sustainable planning and design strategies for the firm’s global work in the realm of architecture and health, spanning from the scale of master planning to highly specialized housing and healthcare typologies. He is a member of the New York Chapter of the American Institute of Architects, and he holds a Master of Architecture degree from Tulane University, New Orleans, USA. He can be contacted at Breeze.Glazer@perkinswill.com.

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Rodney Dionisio

Rodney Dionisio, M.Arch., is principal of Dionisio and Associates, Architects, New Orleans, USA. He specializes in sustainable housing, urban design, and grassroots community advocacy in post-Hurricane Katrina New Orleans. Since Katrina in 2005, he has been active at the neighborhood and citywide level on behalf of homeless and politically underrepresented citizens. He previously was with Perez Architects, LLC, in New Orleans. He holds a Master of Architecture degree from Tulane University. He co-taught a design/build studio at Tulane in 2004-2005. He can be contacted at Rodney.Dionisio@gmail.com.
A METHODOLOGICAL APPROACH FOR READING URBAN OPEN SPACE.

Manal Ahmad Al-Bishawi, Shadi Sami Ghadban

Abstract
This paper suggests a methodological approach for reading and analyzing urban open spaces, based on the concept of behavioral setting, which deals with individuals and their behavior as a tool for reading the urban open space. The behavioral setting is defined as the smallest living entity in the physical environment and has three main components: physical (design), social (use) and cultural (rules). Based on that, the urban open space, as a part of the physical environment, can be considered as either one setting or a system of settings, according to the activities that take place within it and the users who occupy it.

The proposed methodological approach will be discussed through the theoretical analysis of various studies on the physical form of urban open spaces. The approach is expected to help planners and architects in developing and providing urban spaces that comply with people's needs and values.

Keywords
Urban open space; physical form; behavioral setting; needs; values.

Introduction
In any society, individuals have specific needs and values that are reflected in their behavior. These may be reflected in the physical form of the spaces they occupy, through such elements as the physical layout, furniture, pavements, lighting, and the spaces' functions. As a part of modern internationalization, knowledge in the field of architecture and urban design is generally based on identifying standard human needs, but usually without considering properly how these needs influence behavior, which is a cultural variable.

Contemporary research and design professions lack a focus on individuals' needs according to local culture. Most scholars who study the physical environment in general do not give a clear picture of its components (physical, social and cultural), which are influenced by human needs, nor of the relationship between these components. They have focused on investigating needs in relation to behaviour or in relation to physical space without explaining well enough how both people's behaviour and the physical form of the space are influenced.
by their needs. In other words, the scholars do not explain clearly enough the relationship between needs and their components, which correspond to components of the physical environment [Lang (1987); Altman (1975); Rapoport (1982); Hall (1966); Newman (1972); Guardo (1969); Lawton (1975); Worpole (1992); Lynch (1977); Gehl (1987); Abu-Lughod (1987); Morris (1994); Nooraddin (1996); Hakim (1982); Seedat et al (2006); Polk (2003); Kallus (2001); Karimi (2003); Hooshmand (2007); Kotnik (2006); Ghannam (2002); Kenzari & Yasser (2003); Eben-Saleh (1998); Al-Hemaidi (2001)].

In general, current theories concerning this topic seem inadequate for the purposes of this paper, which is concerned with developing a methodological approach that considers both human behavior and needs in reading the physical environment. Our goal, in other words, is reading the physical environment in relation to human needs as a physical, social and cultural phenomenon. This will help planners and architects to understand how different components of the physical environment mutually influence each other. This in turn should help them to design and develop the various elements of urban open space according to human needs and values, bearing in mind that the urban open space, as a part of the physical environment, can be considered either as one setting or as a system of settings, according to the activities that take place within it and the users who occupy it.

The interrelationship between needs, values, behavior and the physical space forms the theoretical background for developing the methodological approach that will be discussed in this study.

Theoretical Analysis

Needs and values are interrelated, therefore needs should be studied according to culture. Maslow (1943) classifies needs according to two types. The first represents basic needs, which are common to all humans and fundamental in motivating human behavior. These needs are biological and universal; they imply physiological, sociological and psychological needs (nourishment, shelter, security, belonging and love needs). Maslow’s second type represents specific needs (values), which are deep desires but differ from one person to another, from one culture to another, and from one place to another. These needs are learned and influenced by traditions and religion and are subject to change and adaptation. Therefore, specific needs are cultural needs, always co-existing with the basic needs, thus they should not be understood as isolated determinants of certain kinds of behavior. Wiggins (1998) explains that there are needs that form a certain class of strong desires, and in that sense the idea of need is equivalent to the notion of desire.

Needs and values are also interrelated with both physical space and human behavior. Rapoport (1980) explains that the physical environments are shaped to meet human needs and values. He defines needs as the action of a proper activity, but on the other hand, values are the specific way of carrying out the activity. For example, sitting, cooking and socializing are activities common to all societies and independent of time or place. But the manner of sitting, cooking and socializing differs from one society to another, from place to place and over time. Based on this, not only the types of individuals’ activities but also the way of
doing these activities should be considered in reading the physical environment. Broadbent (1990) investigates the urban form of different cultures throughout history in relation to needs and values. He explains that basic needs such as water, sun and shade, in addition to aesthetic and strategic military needs, which affect comfort, convenience, and well-being, form the basis of Greek and Roman urban design. In the traditional Islamic city, however, as Broadbent explains, in addition to the above-mentioned basic needs, the need for the visual protection of women was the primary generator of urban form.

The previous studies maintain that needs and values are interrelated with each other as well with human behavior and the physical environment. In other words, needs consist of physical, social and cultural components. During the past two centuries, however, different trends in reading and designing the physical space have been developed. These analytical trends include typological, behavioral and cultural studies.

**Typological studies** are based on the modern movement, which is concerned with providing a physical environment that complies with standard and universal needs. Typology is based on reason as the basis for determining form, classification and a sense of the public domain. Petruccioli (1995) defines “type” as a collective product that is shared by architects and the general public. He defines the existence of the “type” by the fact that a series of buildings share an obvious functional and formal analogy. In general, the concept of “type” was developed after the 1950s to be used as an analytical method for understanding existing urban forms in relation to their function. It appeared as a result of a critique of the model on which the modern movement in urban design was based. Quatremere de Quincy differentiates between models and types. He says: “Type doesn’t represent an image of something to be copied or to be imitated completely; Model does” (in Broadbent, 1990: 90-91). Models and types are both products of the modern movement philosophies, which emerged in response to industrialization and urbanization. The modern concepts of space are based on functionalism, whose main concern is providing basic and standardized functions without focusing on specific cultural or individual needs. In his vision, Le Corbusier (1971) provides a model that shows how the basic functions within the city (residential, movement, vehicle and recreational areas) should be distributed. From the 1950s until the present, a stream of criticism against the modern movement projects of post-war urban development has emerged. This has come as a result of their products’ failure to realize their initial promise or to meet differing individual needs. Among the problems that have come to light in the present literature are the placelessness of the new city, meaning, security, neighborhood and pleasure (Broadbent, 1990). Due to these critiques, several new movements appeared that consider forces such as climate, economics, identity and security in influencing the process of designing spaces.

In general, typological studies maintain that human needs are reflected in the functional, the physical and the cultural components of the space, but without explaining how individuals influence these needs, which is the main focus of behavioral studies.
Behavioral studies are concerned with the relationship between people’s behavior and the physical form of spaces in relation to culture. They focus on investigating human behavior to explain how the physical form of space meets human needs and reflects values.

Lynch (1977) used the mental mapping technique to explain that people’s behavior in spaces answers to maps and images developed in their minds. The outcome of the research is that paths, edges, districts, nodes and landmarks are important signs in forming the image of the city. Lynch focuses on the physical objects – but without considering the local culture – of the three American cities studied: Boston, Los Angeles and Jersey City. He does not explain how the local culture of these cities influenced the interpretation of mental images, nor why the inhabitants were concerned with these physical elements. In this way, Lynch fails to consider how the individual differences in relation to culture and social status influence the image and use of the city. However, other studies do show the influence of social status and cultural issues on forming these mental maps and influencing the behavior of individuals in space. Moore (1983) used mental mapping techniques to show that different people interpret the same physical environment differently, depending on their lifestyle, gender, age, ethnicity and length of residence in the area.

Studies conducted by Wagner (1970), Fiske (1990) and Sless (1986) show that the physical form of the objects is not what influences individual mental images. Instead, it is the meaning of those elements that constitutes a cultural variable. Wagner argues that physical objects are not signs, but a potential vehicle of meaning. Whatever shape it takes, a physical appearance becomes a sign solely by virtue of the meaning attached to it. He explains that there are no marks or signs as such, but only marks or signs for somebody, and this suggests that behavior is culturally based. Although relying on people’s experience in analyzing the physical form of a space covers both the tangible and intangible components of the space, it does not clarify how much each of these two components influences the physical form of the space. For example, the activities, the users, and many of the rules that govern the space are not clarified in these mental maps. Gehl (1987) wrote about the relationship between the individual activities and the physical conditions of the space. He explains that when using a public space for necessary activities, individuals do not care about its physical conditions to the same degree as when they use the space for optional and recreational activities.

White (1980) has carried out a similar study in which he explains how the physical conditions of spaces, such as sitting and walking facilities, are important for improving the social life in these spaces. Both Gehl and White focus on the type of activities but do not consider the influence of culture nor the social status of people engaging in the activities and how they are influenced by the physical conditions of spaces. Although the observations cover the tangible components like people’s activities and the physical environment, they do not cover the intangible components such as people’s feelings and experiences. Therefore, it is important to use both the observation and interview methods in analyzing the physical environment. The observations cover the tangible components of the space, while the interviews cover the intangible ones.
Mountain (1992) investigated the relationship between human behavior in spaces and the formal rules that govern these spaces. Based on observations of social gathering activities in the street, Mountain explains that vehicle access to the street is an important requirement for pedestrians in the use of spaces. He suggests that providing good access for vehicles makes it more attractive for pedestrians to stay on the street. Lawton (1975) explains how life cycle also influences human behavior in spaces. He found, for example, that the proximity of space is an important need for elderly people. Other influences on human behavior, such as textures, sounds and seasonal effect, were discussed by Brodey (1969) and Nikolopoulou (2001).

Apparently, most scholars of behavioral studies group the users of the physical environment into categories according to their standard requirements. Although these studies maintain that human needs are interrelated both with individuals’ behavior and with the design of spaces, there remain issues that have never been dealt with. For one thing, the scholars of these studies do not give adequate consideration to cultural behavior, plus they limit themselves to specific cultures, particularly to Western cultures. That is, most of these studies have been developed and tested in Western settings, and are influenced only by Western values, which are dependent in turn on culture and local context. Therefore these theories cannot be applied universally, and studying similar aspects of the physical space in non-Western contexts may well reveal different situations and thus require reconsideration of design criteria and concepts. Moreover, some of the researchers do not give proper consideration to the social status of individuals, so applying their theories to different individuals may produce different results. Based on the behavioural studies, the experiences, activities and social status of individuals, the physical conditions of the space, textures, vehicle access, and climatic conditions are all important components that should be considered in reading the physical environment.

Cultural studies examine culture as a third dimension in analyzing space and people’s behavior. Haviland (1999: 35) defines culture as “the abstract values, beliefs, and perceptions of the world which lie behind people’s behavior”. Fathi (1978) defines culture as the outcome of the interaction between man and his environment in satisfying his needs. Involving culture in studying the patterns and behaviors of a particular society helps us understand how different design concepts are being created by people over time. Hall (1966), for one, has studied human behavior in spaces as a reflection of culture. Based on his participants’ observations, Hall explains that people are influenced by culture in their behavior in spaces, and this influences the spaces’ physical forms. This is reflected, for example, in the distances that people maintain between each other within spaces.

Through the concept of “behavioral setting,” Rapoport (in Kent, 1990) relates culture to both behavior and the physical environment. He used the concept of “behavioral setting” to indicate the milieu, which defines a situation and its rules of guidance appropriate to the setting, and he explained how these settings are also cultural variables. The setting’s boundaries, rules, and the temporal qualities, which change according to the user groups and time, vary with culture. Rapoport (1980: 15-
A Methodological Approach for Reading Urban Open Space

Manal Ahmad Al-Bishaw and Shadi Sami Ghabban

18) explains that the behavior setting consists of various components relevant to the setting: vision, spaces, sound, smells, people, activities and functions. He divides the components of the setting into two groups. The first is related to the physical structure of spaces and includes the design components and the rules that govern it. These components present the fixed and semi-fixed elements in the space, thus they are permanent. Rapoport’s second group of components is related to the people who use these spaces and their activities. This group includes the use components and the rules that govern it. These components are non-fixed and are subject to change. Also, Rapoport suggests linking culture with physical environment through the concept of needs and values. He suggests studying the needs and values through the activities, which take place in the “system of settings” that have been created for them in the environment. Rapoport divides the activities into four components: the first represents the activity itself; the second represents the way of carrying out the activity; the third deals with the association of the activity with other activities and its combination into activity systems; where it takes place and when and by whom it is carried out; and the fourth component represents the meaning of the activity, which is formed in the minds of users.

Although the concept of behavioral setting allows for analyzing the physical form of space in relation to human behavior, it does not clarify how the setting is influenced by the needs. If by definition the activities are reflections of needs (Rapoport, 1980) and the needs are both basic and specific (Maslow, 1943), then the observed situation will be influenced by both basic and specific needs. For example, in the case of a woman who is stopping at the entrance of the house and observing the street, the motivation for her stopping is not only the need for observing the street, but also could be related to other specific needs such as a need for privacy or a need for security, or for comfort. In this case, then, the entrance of the house is not only a setting for observing the street, but it could also be a setting for seeking privacy or security or comfort. Therefore, it will be important to involve the needs in defining the setting, so that the settings are studied in relation to their specificity rather than generality. By doing this, planners and architects will be able to provide specific designs for the urban open spaces, rather than standard ones.

Lang (1987) suggests that human needs are met by various mechanisms that are related to the physical form of the setting. In addition, the mechanisms of the needs are not constant but rather respond to the setting and its components. For example, when people cannot achieve their needs through design (physical) components, they will utilize the additional use (social) or rule (cultural) components of the setting. This maintains not only that human needs are interrelated with components of the setting, but also that the components are influenced by each other.

Therefore, it will be important to involve the needs in defining the settings, so that the settings are studied in relation to their specificity rather than generality, and that the relationships between different components of the space are considered. By doing this, planners and architects will be able to provide specific designs for the different spaces in the physical environment, rather than standard ones, and
to maintain a balance between the physical, social and cultural components of the setting.

Conceptual Model for the Proposed Methodological Approach

The previous theoretical analyses emphasize the need for a comprehensive approach, one which considers together different components (physical, social and cultural) in reading and analyzing physical environments. To achieve this purpose, the physical environment can be considered either as one setting or a system of settings, according to the activities that take place within it and the users who occupy it (based on Rapoport, 1980, 1990 and Lang, 1987). Accordingly, each type of setting is a reflection of the activities that take place within it. Based on the typological, cultural and behavioral studies, three main types of components of any given setting can be identified, as follows:

- **Design components** (physical components), which include the spaces (where the activities occur), their physical layouts, boundaries, shape, location and objects.

- **Use components** (social components), which include the activities in the spaces (type and time), in addition to the users of the spaces and the social relations between them.

- **Rules components** (cultural components), which include both the formal and informal rules that govern the physical form of public spaces. Formal rules include written rules that are concerned with the design and function of the space, such as written signs that govern the use of the space, building codes and regulations. The informal rules include rules that are concerned with people’s behavior, such as religion, family and societal restrictions.

Nooraddin (2006) used the concept of behavioral setting, which encompasses all three types of components – design, use and rules, in order to analyze the physical form of the city streets of Oslo, Norway. The methodology of this study, however, did not take into consideration people’s needs and how these needs are influenced by the settings’ components.

Furthermore, as clarified in the theoretical analyses, human needs consist of physical, social and cultural components that are interrelated with the other components of the setting, as follows:

- Physical spaces are designed to meet human needs.
- Human behavior is motivated by human needs, and activities are reflections of these needs.
- Rules are a composite of needs and values.

This interrelation between the physical environment and human needs allows for investigating these needs in relation to the space’s components – design, use and rules, as shown in the developed conceptual model (Fig 1), where the data relevant to a space’s design can be grouped into three categories.

Al-Bishawi (2008) tested this methodology in her study about the physical form of open public spaces in relation to women’s need for privacy in the city of Nablus, Palestine. She used the developed conceptual model, reflected in both her observations and a questionnaire, in order to investigate privacy and to analyze the physical form of public spaces and the degree to which they allow for women’s privacy (privacy settings), in both old and new neighborhoods of Nablus.
The observations were conducted in order to identify women’s privacy components and to examine whether and to what degree women’s privacy exists as a result of the three component types: design, use or rules (Fig 2). The observations were conducted on the three levels of city, street and public space, in accordance with the components of behavioral setting (design, use and rules). In general, the observations focused on the tangible components while the questionnaire focused on both tangible and intangible components of privacy. In the questionnaire, women were asked about how they assess their feeling of privacy (experienced privacy) and how they would assess the importance of privacy (attitudes towards privacy components). The results regarding women’s experience of privacy showed that the privacy statistical mean for the older neighborhood (58.3) is less than that of the newer neighborhood (61.3) (Table 1.A). Also, the results related to women’s attitudes towards privacy components showed that the privacy statistical mean of the old neighborhood (68.3) is higher than in the new neighborhood (65.1) (Table 1. B). In other words, these results gave the same indication, i.e. that the privacy need for women in the old neighborhood is higher than the privacy need for women in the new neighborhood, which supports the validity of
the method. The results also showed that there is a significant relationship between privacy and neighborhood (Table 1), which indicates that women’s need for privacy is influenced by the physical form of open public spaces. In other words, the privacy components are interrelated with the components of the setting. This result also indicates that the need for privacy is important within the society of Nablus.

In addition, the results showed that there is a high positive correlation between privacy and its components and between the components themselves, indicating that all the components are relevant to women’s privacy and are influenced by each other (Table 2). This point was supported by the results of the observations, which showed that achieving privacy through use components encourages women’s adaptation, and causes change in design, behavior or values. On the other hand, meeting privacy needs through design components allows for desirable (comfortable) interaction and preserves cultural continuity. Finally, achieving privacy through rules components restricts the use of the space and does not maintain the continuity of the architecture. Accordingly, this helped in providing suggestions for the design and development of open public spaces which support women’s privacy and encourage women’s use of these spaces in Nablus.

The conceptual model suggests that human needs should be factored in and studied through the setting components. This allows for investigating the relationships between human need and the components of the setting and between the components themselves, toward the goal of providing physical environments and urban open spaces that comply with present human needs and values. Moreover, structuring the components of the setting as in this model (main and sub-main components) makes the model flexible and allows for changes in the sub-components according to the context, which is under study. However, factoring the needs into components may cause some limitations. In particular, human needs are not fixed but are subject to change. Therefore, individuals may have perspectives differing
from the standard (scholars’) understanding about their various needs. To ensure the validity of the suggested model, it is necessary to use this model in the methods of both observation and interview. Using the model in connection with observation is important for covering the tangible components of human needs, particularly as these components are related to the physical environment, which is the main focus of this paper. Using the model in the interview method is also important, in order to cover the intangible components of the needs, particularly those related to social factors (the individuals’ social and educational status, age, etc.).

Conclusions
This paper provides a comprehensive approach for analyzing and reading urban open space in relation to human needs, taking into consideration all the components of the space (social, cultural and physical components) and the relationships between these components. The theory developed in this paper builds on this particular configuration of factors and investigates it in relation to the components of the setting. The relationships between the components can be summarized as shown in (Fig 3).

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>No.</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Degrees of freedom</th>
<th>T-value</th>
<th>Sig</th>
</tr>
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<tbody>
<tr>
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<td>58.3</td>
<td>7.46</td>
<td>198</td>
<td>2.46</td>
<td>0.036*</td>
</tr>
<tr>
<td>New</td>
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<td>61.3</td>
<td>7.14</td>
<td>198</td>
<td>3.02</td>
<td>0.003*</td>
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* sig at (α = 0.05)

<table>
<thead>
<tr>
<th>Setting's component</th>
<th>Design</th>
<th>Rules</th>
<th>Use</th>
<th>Privacy</th>
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<tbody>
<tr>
<td>Design</td>
<td>0.979**</td>
<td>0.971**</td>
<td>0.954*</td>
<td>0.934*</td>
</tr>
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<td>Rules</td>
<td>0.954*</td>
<td>0.935*</td>
<td>0.980*</td>
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</table>

** significant level at 0.01
* significant level at 0.05

The relationship between DESIGN and RULES is the first half of what architects and planners need to know, that is, how design meets the requirements of the rules. The relationship between DESIGN and USE, then, represents the other half of what architects and planners need to realize, that is, how design makes possible appropriate and convenient use. The third leg of the triangle, the relationship between RULES and USE also needs to be considered, although this is a research area more appropriate to sociologists.
and anthropologists. Rules are interpreted in practice, and also get re-interpreted over time. Nor do all individuals behave the same way at any given time, and how they behave depends on their values, which in turn are influenced by social status. Therefore, architects and planners need to be aware of current trends, and new research needs to be done regularly, as contributions to the ongoing development of discourse within urban design.

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Manal Al-Bishawi

Dr. Manal Al-Bishawi, is an assistant professor in architecture & Landscape at the Department of Architectural Engineering/Faculty of Engineering at Birzeit University, Palestine, and member of the Palestine Engineers Association. Also, she teaches in the master program of Urban Planning and Landscape Architecture at Birzeit University. She worked and participated in several local and international workshops and conferences. Her academic and research activities are oriented towards the urban landscape, relationship between physical environment and individual’s behavior, gender
issues in urban open spaces, particularly in Arab-Muslim cities. In addition, she worked in design and supervision of several architectural projects in Palestine. She can be contacted at mbishawi@birzeit.edu.

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**Shadi Ghadban**

Dr. Shadi Ghadban, is an associate professor in architecture & planning at the Department of Architectural Engineering/ Faculty of Engineering at Birzeit University, Palestine. He has a wide administrative experience as chairman of the Department and Dean of the Faculty of Engineering. His academic and research activities are oriented towards the problems of traditional architecture, housing and sustainable development. In addition, he supervised many Master and Ph.D. theses and worked as a project coordinator for several cooperation projects between his Department and international universities. Yet, he acted as consultant and project manager for a large number of architectural and rehabilitation and restoration projects in several major Palestinian cities. He can be contacted at SGHADBAN@birzeit.edu.
ANALYSIS OF THE BUILT ENVIRONMENT OF INFORMAL SETTLEMENTS USING SYSTEMS OF SETTINGS AND ACTIVITIES.

Stephen Diang’a and Ambrose Adebayo

Abstract
This study seeks to identify and propose relevant elements and components of the built environment of the informal settlements that need to be considered in intervention strategies and design. The paper is based on empirical research that focuses on informal settlements in Nairobi with the objective of establishing parameters that adequately address the physical, social and economic aspects of the dwellers, which are considered useful in the regularization of these settlements. The built environment provides the setting for human activity and Environment-Behaviour Relations which deals with the relationship between people, society and the built environment offers an appropriate framework of analysis for the derivation of useful design parameters for settlement improvement. With this intention, the paper is composed of three main parts. In the first part, the concept of environment is related to systems of settings and the embedded systems of activities. The second part presents systems of settings and activities in an informal settlement both at the neighborhood and dwelling levels. Finally, the third part presents elements and components of the built environment that play dominant roles in informal settlements. According to the study, systems of settings and activities offer a useful framework for the analysis of the built environment and facilitate the identification of settlement characteristics that form important design parameters in the improvement and regularization of informal settlements.

Keywords
Systems of settings; systems of activities; built environment; informal settlements; design parameters.

Introduction
Most studies in housing describe the different ways to house the poor and deal with the complexities of urban settlements. As summarised by Hamdi (1991) some studies focus on institutional changes needed to lever more equitable housing with more efficient cost and resource saving techniques. Some focus on market operations and enabling environment that encourages housing delivery and choices. Some point to technical aspects of building, designing, and utilizing land more efficiently. Yet others measure the impact of policies on housing delivery systems. Some look at housing in the context of development and urbanization seeing housing as a developmental and urbanization problem. As observed by Rapoport, (2001) and Clapham (2002), very little attention is given to environmental/behavioural determinism of the built environment that has
great impact on the way people live. The built environment generally refers to the manmade surroundings that provide the setting for human activity, ranging from the large-scale civic surroundings to the personal places (Bartelmus, Bringezu, & Moll, 2001). It reflects a settlement’s history, culture, beliefs, lifestyles, social, and economic organization (Vischer, 2008). A clear understanding of the factors that generate the built environment is a useful approach towards the understanding of the link between housing and its neighborhood. This is important information for designers dealing with aspects of settlement upgrading, urban renewal and redevelopment. In this regard, Environment-Behaviour Relations which deals with the relationship between people, society and their built environment offers a useful framework of analysis for the derivation of useful design parameters that can assist in the design of informal settlements intervention strategies.

Culture has been established to be the link between the built environment and human behaviour (Rapoport, 1993). Behaviour entails “activities” and these take place within “settings”. This paper is concerned with the relationship between “activities” and “settings” and the “systems” within which they interact. Whereas this approach gives emphasis to physical environment, it entails a holistic evaluation of the settlements’ built environment including forms of shelter, organization of space, systems of settings, cultural landscape and other fixed, semi-fixed and no-fixed features, including all the actors within the established context (Moore, 2004; Rapoport, 2001).

This paper illustrates a systematic approach to development of a comprehensive and exhaustive framework for analysis of informal settlement’s built environment by way of deriving specific variables from fundamental principles and constraints that determine neighborhoods and dwellings characteristics and functions. The paper examines informal settlement parameters that could be useful in the design of sustainable housing environment for the urban poor. The study adopts Moffatt and Kohler’s (2008) definition of variables of built environment based on a sequence of elements and components that sustain a neighborhood system as well as the dwelling system. The built environment of selected informal settlements in Nairobi were explored to identify, account and document the prevalent systems of settings and activities at neighborhood and dwelling levels and their implications on the characteristics of the built environment. The objective was to establish positive built environment attributes that relate to the dwelling and neighborhood qualities associated with the urban poor.

The study was conducted in Mathare Valley which is an informal settlement located along the Mathare and Gitathuru river valleys approximately 6 Km to the East of Nairobi’s city center as illustrated in figures 4 and 5. It is the second largest settlement of this nature after Kibera. The 1999 Population and Housing Census put the population of the Valley at 69,003. The settlement is bounded by Pangani to the west (which was originally an African settlement before their houses were razed to the ground and the land allocated to Moslem Asians), Juja Road to the south, Outer Ring Road to the east, and to the north, a section of private housing, the Mathare Mental Hospital, Police housing, several company sports-grounds and a drive-in-cinema. Across the Outer Ring Road is a light
industrial area offering employment to a large section of the population. These boundaries enclose an area of approximately 496 acres. Juja Road connects the entire Valley to the rest of the City and there exists an efficient public service transport to the City Center.

The study was explorative in nature and used qualitative research method. Mathare Valley settlement was selected for the study due to the fact that it is the oldest informal settlement in Nairobi and presents a mosaic of intervention approaches. There are distinct neighborhoods in the settlement providing appropriate setting for the study. There are ten villages (also referred to as neighborhoods) in the settlement including three major housing intervention projects namely Ngei, Huruma, and Mathare North. All these settlements depict varied levels of informalities.

On the basis of the objectives of this study, three neighborhoods were selected for in-depth study because of the characteristics they presented. Village III was selected as a case because of its location on government land, high population density, and minimal improvement interventions. Mathare IVA (Village IVA) was selected because of its upgrading program aimed at the provision of rental housing. The third case, Ngei II, was selected because it presents informal settlements of both permanent and temporary buildings.

Four clusters were selected in each case, representing a total of 10 per cent of the household population. The criteria used in identifying the clusters included physical characteristics of the dwellings, network of roads and footpaths, open spaces, activities such as commercial, recreation, and sanitation. This convenience sampling involves purposive or deliberate selection of particular units of the universe for constituting sample that represents the universe. The criterion for selecting these dwelling units was based on their immediate surroundings. Factors considered included their locations in relation to minor footpaths, major footpaths, proximity to open spaces, the two rivers, and public utilities. The selected dwellings were marked on the neighborhood map. The layouts of each of the dwelling units were sketched indicating activity settings. Primary data was collected by way of observation of spatial utility and configuration and interviews of residents.

**Systems of Settings and Activities in Housing**

A system is an assemblage of interrelated parts that work together by way of some driving process (Albeverio, Andrey, Giordano, & Vancheri, 2008). Systems are often visualized or modelled as component blocks that have connections drawn between them. According to Moffatt and Kohler (2008), most systems share the same common characteristics which include: the quality of having a structure that is defined by its parts and processes; a generalizations of reality; systems that tend to function in the same way; functional as well as structural relationships between each other; a flow and transfer of some type of energy and/or matter; exchange energy and/or matter beyond their defined boundary with the outside environment and other systems through various input and output processes; functional relationships occurring because of the presence of a driving force; parts that make up a system show some degree of integration.
Attempts to define the built environment in relation to systems contrast the built environment to the ‘un-built’ environment or the ecosphere (Moffatt & Kohler, 2008). The argument here is that in a system representation, both the built environment and the ecosphere can be considered as complex, dynamic self-producing systems which exist in loose, nested hierarchies, each component system contained by the next level up and itself comprising a chain of linked subsystems at lower levels. (Rees, 2002, as cited by Moffat and Kohler, 2008).

Rapoport (2001), on the other hand, presents a conceptualization of the built environment that is dismantled into four complementary components namely:

- the organization of space, time, meaning and communication
- a system of settings within which systems of activities (including their latent aspects) take place
- the cultural landscape
- composed of fixed, semi-fixed and non-fixed elements

These components form part of a system of settings which in turn, is embedded in different ways into larger systems of settings such as blocks, compounds, neighborhoods, and settlements (Rapoport, 2001). Accordingly, a house comprises of a system of settings within which systems of activities take place. Houses may differ in terms of cultural, social and economic backgrounds but they may be compared in terms of activity settings that they shelter such as cooking, sleeping, lounging, etc as depicted by Rapoport (2001) in Figure 1 and by the author in Figure 2 below. These activity settings are present in every dwelling whether a single roomed shack in a slum or a mansion in an up-market neighborhood. What differentiate the settings in the two different dwellings are the
spatial allocations for the systems of activities.

Neighborhoods too comprise of systems of settings embedding systems of activities. These may include elements such clustering of buildings in lots or blocks, zoning of space for facilities such as commercial, educational, social, recreational, religious, infrastructural, etc. Also considered as an important built environment determinant according to Rapoport (2001) are lifestyles and rules about what behaviour is appropriate in which setting (Baumgartner, 1988 as cited by Rapoport 2001), which influences acceptability and definitions of crowding, privacy, etc. – and thus environmental quality. Figure 3 is a graphical representation of the relationship between housing defined as a system of settings, and the larger systems of neighborhood and settlement.

Thus in the context of this paper, the built environment is conceptualized as the set of all facilities constructed by humans to meet their needs and aspirations. Each facility, in conjunction with its users and location, can be considered as a system. Facility systems can then be defined as the set of physical elements comprising a built facility, the site on which it stands, plus the stakeholders who impact or are impacted on by the existence of the facility (Moffatt & Kohler, 2008).

**Mathare Valley Settlement as a System Settings and Activities**

The term ‘settlement’ has varied meanings. In this study the term is used to refer to human settlements. The 1976 United Nations Conference on Human Settlements Vancouver Declaration defined human settlements as:

"... the totality of the human community - whether city, town or village - with all the social, material, organizational, spiritual and cultural
elements that sustain it. The fabric of human settlements consists of physical elements and services to which these elements provide the material support. The physical components comprise of shelter, infrastructure, and services.” (UNCHS 1976)

A settlement can be viewed from Macro, Meso and Micro scales. The Macro-scale views a settlement at city or town scale. The Meso-scale views the settlement at neighborhood scale and the Micro-scale views the settlement at dwelling scale. A city is a settlement but when viewed from a macro-scale level, it comprises of numerous distinct settlements supported by numerous facilities. In the case of Nairobi, these relate to the zoning approach to planning that was applied at various stages of its development. This modern planning approach differentiates residential areas from other facilities such as industrial and commercial. The residential zones are also further differentiated according to social groupings based on income levels. Further division arise from adherence to or none adherence to planning regulations which has led to the development of planned and unplanned settlements or informal settlements.

At macro-scale level, the city of Nairobi as a system was noted as incorporating 135 informal settlements of varying sizes ranging from large one such as Kibera with a population of over 500,000 to smaller one as Runda. Large informal settlements such as Kibera and Mathare are too large to be considered as single neighborhoods. The study concluded that these large informal settlements comprise of numerous neighborhoods with interlinking facilities such as roads, footpaths.

Figure 4: Map of Nairobi showing the spread of informal settlements (Source: City Council of Nairobi, 2006).
Other interlinking facilities include schools, churches, mosques, and health centers which serve more than one neighborhood. Figure 4 is the map of Nairobi showing the locations of these informal settlements. Given the similarities, the paper focuses on Mathare Valley as a case study area.

The concept of the built environment as embodying systems of settings for systems of activities was applied in the analysis of Mathare Valley informal settlements. It was observed that aspects of the settlement’s context were important to this analysis. For example the inception of Mathare Valley settlements as small villages characterised the existing neighborhoods. In the formative years, the neighborhood settings were predominantly rural in nature with scattered dwellings and cultivated fields. Some of these initial settlements stretched over several plots privately owned by individuals while others were on government land. Over the years the neighborhoods grew into densely populated settlements with elaborate systems of facilities including footpaths, roads, schools, shops, churches, community halls, health facilities etc.

The activities of the 22 land buying companies formed with the objective of securing land tenure for all the squatters aided the definition of the settlement’s built environment. Each company pursued its own objective of meeting the housing needs of its members. As a result, varied housing typologies were developed which are only evident from close scrutiny. Figure 5 shows the Mathare Valley settlement and its neighborhoods. Huruma, Ngei and Mathare North are planned settlements whilst the rest are unplanned settlements. However, in this study the planned settlements are categorised as informal settlements due to the fact that they have flouted Nairobi City Council building development regulations.

Figure 5: Mathare Valley Villages and environs. (Source: Derived from 2006 Survey of Kenya aerial photograph by the authors).
Mathare Valley as an urban settlement comprises of several neighborhoods whose origins as villages have already been described above. These neighborhoods are interrelated and complimentary. They are interlinked by systems of roads and footpaths and flow into one another. They are also served with common facilities such as schools, churches, and government administrative set ups among others, making the settlement a community. Among the neighborhoods, Mathare 4A is the most discussed because of the on-going upgrading program which aims at developing rental housing units in response to the dominant tenure system in the settlement. The concealed location of the settlement in the valley encouraged its growth. The study concluded that at macro-scale level, systems of settings and systems of activities were limited to facilities such as commercial, social, and infrastructural nature.

**Systems of Settings and Activities at Neighborhood Level**

Neighborhoods are localities where dwellers live closely. They are typically generated by social interaction among people living near one another (Mumford, 1954). In this study, neighborhoods were considered as occurring at the meso-scale level and comprise of groups of dwellings and supporting facilities. Three neighborhoods were selected for in-depth study but in this paper, only one neighborhood is reported namely, Village 4B. Contextually this village was developed on land that was not so easily accessible at the confluence of Mathare and Gitathuru rivers.

Unlike most of the informal settlements in the Valley, Village 4B developed on government land, a fact that has contributed to its relatively high density. There was a response to the topography with dwellings being constructed along the contours on the gently sloping land. Figure 6 is an aerial photograph of the settlement clearly showing the configuration of the neighborhood. Dwellings and an inventory of the existing facilities were mapped as shown in Figure 7 following a general survey of the neighborhood by the author. Four clusters indicated in Figure 7 were identified for detailed and formed the basis for the analysis of the neighborhood's systems of settings and the embedded systems of activities.

![Figure 6: An aerial photograph of Village 4B neighborhood showing the densely built environment. (Source: Authors).](image-url)
from the aerial photograph. The system of settings in the neighborhood is dominated by a system of footpaths serving the dwellings and related facilities. Two categories of paths were established. Narrow paths of an average width of 1.2 Meter serve the dwelling blocks. Broader footpaths of between 2 and 3 Meters form the major pedestrian circulation spine. In addition to being the major spine from which the smaller paths radiate, the spine hosts facility systems including shops, social halls, religious premises, a school and a health center. This sequence of activities is illustrated in Figure The network of footpaths and the facilities it supports were informally planned and is an indication that dwellers of informal settlements can establish and provide some of the basic needs of their neighborhoods. Figure 7 below indicates the systems of settings and facilities in the neighborhood. The pink paths are the narrow paths while the yellow paths are the broader one described above.

The 3 by 3 meters configuration of dwelling units has formed a module that is applied in all the facilities in the neighborhood. Facilities such as schools and churches respond to this module. This is attributed to the fact that such facilities are a later introduction and have been hived off from existing dwellings. Open spaces, unlike the footpaths appear to be incidental as opposed to being consciously considered.

Sanitation is provided communally with the city council and charitable organizations having built sanitation blocks. These are complemented with pit latrines especially along the riverbanks. Unfortunately, the location of the pit latrines along the riverbanks and the damping of solid waste here has contributed to the heavy pollution of the river. It can be concluded that Village VB neighborhood is based on maximum utilization of the available land albeit to the detriment of the dweller’s well-being. Majority of the dwellers interviewed are dissatisfied with the state of their neighborhood environment but display considerable apathy towards its improvement having resigned their tribulations to fate that befalls the poor. Despite these setbacks, the neighborhood presents an effective system of settings and related activities.

Systems of Settings and Activities at Dwelling Level

According to the study, there is one common housing typology defining the dwellings’ systems of settings and activities. This single roomed dwelling configuration is set in closely built rows of blocks, set back to back as indicated in Figure 8. Even though the setting of the dwelling
unit limits the systems of activities that it hosts, it was observed that the systems of activities in each dwelling had the following basic systems of activities: sleeping, cooking, eating, and resting. These are basic systems of activities that would be expected in any dwelling of minimum standards.

The narrow footpath between the residential blocks are multifunctional spaces and forms the immediate open spaces supporting numerous systems of activities in addition to pedestrian circulation. These include washing of clothes and dishes, drying of clothes, lighting of charcoal stoves, outdoor relaxation, and children’s play area. These footpaths also serve to light and ventilate the dwellings in addition to embodying the storm and foul drainage. Observations indicated that these paths are overloaded with activities and in most instances, present the filth of the built environments. Mothers and toddlers spend most of their time in these paths/open spaces. Older children and men tend to spend their time along broader open spaces and the broader footpath.

Systems of activity settings were sketched in each of the dwellings surveyed samples of which are indicated in Figure 10. Sleeping as a system of activity dominates the dwelling system. 60 percent of the dwellings have two bed spaces while the rest have only one bed space. The use of double-decker beds is much lower than would have been expected.

Lounging as an activity is given prominence in the dwelling even though it takes much lesser hours as compared to sleeping.
Furniture provision defines the spatial utility for this activity. Furniture provision ranges from use of simple stools to more elaborate sofa sets. Cooking, although a much more complex system, is generally confined to a much smaller space. There is much flexibility of spatial utility for this activity with some households shifting the cooking stove towards spacious area of the room when the nature of cooking demands more space. The use of paraffin stoves eases this flexibility. The dwellings have no flues over the cooking area but the roof structure in most cases allows fumes to pass through. Eating as an activity utilizes the same space as lounging and multiple use of space for a number of activities is a common occurrence. For example the bed is used as a seat when the need arises.

**Conclusion**

Design has been defined as a process that focuses on the components or elements of a structure or system and unifies them into a coherent and functional whole. System based analysis of the built environment enables a critical review of the built environment leading to useful data that can assist in the formulation of intervention strategies and design. At macro-scale level of a settlement, systems of settings and activities are not as evident as they are at meso-scale level. This can be attributed to the repetitive nature of systems of settings at the neighborhood level, as it is these neighborhoods that make up the macro-scale settlement level. Thus the neighborhood is the most significant element within the settlement systems of settings.

Systems of settlement settings center more on socio-economic settings of the community, which determine the elements and components of a settlement. Associated with this is access to land with the economically disadvantaged groups squatting on public and private land with
minimal amenities. Even where settlements are planned, categorization of the housing as low-income housing bears a reference to the low-income social group. Thus the housing typology and the resultant built environment characterize the socio-economic group’s capabilities.

Elements and components of neighborhood systems bond the neighborhood community. The clustering of houses, the network of roads, footpaths, open spaces, and services such as water, sewerage, define the resultant built environment and are important design parameters for neighborhoods. Social, cultural, and economic elements are important design parameters at the neighborhood level and play a major role in the definition of the neighborhood’s built environment.

At the dwelling level, the ability of households to adopt minimal spatial standards is evident. Even within these minimal spaces, there are indications of variations in the provision of facilities for varying systems of settings within the dwelling. Poorer households exhibit a very limited provision of furniture with some only providing mattresses laid on the floor and simple stools as furniture. This is indicative of limitations arising from livelihood capabilities of the households.

The 9 square meters floor area provided for each household in the informal settlement is a dismal provision in comparison to the 36 square metres stipulated in the housing policy as minimum standard for adequate housing. However, the study could not establish whether the size of the dwelling units in this settlement limits the spatial allocations for the activity systems or whether the activity systems as set by the households are all that they can afford and need no more spatial allocation than is provided. This can only be established by linking the analysis of the built environment to analysis of livelihood capabilities and constraints.

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Stephen Diang’a
Stephen Diang’a is PhD in architecture candidate at the School of Architecture, Planning and Housing, Durban. He is a lecture at the School of Architecture and Building Sciences, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya. A former chairman, Department of Architecture at the same university and a senior architect at the Ministry of Public Works, Nairobi. A practicing architect and arbitrator. Holder of Bachelor of Architecture degree from University of Nairobi and Master of Architectural Engineering from Catholic University of Leuven. He can be contacted at sdianga@yahoo.com.

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Ambrose A Adebayo
Ambrose A Adebayo, PhD is Professor of Architecture and Head of School of Architecture, Planning and Housing at the University of KwaZulu-Natal, Durban. Former Co-President of the UNESCO/UIA Architectural Education and Validation Committee for the African region. Former Chairman of Board of Education, Research and Technology, African Union of Architects. Practicing Architect, Urban Design and Housing in South Africa and other African Cities. Educated in Vienna, Europe. Academic with numerous publications in the Built Environment and successful supervision of Masters and PhD candidates in Architecture, Planning and Housing.
MEDIATING COGNITIVE TRANSFORMATION WITH VR 3D SKETCHING DURING CONCEPTUAL ARCHITECTURAL DESIGN PROCESS.

Farzad Pour Rahimian, Rahinah Ibrahim, Rahmita Wirza Binti O. K. Rahmat, Muhamad Tauffk B. Abdullah, and Mohd Saleh B. Hj Jaafar

Abstract
Communications for information synchronization during the conceptual design phase require designers to employ more intuitive digital design tools. This paper presents findings of a feasibility study for using VR 3D sketching interface in order to replace current non-intuitive CAD tools. We used a sequential mixed method research methodology including a qualitative case study and a cognitive-based quantitative protocol analysis experiment. Foremost, the case study research was conducted in order to understand how novice designers make intuitive decisions. The case study documented the failure of conventional sketching methods in articulating complicated design ideas and shortcomings of current CAD tools in intuitive ideation. The case study’s findings then became the theoretical foundations for testing the feasibility of using VR 3D sketching interface during design. The latter phase of study evaluated the designers’ spatial cognition and collaboration at six different levels: “physical-actions”, “perceptual-actions”, “functional-actions”, “conceptual-actions”, “cognitive synchronizations”, and “gestures”. The results and confirmed hypotheses showed that the utilized tangible 3D sketching interface improved novice designers’ cognitive and collaborative design activities. In summary this paper presents the influences of current external representation tools on designers’ cognition and collaboration as well as providing the necessary theoretical foundations for implementing VR 3D sketching interface. It contributes towards transforming conceptual architectural design phase from analogue to digital by proposing a new VR design interface. The paper proposes this transformation to fill in the existing gap between analogue conceptual architectural design process and remaining digital engineering parts of building design process hence expediting digital design process.

Keywords
Conceptual architectural design; external representation; VR 3D sketching; design collaboration; design cognition.

Introduction
This study has been motivated by the existing literature reflecting the shortcomings of current design tools in conceptual architectural design process. The literature on one hand argues that conventional manual sketching interfaces have some shortcomings in articulating new comprehensive global projects (e.g. Madrazo, 1999, Marx, 2000) and on the other hand, it indicates the failures of current CAD tools in replacing the manual sketching interfaces (e.g.,...
Bilda and Demirkan, 2003, Kwon et al., 2005, Meniru et al., 2003, Pour Rahimian, Ibrahim, & Baharuddin, 2008) due to their inherent problems which hinder designers’ spatial cognition during the conceptual architectural design process. Hence, there are still parts of design that are handled by freehand sketches (Suwa et al., 1998) while most other parts are being done digitally. This transition is known to interrupt the continuity of a design process (Kwon et al., 2005). However, the integration of the whole building design process has since been suggested by Fruchter (1998) as she believes that it can better support collaboration among team members besides having major advantages in decreasing labor and material costs within current comprehensive production procedures. In summary the aim of this research was to facilitate digitization of conceptual architectural design process. This is expected to serve integration of whole building process besides the possibilities for improving designers’ cognition and collaboration during conceptual architectural design process. As mentioned earlier, this aim was motivated by emerging challenges caused by comprehensive global building projects (Pour Rahimian, Ibrahim, & Baharuddin, 2008).

The purpose of this research was to enhance the integration of whole building process besides the possibilities for improving designers’ cognition and collaboration during conceptual architectural design process. This study found some capabilities in new VR technologies to address all the above-mentioned problems. In other words, it suggested using a substitute modelling technology that is called VR 3D sketching in order to overcome the inadequacy of conventional manual design tools in articulating complex design ideas and to compensate the inflexibility of current CAD tools in intuitive design ideation. This VR based design interface is defined by the scholars as a design tool, which is easy to use, as the manual sketching besides providing a highly detailed 3D visualization environment. In defining this design interface Levet et al. (2006) use sketching metaphor and mention that in 3D sketching designers can swiftly produce 3D prototypes to exemplify the 3D objects that they have in mind. The idea of using VR 3D sketching in design is also supported by Kwon et al. (2005) since they believe that this would improve the performance of the computerized design process and speed up the incorporation of engineering requirements during the conceptual phases; i.e. applying the digital format rather than such analogue conventional formats that are currently being used.

To achieve the mentioned aim the study developed the main research question. Afterwards, in order to answer the main research question the study divided it into three Sub-RQs which are to identify: 1) the characteristics of current design media, 2) the collaborative design culture of conceptual architectural design process, and 3) the key enablers in VR 3D sketching interface that can optimize designers’ cognition and collaboration during conceptual design sessions.

**Research Methodology**

The aim of this research was to facilitate digitization of conceptual architectural design process in order to enhance the integration of the whole building process besides developing and enhancing the current state of the design.
Mediating Cognitive Transformation with VR 3D Sketching during Conceptual Architectural Design Process

FARZAD POUR RAHIMIAN, RAHINAH IBRAHIM, RAHMITA WIRZA BINTI O. K. RAHMAT, MUHAMAD TAUFIK B. ABDULAH, MOHD SALEH B. HJ JAAFAR

interfaces. This was expected to improve designers’ cognition and collaboration during conceptual architectural design process. This aim was intended to be achieved by developing a new design methodology based on Schön’s (1983a) “reflective practitioner” theory and Fitts’ (1964) “motor learning” theory, then verifying its effectiveness based on collected empirical data. Schön’s (1983a) “reflective practitioner” theory argues that designers are in a mutual relationship with external representations and are getting reflections from them. Whereas, Fitts’ (1964) “motor learning” theory states that tangible interfaces can improve designers’ cognitive actions. In this case the focus is on the integration of designers’ other senses (e.g. the sense of touch) with their visual sense.

To reach to this aim, the research seeks for the current state of utilized design interfaces and the existing communication culture among designers. According to Shuttleworth (2008), qualitative case study research methodology could be an appropriate research methodology for this kind of research, which tests theoretical models by using them in real world situations. On the other hand, our research looks for the quality of the designers’ cognitive and collaborative actions in using a particular design interface, i.e. 3D sketching. For this part of the research, design protocol analysis as a quantitative research methodology was chosen, since it has become the most prevailing research methodology for studying design process (Cross et al., 1996). Creswell (2002) named such a research methodology, which starts qualitatively and continues quantitatively, as “sequential mixed method research” approach.

Our early qualitative case study research (Ibrahim and Pour Rahimian, 2010) employed ethnography for data collection and artefact analysis for data analysis. Units of analyses for this part of study were design artefacts of a 2nd year architectural design studio at a local university comprising of 37 students and four studio mentors (Figure 1). Taking into account the nature of the building project that they examined, the study adopted the judgment sampling method (Kumar, 2005) to choose the sample population among available different studios. The gatekeeper during the

Figure 1: Individual and group activities of students (Source: Pour Rahimian and Ibrahim, 2008).
data collection was the Studio Master of the course. The conducted case study identified the characteristics of current design media and collaborative design culture of conceptual architectural design process. Consequently, the recommendations of the case study research helped us to develop theoretical foundations of the study.

On the other hand, the purpose of the quantitative part was to provide empirical evidence for the subjective view that proposed VR based 3D sketching interface improves the designers’ spatial cognition and collaboration. In the experiment by Pour Rahimian and Ibrahim (2010), a traditional sketching toolkit was developed as a baseline to be compared with a proposed 3D sketching design interface (Figure 2). The purpose was to reveal the cognitive and collaborative impacts of the proposed design system. Five pairs of 5th year architecture students experienced with the traditional design and CAD systems were selected as participants for this experiment. During the experiment, protocol analysis methodology (Dorst and Dijkhuis, 1995, Ericsson and Simon, 1993, Foreman and Gillett, 1997, Lloyd et al., 1995, Schön, 1983a) was selected as a research and data acquisition method. The adapted methodology evaluated the designers’ spatial cognition at four different cognitive levels: “physical-actions”, “perceptual-actions”, “functional-actions”, and “conceptual-actions”. It also evaluated the designers’ spatial cognition in two different collaborative levels: “cognitive synchronizations” and “gestures”.

Results and Analyses
The Characteristics of the Current Design Media in Conceptual Architectural Design

The conducted case study research listed three dominant types of sketching—i.e. fully manual, mixed, and fully digital—used by the students and their studio mentors. The three groups are as follow: Group 1 (Full Manual Mode—FM) uses only traditional sketching tools and abstract modelling methods, Group 2 (Mixed Mode—MM) started design using traditional methods, but later continue the process utilizing CAD modelling tools and abstract modelling methods, Group 3 (Full Digital Mode—FD) started design in CAD environment and continues finalizing the design with it.
Besides, this study employed four dependent variables and three independent variables in order to identify the supportive characteristics and challenges of current external representation media. The dependent variables were solution quality, certainty of the correctness of the solution, total solution time and experienced difficulty in design problem solving while the independent variables were fully manual, mixed method and fully digital design sketching modes. This study conducted variance analysis (ANOVA) to check whether there is any significant difference among dependent variables belonging to all independent three groups or not. The results are presented in the following paragraphs.

Based on the results from the selected sample the study concluded that the design solutions by subjects using mixed traditional sketching and CAD modelling tools (MM) produce significantly higher solution quality compared to the other two groups (n = 37). On the other hand, the entirely manual sketching subjects have significantly higher solution quality compared to those subjects who solved the problem completely in a CAD environment (n = 37; p < 0.05). The subjects who used mixed traditional sketching and CAD modelling tools utilized manual sketching in initial design ideations and employed CAD tools in developing design ideas. Based on the findings this study posits that using CAD tools hinder designers’ creativity in the early conceptual design stages. It also posits that conventional manual sketching tools are not so successful in developing design ideas particularly when the artefact becomes complicated.

However, the analysis of the second and third variables triggers more doubts about the adequacy of the conventional manual sketching in complicated design stages. Analysis of the second dependent variable revealed a significant decrease for the certainties of the correctness of the solutions of FM subjects compared to the subjects of the other two groups (n = 37; p < 0.001). However, the results from the survey show no significant difference among the three groups regarding their total time taken for creating their respective solutions (n = 37; p > 0.05). It implies that while the MM and FD groups had used 3D prototyping techniques to ensure that various design parts fitted and matched together, the FM group (FM) was not quite successful in convincing designers in this regard.

Since it was impossible to control the protocol size for such a huge observational data in terms of time and number of groups, the study resorted to applying subjective protocol evaluation for experienced difficulty of the design problem solving for the observed groups. Based on the subjective protocol evaluation using the narrative stories transcribed from the recorded videotapes, results indicate that subjects who had utilized mixed design media were able to pace their design processes with considerable less difficulty compared to subjects from the other two groups. The field observations (see Pour Rahimian and Ibrahim (2008)) noted that the same subjects were able to manipulate free hand sketches—as external representation tools—to solve design problems faster and easier. They were also able to use computational capabilities for solving their communicational problems either within design situations or with other designers. Results also indicate that the FM group had slightly less difficulty in producing design solutions compared to the FD group. The
results of artefact analysis are summarized in Table 1.

From the above results, the study found that among the three evaluated sketching support systems, the best external representation methodology comprises of mixing both manual and digital tools. The observations and indicative results illustrate that neither manual sketching tools nor CAD software are the better media for current conceptual design communications. This study posits that design semantic gets lost when manual design fails in articulating explicit design idea while design creativity diminishes when using arduous CAD software. The results support the earlier proposition to develop a 3D sketching methodology in VR in order to fill the gap between creative experimentation and precise manufacturing-oriented modelling supporting an integrated conceptual architectural design process.

### Characteristics of the Collaborative Design Culture of Conceptual Architectural Design Process

Our second research question was: how do the novice designers collaborate in design teams during conceptual architectural design process? To deal with this question the study categorized the design communications that were observed into two groups: 1) between a designer and his or her design situation when trying to solve the design problem, and 2) between different designers during design collaboration. This study proposes calling the quality of such communications and the ways that they use to communicate as “Collaborative Culture”. The observations indicate that the use of manual sketching would offer the designer the opportunity to trade off between accuracy and legibility. Hence, the manual design representation techniques do have the potential to convey design ideas more directly compared to other design support systems. The study observes that within such design projects, relationships between site plan elements were
smoother when the design could be extended from the building to its site. Moreover, despite having a lower accuracy, the author noted that manual presentations exude richer emotions besides having more capability for carrying stronger design concepts. However, the works that use no digital design tools were almost raw and usually they stopped at a certain perceptive level. Regrettfully, the fully manual approach ended less expressively than its initial good design concepts and intent.

The observations and protocol analysis indicate that using conventional CAD tools had shortened students’ creativity and imagination during their conceptual design processes. This study proposes that this phenomenon was mainly due to many shortcomings of CAD tools in freely expressing designs ideas. In majority of their observed cases, computer-made perspectives were found to be more elaborate, had more details and were more realistic. The subjects were able to express nicer interiors with more refined details of lighting, paving, and design or colour of furniture. Yet, in most cases the author also witnessed some inconsistencies among different spaces and they lacked unity in the sense of space. The study claimed that the reason for contrast was due to different media type sketching environment.

During the digital design process, the designers saw many alternatives from perspective viewpoints rather than in plans and elevations. Hence, the perspectives could be expected to show amazing outputs compared to their final 2D elevations. The author believes that similar assumption could be applied to manually designed projects. Due to the lack of holistic consideration of the building—immersed in the perspectives—silhouettes in such cases were boring and non-artistic. Overall, the study found that the most amazing volumes did belong to computer-aided designs while the nicest conceptual spatial senses were from manual design attempts. Moreover, while most computer-generated or computer-aided works had almost similar characteristics, some of the excellent manual design solutions were unique indeed in comparison. The study found that the most successful cases were those that were designed completely manually but visualized digitally. This is because in such cases the designers would utilize the capabilities of each method to compensate the shortcomings of the other. These findings concur with the earlier conclusions from the artefact and protocol analysis that neither traditional sketching methods nor conventional CAD software are the perfect media to be used during conceptual architectural design process. Herewith, Table 2 presents a summary of challenges and benefits of each visualization method during conceptual architectural design phase.

With both ethnography and artefact and protocol analyzes suggesting no media winner between the traditional sketching method and the conventional CAD software, the study strongly recommend the need to develop an alternative design medium that could successfully transgress between both advantages. The alternative sketching tool must be able to facilitate intuitive idea expression abilities, and the excellent modelling and walkthrough capabilities while able to technically provide faster documentation process when in use.

Identifying Key enablers in VR 3D Sketching Interface That Can Optimize Designers’ Cognition and Collaboration during Conceptual Architectural Design Process
Mediating Cognitive Transformation with VR 3D Sketching during Conceptual Architectural Design Process

An experimental protocol analysis research has been conducted to identify key enablers in VR 3D sketching interface which can optimize novice designers’ cognition and collaboration during conceptual design sessions (Pour Rahimian and Ibrahim, 2010). The study employed a cognitive approach to design process to articulate all aspects of the utilized medium during conceptual architectural design process. Here the traditional sketching method—which is usually appreciated by many scholars—is selected as a baseline to be compared with the proposed 3D sketching design methodology and to reveal the cognitive and collaborative impacts of the proposed design system. The experiment comprised of five main steps: 1) to conduct experiments, 2) to transcribe protocols, 3) to parse process into the segments, 4) to encode the segments based on a coding scheme, and 5) to analyze and interpret the encoded protocols. In encoding the collected data and developing the hypotheses the study categorized designers’ cognitive actions into five major action categories as physical, perceptual, functional, conceptual, and collaborative. In interpreting the finding the study relied on the observations of the designers’ behaviours during the experiment and also on statistical analysis of the encoded design protocols. Nevertheless, in the implications the impact of the encoded data is rather high compared to the behavioural observations.

Even though the number of participants, which is six people, seems somewhat small, the protocols included pairs’ verbal accounts concurrently per experiment, therefore providing adequate data for an empirical exploratory study. Three participant groups are exactly the same number that Clayton, Kunz, and Fischer (1998) suggested to use for guaranteeing the validation of such Charrette-based experiments. Furthermore, the number of similar previous practices (e.g. Bilda et al., 2006, Kim and Maher, 2008, Menezes and Lawson, 2006) that used 2-3 pairs of designers as their participants reconfirms the facts that the utilized sample size is good enough for inferring the hypotheses via the findings.

Table 2: summary of challenges and benefits of each visualization method during conceptual architectural design phase (Source: Pour Rahimian, Ibrahim, & Jaafar, 2008).

<table>
<thead>
<tr>
<th>Current manual sketching tools</th>
<th>Current CAD tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Flexibility in ideation due to tangible interface</td>
<td>• Lower capability for shifting from micro to macro level and vice versa</td>
</tr>
<tr>
<td>• Ease of use</td>
<td>• More tacit information flow walkthrough</td>
</tr>
<tr>
<td>• Ease of changing reforming the design alternative</td>
<td>• Lower details of visualisation</td>
</tr>
<tr>
<td>• Ability for using different scales of drawing and trading of between accuracy and clearness</td>
<td>• Fragile models and documents for editing or reviewing</td>
</tr>
<tr>
<td>• Maintaining design idea during design process providing the ability to see all documents together and to compare</td>
<td>• Failing to add and control more details into design alternative due to weak level of visualisation</td>
</tr>
<tr>
<td>• Difficulty in transition of the format when being used in the other design stages</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: summary of challenges and benefits of each visualization method during conceptual architectural design phase (Source: Pour Rahimian, Ibrahim, & Jaafar, 2008).
Discussions

Overcoming the Shortcomings of Conventional Sketching Methods

Our ethnography study and the artefact and protocol analyzes on the ethnography findings (Ibrahim and Pour Rahimian, 2010; Pour Rahimian, Ibrahim, & Jaafar, 2008) concluded that there is no better winner for the choice of current media for external representation purposes. Both studies affirm the inflexibility of traditional geometric modelling tools against intuitive ideations. Moreover, both have equally observed the shortcomings of conventional manual sketching tools for further articulating design ideas whereby it had difficulties in turning tacit knowledge into explicit knowledge for collaboration purposes. On the other hand, the results have shown that neither manual sketching tools nor current CAD interfaces are the perfect media for current conceptual design communications. The alternative tool must also support all intuitive idea expression besides the precise manufacturing oriented modelling and effortless design walkthrough. This is because any new alternative need to acknowledge Griffith et al.’s (2003) idea about the tacit role of knowledge during a design process. The proposed VR tool may help designers to articulate this tacit knowledge and documenting that tacit knowledge into explicit data.

Implications for VR 3D Sketching Interface

The results of the artefact and protocol analyzes show that major barriers with conventional sketching design tools when designing complex design procedures were mainly due to their shortcomings in advanced visualization for communication purposes as the design progresses. This was particularly so for novice designers who did not know how to sketch manually very well. Current conventional sketching tools cannot be replaced directly with current geometrical CAD modelling tools since the study found that certain definite intuitive characteristics of conceptual design processes cannot be supported by existing CAD software. In brief, the inflexibility of traditional arithmetical modelling software on one hand and the restricted visualization capabilities of current manual sketching tools on the other hand are increasing the tendency for substituting manual modelling techniques with digital technique. Hence, the study proposes that an alternative 3D sketching tool becomes an intermediate sketching tool that bridges both characteristics.

In using the sketching metaphor, Levet et al. (2006) have proposed the use of some design interfaces in which designers can swiftly produce a 3D prototype to exemplify the 3D object they have in mind. Kwon et al. (2005) have considered this factor in order to improve computing performance for expediting the progress of the conceptual phase into the remaining design stages—i.e. applying the digital format as early as possible after the use of such analogue conventional tools.

Cognitive-Based Protocol Analysis Experiment for Testing Efficiency of VR 3D Sketching

The main aim of this experiment was to provide objective and empirical evidence for the subjective view that proposed VR based 3D sketching interface improves the designers’ spatial cognition and collaboration during conceptual architectural design phase. In
this experiment the focus was on designers’ cognitive and collaborative actions and the hypotheses were being tested relying on the designers’ actions. The codes assigned to the different segments were considered as the units of analysis of this study. Although this experiment was made up of three pairs of designers performing six design sessions in total, the experiment provides adequate data for observing overall designingly trends and actions. Besides, this study is guided by Clayton et al.’s (1998) recommendations in validating the results. Moreover, during the exploratory study the study has revealed consistent improvements in the main five aspects of design sessions and spatial cognition across the three pairs that further validate the claim that 3D sketching interface facilitates better quality of designing.

From the empirically collected data, the study found that in 3D sketching sessions the increased integration of the physical actions with mental perceptions and conceptions led to occurrence of epistemic actions to improve the designers’ spatial cognition. Besides, relying on the literature (Kirsch and Maglio, 1994) the study posited that the epistemic actions facilitated by the rich interface offloaded the designers’ mental cognition partly into the physical world, thus letting them have freer mind to create more design ideas.

Moreover, 3D sketching interface improved the designers’ perception of visio-spatial features, particularly in terms of unexpected discoveries of spatial features and relationships. Based on outstanding design theories, (e.g. Schön (1983a)) the study explains how association between mental cognition with the perception of physical attributes can stimulate creativity and offload the mental load. Furthermore, the author paraphrased from Suwa et al.’s (2000) arguments to explain how unexpected discoveries can lead to more creativity and also to the occurrence of more situative inventions.

In terms of functional-conceptual actions of the design process, the study discovered that 3D sketching interface improved the designers’ problem finding behaviours as well as improving their co-evolutionary conceptions of their perceptions and problem findings. Borrowing from Suwa et al.’s (2000) this study called the most important aspect of the problem finding behaviours as ‘situative-inventions’ and argued how the increased percentage of the co-evolutionary and situative-inventions actions can lead to improved creativity in 3D sketching design session. Further, it had the same argument about the capability of the co-evolutionary conceptions in increasing design creativity.

Lastly, in terms of the collaborative activities, the study has observed that the explicit representation ability, which is applied in the proposed 3D sketching interface, is capable to motivate the designers to share more ideas together. Moreover, the study explained how this interface is capable to change the type of conversations from ordinary clarifications to new proposals and arguments for development of the problem and solutions space. Finally, the author cited from Kim and Maher (2008) to show that emergence of this quality in design conversations can enhance the creativity of the design process.

In conclusion, this study posits that the emerging VR technologies are capable to facilitate
some senses beyond the visual aspects of the design artefact by offering a new generation of promising CAD tools, which are constantly in touch with designers’ cognition and collaboration during conceptual architectural design process. It also conjectures that by utilizing the same digital format during both conceptual architectural and engineering stages of the building design process—the full design integration aimed by Fruchter (1998)—can be better facilitated.

Conclusions

A sequential mixed method research comprising case study and protocol analysis studies is conducted. The case study contributes in extending theoretical foundations for improving designers’ cognition collaboration during conceptual design process. These foundations became recommendations for improving and optimizing operational behaviours of design project teams. On the other hand, the purpose of the protocol analysis was to empirically evaluate and verify the role of 3D sketching using VR technology to facilitate integration between conceptual and engineering parts of building design process. The study identifies: 1) issues and challenges for multidisciplinary architecture-engineering-construction (AEC) teams in project collaborations, 2) inherent characteristics of the conceptual design process and its external representation tools, and 3) the theoretical and technical requirements of the proposed 3D sketching in VR as a new external representation tool.

The conducted empirical protocol analysis experiment compares the proposed 3D sketching design interface with traditional design methods. It explains the results of implementing the basic VR-based design interface to recommend how 3D sketching can be developed as a collaborative medium in a VR environment. Moreover, adopting a cognitive approach to design, it identifies supportive characteristics of VR in enhancing designers’ cognition and collaboration in conceptual architectural design stages. The findings of this study contribute to three main areas namely architectural education, architectural profession, and integrated building industry. The following sections describe those impacts and contributions besides proposing future research on those mentioned areas.

Claimed Contributions and Impacts of the Study

i. Integrating the design process. The theoretical foundations of this study about cognitive and collaborative aspects of implementing VR 3D sketching interface contributes towards transforming conceptual architectural design phase from analogue to digital process. This study claims that this transformation can fill in the existing gap between analogue conceptual architectural design process and remaining digital engineering parts of building design process. This is because in the building industry, conceptual architectural phase is the only stage that is yet to be computerized.

Therefore, implementing VR 3D sketching interface is expected to improve the integration of the entire design process by digitization of this phase. This idea is also supported by Kwon et al. (2005) that digitization of conceptual architectural design phase can improve the integration of the whole design process.
Additionally, Fruchter (1998) recommends the integration of design process since she believes that it can better support collaboration among team members besides benefiting the process by decreasing labour and material costs. Therefore, the study claims that migrating from analogue to digital conceptual architectural design process can become a stepping-stone for trans-disciplinary teamwork to share VR 3D sketching interfaces in distant locations. The author expects that this could be successful by enabling professionals to save and amplify design semantics throughout a project development lifecycle phases. Thus, advancing methodologies and technologies in the design phase that lead towards 4D construction implementation (Ibrahim, 2007) besides developing a new generation of architects who are able to work collaboratively in geographically dispersed locations (Ibrahim et al., 2007).

**ii. Improving design cognition and collaboration.** This study contributes to the development of theoretical foundations towards implementing VR 3D sketching interface as a more flexible and explicit conceptual architectural design interface compared to existing conceptual design interfaces. The study claims that it can improve the quality of architectural education by providing a more capable and explicit design interface. The results revealed that this interface can become stimuli for accelerating designers' creativity during design process. The findings confirm Suwa et al.'s (2000) arguments relating to more explicit design interfaces as aspect of 'learning through experience'. The study agreed that VR 3D sketching interface can become stimulus for retrieving more knowledge and accelerating inventions by articulating tacit knowledge of design. Moreover, it claims that more explicit visualization in VR 3D sketching interface can facilitate better design conversations hence improving knowledge flow between mentor and apprentice in mentoring sessions.

**iii. Developing a new approach for studying design process.** This study contributes to architectural design education by extending
the findings of a qualitative case study research into the conducted quantitative experiment. So far, all the previous studies that dealt with architectural education either qualitatively or in some experimental laboratory conditions were not quite successful in integrating designers’ cognition with their collaborative behaviours.

The adopted mixed method helps the researchers to obtain their insight into designers’ needs for external representation interfaces through conducting qualitative research. It also helps them to microscopically evaluate developed theoretical constructs by adopting a quantitative approach. This study claims that extending the findings of a preliminary qualitative study can enrich the quantitative research by providing higher level of theoretical foundations for establishing assumptions and interpreting the findings.

**iv. Documenting educational design process in Malaysian context.** This study contributes by identifying and documenting designers’ cognitive and collaborative conceptual design behaviours in the Malaysian context. This study categorized their collaborative behaviours into two major groups: 1) their collaboration with design situation, and 2) their collaboration with other team members. With regard to cognitive behaviours the study formulized Malaysian designers’ collective cognitive behaviours in five major levels: physical-action, perceptual-actions, functional-actions, conceptual-actions, and collaborative-actions. The accomplished full scenario documentations during ethnography and protocol analysis research can be used as a reference for future researches in architectural design education in the Malaysian context.

**Recommendations for Future Study**

The results of this study are expected to help the development of cutting-edge information technologies in architectural education and profession. Therefore, this study suggests some further researches to extend the cognitive and collaborative features of the proposed VR 3D sketching interface towards creation of some professional and pedagogical programs. The created programs should involve more elaborated design practices to support new global and complicated design processes. They are also expected to consider the global and non-collocated practices during conceptual design phases. The authors believes that it can train professional graduates who are competent in multidisciplinary teamwork and equally competent in utilizing IT/ICT in delivering their building projects within the allotted time and budget.

The results and implications of this research only revealed the virtue of the new VR technology in enhancing design interfaces in term of supporting designers’ cognition and collaboration. However, further research is recommended to reveal more technical and theoretical aspects for extending the implemented VR 3D sketching interface towards creating an advanced curriculum for IT/ICT based design studio. The potential researches are listed below:

i. to test VR 3D sketching in non-collocated collaborative conceptual design projects,
ii. to seek the effects of the fully immersive interfaces on the designers’ cognitive processes, and
iii. to investigate the designers’ collaborations when using multiple haptic design tools, and
iv. to explore higher capabilities of haptic design tools in architectural design by developing customized environments based on open source application programming interfaces.

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Mediating Cognitive Transformation with VR 3D Sketching during Conceptual Architectural Design Process

FARZAD POUR RAHIMIAN, RAHINAH IBRAHIM, RAHMITA WIRZA BINTI O. K. RAHMAT, MUHAMAD TAUFIK B. ABDULLAH, MOHD SALEH B. HJ JAAFAR


ASSESSMENT OF VISUAL PERCEPTION OF WEB-BASED VIRTUAL ENVIRONMENTS SIMULATIONS OF AN URBAN CONTEXT.

Ayman Hassaan A. Mahmoud

Abstract
The existing research literature on environmental perception is a body of work mainly based on the use of static representation of environments. However, the real world is usually experienced in a dynamic experience. Virtual environments' technologies offer the potential to produce simulated environments that create the impression that we are in spaces other than those we actually occupy. A review of literature on environmental perception revealed two components of perception: "space-based" and "object-based" perception. An experiment was conducted to investigate visual perception obtained from a direct experience of an urban landscape and from its representations in desktop virtual environments (desktop VEs). The issues investigated were: accuracy of space-based and object-based visual perception obtained from the physical environment and from desktop virtual environment. A series of tests were administered to assess the visual perception of participants who explored the urban environment following a direct experience, and X3D-VRML models. The results indicated that participants who experienced the X3D-VRML models conducted fewer errors in space-based perception tests. There was evidence that participants in X3D-VRML perceived more objects than their counterparts in the physical environment. Similarities and differences between the physical and virtual environments were discussed suggesting the potential and limitations of desktop VEs in environmental representation. An agenda for future research work is suggested.

Keywords
Visual perception; web-based virtual environments; X3D; VRML; simulation; urban space.

Introduction
Bell et al. (1996) defined "environmental perception" as "the processing of the sensory information encountered in everyday life". Theories of visual attention argue that observers focus attention on an object in a complex scene. (Desimone and J. Duncan, 1995) In a visual scene, objects' forms are locally based on a contiguous geometric structure, such as edges, boundaries and contours. Discrete local patches can be perceptually linked, based on similarity of texture, color and other features, to form whole objects (Feldman, 2003).

There are two theories of visual perception, including "space-based" and "object-based" theories. Advocates of the "space-based" perception theory imply that perceptual
attention selects regions of space independent of the objects they contain (Posner and Cohen, 1984; Treisman, and Gelade, 1980). This model highlights the significant role of boundaries of the space (e.g., walls, and buildings) on our sense of perception; however, elements within the space do not play an equivalent role. Advocates of “object-based” perception suggest that perceptual attention select objects rather than regions of space (Kahneman et al., 1992). This, in contrast with the space-based model, highlights the significance of elements within the space in establishing a consistent sense of perception.

Space-based theory of perception assumes that space is represented by a two- or three-dimensional map of locations with objects represented as points in space. This theory assumes that distance between objects is represented by “Euclidean” metric variables (Wolfe, 1994). The significance of these theories is that they provide guidelines for understanding the way the urban environments are perceived by the potential users. A substantial body of literature investigated the perception of urban spaces indicating a relationship between shape and perceived area (Ishikawa et al. 1998).

Object-based theory of perception indicates that space is represented as a two-dimensional or three-dimensional array of objects organized by “Gestalt” grouping principles (i.e., goodness of form). This theory abandons the Euclidean distance. In vision, this mode of perceiving is described as a biased competition between perceptual objects. (Desimone and Duncan, 1995). Biased competition takes place automatically and ubiquitously when there are multiple objects in a scene. Which object wins the “competition” depends upon both on the inherent salience of the objects and the influence of volitional, top-down attention, which biases the competition to favor objects with desired perceptual features (Desimone and Duncan, 1995; Yantis, 2005; Shinn-Cunningham, 2008).

The existing research literature in environmental perception is a body of work mainly based on the use of static representation of environments (Nasar, 1994). However, the real world is usually experienced in a dynamic experience. Through a program of research, Gibson (Gibson, 1979) indicated how movement enhances the process of perceiving environmental features. A small number of researchers in the environment-behavior field have stressed the significance of dynamic representation of the environment (Appleyard et al., 1964; Lynch, 1960; Thiel, 1997, Heft and Nasar, 2000).

**Visual Perception of Virtual Environments**

Virtual environments are described as a “pure representation of the external world, extending it by penetrating inside objects, enlarging them, and transcending space and time” (Pragier and Faure-Pragier, 1995). Virtual environments’ technologies offer the potential to produce simulated environments that create the impression that we are in spaces other than those we actually occupy (Amith, 1998). The rationale of using 3D-computer representation in further includes that it controls possible factors affecting the perception of the area of an open space. It also creates a hypothetical reality of walking in an actual city. It enables one to collect data in a less costly way than in a field setting.
Perception of abstract virtual environments has been discussed (Wann and Mon-Williams, 1996). “Depth sensitivity” was defined as the ratio of viewing distance to the depth discrimination threshold, hence the sensation of reality in a picture occurs because of visual depth perception (Wann and Mon-Williams, 1996). This, in fact, indicated that perception of depth and distance in virtual environments is no different from physical environments as it depends on equivalent cues for depth perception.

Wann and Mon-Williams (1996) argued that display of virtual environments should satisfy criteria that arise from the nature of human spatial perception. Perceptual criteria would act as the foundation of an effective VE display. They proposed that VEs-based design must concentrate on the user’s “perceptual-motor capabilities” in the context of the undertaken task. Shape constancy, according to Borresen & Lichte (1962), involves requesting that the viewer make some estimate of the geometric properties of an object. It does not disappear during static, monocular viewing. This concludes that perception of a virtual environment could be enhanced if virtual objects are close to users’ internal 3D-models and their geometry, and further, by relating them to the realistic surroundings.

Most of the virtual environments-based presentations include desktop virtual environments (desktop VEs), which, are mostly displayed on 2D screens (Pimentel and Teixeira, 1995, Burdea et al., 1996). The problem might be that the 3D simulated environments are displayed in a pictorial display. Hence, if the desktop VEs are used in environmental representations, some limitations should be considered, for example, the effect of viewing a pictorial display from too close or in addition far. Perception of desktop VE is expected to be rather different from perception of objects in 3D immersive VE, and consequently, more different from perception in real environments. Some depth misjudgments would be expected.

Ishikawa et al. (1998) empirically investigated the perception of the area of an open space using desktop VEs to present subjects with a simulated environment. Their representation created a “hypothetical reality” of being in an actual city. However, it was limited by lack of rotation options, fixed masses’ heights. Their results showed that shape and location of an open space affect the perception of the area (width/depth ratio effect & visible area effect).

The objective of this paper is to explore the differences in visual perception in virtual and real environments. An experiment was conducted to investigate the visual perceptions obtained from a direct experience of an urban landscape and from its representations in desktop virtual environments (desktop VEs). The issues investigated were: accuracy of space-based and object-based visual perception obtained from the physical environment and from desktop virtual environment.

VRML is one of Web 3d technologies that has been in existence since 1995 and has become the most popular tool for providing interactive 3D models on the Web. Several Web3d technologies such as Pulse3D, Cult3D, Viewpoint and Shockwave3D, etc. are developed or being developed now but only VRML can be practically used for walk-through simulation. VRML is a high-performance language for 3D
visualization on the WWW (world wide web). As a programming language and library for 3D computer graphics, VRML has many functions such as shading, setting objects, projection, and texture mapping. Virtual reality worlds can be easily built on the WWW with this technology. VRML 1.0 was introduced in 1994 and VRML 2.0 (97) with more dynamic and interactive functions was made in 1996. GeoVRML and X3D, which are the successors of VRML, are currently being developed. In this study, VRML 97 was used in the present system. Users working with a browser who supports VRML can easily download programs written in VRML from the WWW and view 3D images on their personal computers. These VRML browsers are available for the Windows, Macintosh and Unix operating systems, as well as other platforms. In this study, Cosmo Player2.1.1 (Silicon Graphics Inc.) was used as a VRML browser with Internet Explorer6 (Microsoft Inc.) on Windows (Microsoft Inc.). Several VRML browsers were tested on Internet Explorer and on Netscape with Windows XP (Service pack 3).

The rendering speeds of these VRML browsers were almost the same. To write and run VRML code only a VRML browser and Internet browser are required. Cosmo Player and other VRML browsers can be downloaded as freeware, and the development environment can be built economically. VRML crime maps are more useful as they allow a better understanding of data. 3D VRML models allow users to explore the data by animations and various manipulation tools, e.g. tilting and rotating (Lodha et al., 1999). VRML is recently being replaced by X3D (Bullard, 2003) based on the “eXtensible” Markup Language (XML). The Web3D Consortium and the World Wide Web Consortium (W3C) have established X3D as an XML-compliant ISO standard for interactive 3D on the web (Kumaradevan and Kumar, 2001). X3D uses XML to express the geometry and behavior capabilities of 3d models (Brutzman, 2002), yet as it is extensible, metadata may be embedded in the file and linked to any other spatial or non-spatial dataset. The power of this technology is that it permits a user to interact with the embedded datasets in the 3D model in real time over the Internet. The use of level-of-detail nodes enables data that is ‘out of scope’ to be ignored, assisting navigation and management of complex large environments (Barton et al., 2005).

Previous studies have successfully presented virtual tourism sites, through which users can access virtual models of towns and cities, or interrogate information regarding cultural heritage. These include web sites containing navigable VRML models, where an emphasis is placed on providing pertinent data as users move through a space (for example, Salgado et al. 2001; Webb and Brotherhood, 2002). These studies were concurrent with research, which concentrated on the development of the VRML technologies themselves, which allowed users to navigate interactive and photo-rendered spaces (Schaerf and Tessicini, 1999). A key strength of such systems are that they are capable of containing and displaying a suitable range of text and image based data, potentially selected and presented in response to specific user characteristics (for example, Bonfigl et al. 2004; Tan et al., 2006).

Developments in the construction and presentation of virtual environments suggest that it is time to reconsider experiential approaches
to preference research rejected as too complex in the 1980’s. Some aspects of behavior in the landscape can now be effectively observed in a computer-generated world at reasonable cost and with more complete control of variables (Groner, R., at al., 2004; Bishop et al., 2001).

**Methods**

**Participants**

Participants included undergraduate and postgraduate students and workers randomly selected from an Egyptian University Campus within the Greater Cairo Region. 110 participants were recruited to take part in between users’ experiment. 58 participants were female and 52 were male. Their average age was 32. Further, 96% of participants had a minimum of a high school standard education. Participants were randomly assigned into two groups, including, control group (N = 20), and experimental groups (N = 20).

**The Environmental Display**

The University campus was utilized in this investigation based on a number of criteria. According to Booth (1983), since the research is designated to provide enhancement to the visual simulation of an environment, it was essential to consider the use of an environmental context that represents a variety of landscape elements. Danford and Williams (1975) provided a set of criteria that could be used in selecting study areas for landscape preference investigations. According to their criteria, the study area would fulfill (a) homogeneity in design; (b) relative isolation from external environments; and (c) accessibility and proximity for participants. Fig. (1) illustrates the layout of the university campus.

**The Stimuli-Set**

The stimuli-set employed in this investigation included two urban spaces within the University Campus. The stimuli set for the experimental group (X3D-VRML group) included an X3D-VRML simulation model of the same urban spaces. The desktop V.E. system included hardware, software, and a geometry database. The hardware included an IBM compatible PC equipped with an Intel Pentium Duo 2 Core processor 3.4G, 4 GB RAM, 320 GB hard disk, and 512 MB graphics card. Input device included standard optical 2-D mouse, while the output device included 17 inches PC true color LCD monitor. The software used to create the virtual model included 3D Studio Max version 9.0 software, Flux Player version 2.1 plug-In as an X3D-VRML browser. All software was running under the Microsoft Windows 7 operating system platform.

Perception of desktop VEs representations would be more successful in replicating perception of the real environment if few guidelines were applied (1997). Synthesis of components of the virtual environment followed the “geometrical principles” of their real world counterparts. This includes replicating the actually proportions, shapes and units. The geometry database was adapted from a former digital survey of the campus. On-site measurements were conducted to edit the existing database and to update important geometrical details. The 3D CAD model followed basic morphological details of both masses (e.g., openings, mass geometry, and projected/recessed ornaments) and spaces (e.g., ground and spatial vegetation.
elements, land topography, stairs and ramps). Primary 265-colour index was used to represent a texture difference.

Surroundings (e.g., building facades) as well as the discrete elements within the space (e.g., furniture elements) were carefully considered. “Landmarks” were emphasized by contrasting colors or shapes. Multiple “vantage points” were provided within the virtual environments using “cameras” to offer alternative viewpoints for users to start their navigation. Objects were related to foreground and background according to actual physical relationships. Sense of navigation was maintained using a 35-mm (Focal length) camera representing a human eye placed 170-cm above the ground. Each of the three cameras was carefully placed to maintain a vantage point from which participants would be asked to start their navigation. Desktop VEs, however, were expected to show some limitations of understanding of depth; these limitations were managed providing scale references within the virtual environment, for example, considering floor patterns. The final model is illustrated in figure (2).

“Bitmap” textures were not used for three reasons. First, the research was not interested in simulating the very details of textures of the environment because this was not recommended by Kaplan (1977). Second, to avoid larger file sizes in order not to affect the rendering speed of the X3D-VRML browsers at the end. Third, 3D Studio Max recommended minimizing the use of “texture maps” and keeping the “polygon count” of the objects down as they were considered effective factors in enhancing the performance of the X3D-VRML model. The X3D-VRML model was exported from 3D Studio Max using the VRML 2.0 export plug-In. The final VRML model included the three-dimensional geometry, initial viewpoint for animation and textures.

**Procedure**

**The Real Environment Experience**

Participants were handed a self-report form that included the perception tests. They were asked to spend 10 minutes moving through the space respectively, they were asked not to move outside the boundaries and to move freely to explore different sides of the space.

The off-site part of the test included sketch-map-drawing task. Participants were asked to gather in a room that was isolated from the environmental context, and were given a blank A4 size sheet of paper. They were asked to recall their guided tour within the spaces and represent it in a drawn sketch. Participants were asked to include all elements they could recall from memory to assist in directing the stranger.

Procedure for Virtual Environment Navigation

Participants of the VRML group performed all the tasks in a lab-like condition. Participants performed the test one at a time. After being handed the self-report form, participants were asked to take a seat and were introduced to the desktop virtual environment system provided to them. The test proceeded through three phases, including pre-training, desktop virtual environment navigation test, and sketch-map drawing test.

In pre-training, the researcher demonstrated the functions of each device of navigation tools of the desktop virtual environment system.
Participants were asked to practice on the desktop virtual environments system for about 5 minutes in an abstract simulation that was different from the simulation selected for the test phase. The practice environment was of a similar structure to those used in the corresponding test condition. They were asked to navigate through the virtual environment to reach a particular point and return to the start point. This pre-training exercise was thought to enhance users’ familiarity with the navigation tools. A number of participants reported difficulty in managing the navigation devices; yet, they mastered them by the end of the 5-minute pre-training session.

Participants started the navigation from the same point from which the participants of the control group started. Participants used the two-dimensional navigation device to navigate through the three-dimensional virtual environment using a set of buttons at the bottom of the screen.

Participants were given the same instructions as those given to the participants of the control group. They were also restricted with the same time-allocation for each task. Participants had the freedom to decide the route of their navigation within the space. A few participants experienced problems in returning to their initial viewpoint, at that stage. The researcher had to interfere in order to help the participant.

In order to extract components of visual perception data from sketch maps, two methods were applied. First, to extract the space-based perception accuracy, each map was converted into a digital format by scanner, and files were imported into AutoCAD Architecture 2008 software in order to be converted into a...
vector format. The aim of converting the maps into a vector format was to determine the geometrical parameters of the shapes of the drawn elements of space. Those geometrical parameters - including shape indices reported by Ebdon (1985) - would be considered a quantitative measure of environmental perception equivalent of the visual sketch map. Four shape indices were computed, S1, S2, S3 and S4. Shape index is defined by the equation:

\[ S = 1.27AL^2 \]

Where \( A \) = area of shape in km\(^2\) and \( L \) = the length of the longest axis in km.

A value of 1.0 expresses maximum compaction, where the shape is circular. As the shape is elongated, the less compact is the slope, and the lower the value of the index. A Mean Shape Index (\( S \)) for the space has been calculated as a measure for space-based perception of the urban landscape. Second, in order to analyze the object-based perception data, landscape elements included in each sketch map was quantified. Landscape elements included buildings, furniture, pavement, spatial vegetation, ground cover vegetation, and site structures.

**Results**

Initially, each self-report form was given a label to indicate the group type of the participant and an ID number. Personal data as well as collected numerical data were entered into SPSS version 13 (Statistical Package for Social Scientists) software in the form of a rectangular data matrix (scale in columns and respondents in rows). Form-recognition results were converted from the nominal scale (true/false) into a numerical scale (true = 1, false = zero). Sketch-map data were entered in the same ordinal scale obtained.

The difference between-groups data were analyzed on a pair-wise basis. The interest of this phase of investigation is to test the effect of stimuli type as an independent variable on preference variables. Hence, the Multivariate ANOVA test would be used to investigate the significant difference between groups.

**Sketch Map Analysis**

In the shape index test, it was found that the mean error of shape index for the space was slightly lower in the PE group than in the VRML group (\( p > 0.05 \)). Another measure of environmental perception was the quantitative analysis of the sketch maps, in which, landscape elements of each sketch map were listed, and classified into Booth's elements of landscape architectural design. Those elements included buildings, furniture, pavement, spatial vegetation, ground cover, and site structures (1983).

Table (1) depicts the descriptive statistics of objects that appeared in sketch maps. Mean frequency of “buildings” was slightly less in the PE group than in the VRML group (\( p > 0.05 \)). Considering “furniture”, it was found that the mean frequency of the PE group was considerably higher than the VRML group, there was a statistically significant difference between frequencies of both groups (\( p < 0.05 \)). Table (2) depicts results of ANOVA test.

Results of ANOVA revealed that the mean frequency of the PE group was considerably less than the VRML regarding “pavement” element,
with a statistically significant difference between-group difference ($p < 0.05$). Regarding “spatial vegetation”, it was found that the PE group was considerably less than the VRML group, and a significant between-group difference was found ($p < 0.05$). Considering the site structures, it was found that the mean frequency of the PE group was considerably greater than the VRML, with a strongly significant between-groups difference ($p < 0.05$). In summary, the VRML group was different from the PE group in different landscape components as less furniture, more pavements, and more spatial-vegetation; and fewer site structure elements were perceived. However, they were no different in perception of buildings.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>5.241</td>
<td>0.483</td>
<td>0.034</td>
<td>0.931</td>
<td>2.172</td>
</tr>
<tr>
<td></td>
<td>(0.236)</td>
<td>(0.146)</td>
<td>(0.034)</td>
<td>(0.192)</td>
<td>(0.243)</td>
</tr>
<tr>
<td>VRML</td>
<td>5.444</td>
<td>0.111</td>
<td>0.167</td>
<td>1.944</td>
<td>0.944</td>
</tr>
<tr>
<td></td>
<td>(0.422)</td>
<td>(0.076)</td>
<td>(0.090)</td>
<td>(0.286)</td>
<td>(0.347)</td>
</tr>
</tbody>
</table>

Table 1: Means and Standard deviations (between parentheses) of frequencies of objects mentioned in sketch maps as a function of group type (Source: Authors).

<table>
<thead>
<tr>
<th>Variable</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape Error</td>
<td>0.0168</td>
<td>1</td>
<td>0.0168</td>
<td>3.157</td>
<td>0.08</td>
</tr>
<tr>
<td>Buildings</td>
<td>0.4130</td>
<td>1</td>
<td>0.4130</td>
<td>0.186</td>
<td>0.669</td>
</tr>
<tr>
<td>Furniture</td>
<td>2.0540</td>
<td>1</td>
<td>2.0540</td>
<td>4.491</td>
<td>0.041</td>
</tr>
<tr>
<td>Pavement</td>
<td>0.2690</td>
<td>1</td>
<td>0.2690</td>
<td>3.985</td>
<td>0.053</td>
</tr>
<tr>
<td>Vegetation</td>
<td>6.9900</td>
<td>1</td>
<td>6.9900</td>
<td>5.305</td>
<td>0.027</td>
</tr>
<tr>
<td>Structures</td>
<td>17.437</td>
<td>1</td>
<td>17.437</td>
<td>8.810</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Table 2: Results of ANOVA test (Source: Author).

**Discussion**

This study aimed to investigate the differences and similarities between visual perception obtained from a direct experience of a real environment and the experience of its representation in three types of desktop VEs.

**Space-based Visual Perception**

This study revealed that participants within the VRML group were successful in maintaining a competent space-based visual perception of the space. However, they tended to show more errors in the shape index, yet this was not statistically significant when considering individual errors. It is important to mention here that the participants were instructed to include the details of the environment and not only the outline of space boundaries.

**Object-based Perception**

The results for object-based visual perception in VRML suggest that participants tended to perceive more buildings than real-environment participants. Even though this observation was not statistically significant, it might be argued that buildings in VRML were the dominant landscape element because of their legible geometrical forms and well-defined edges that enhance their perception. When Gibson’s phenomenon is applied (Gibson, 1979), it appears that VRML sustained continuous dynamic changes that were mainly dominated by buildings.

Furniture and site structure elements were less perceived in the VRML than in the PE. This observation might be related to four facts. Firstly, using furniture or site structure elements was a part of experience within the PE group, yet participants within the VRML were certainly
unable to use and feel them. Secondly, VRML participants tended to “fly” over the normal viewpoint and could not make sense of the small-scale furniture elements or site structures, including ramps and stairs on the ground. Thirdly, furniture elements by nature are “very” small compared with other landscape elements limiting the chance of perceiving them. The fourth fact is that furniture elements were not “physical obstacles” in VRML as they were, in reality, since people could go through them because of the lack of “collision detection”.

Since pavement textures and ground cover vegetation in the VRML model were based on the AutoCAD 256-colours index, pavement did not appear either realistic or harmonious with other elements of space. Additionally, large areas of pavement colors tended to dominate the display within the VRML presentation. On the other hand, ground cover vegetation appeared to be more realistic in their dark green color. For this reason, it was found that VRML participants reported more pavement textures than PE participants did. However, it was not difficult for real-environment participants to perceive the ground cover elements, since they consisted of considerable large areas of the two spaces. Spatial vegetation elements were abstracted in the VRML model in order to reduce the final file size. However, it seems that this abstraction was a reason for enhancing their perception according to the “goodness of shape” theory, hence it was found that VRML participants perceived more spatial vegetation elements than PE participants did.

**Conclusions**

To conclude, this study intended to empirically investigate the similarities and differences between visual perception obtained from direct experience of a physical environment on an urban landscape and the experience of its representation in desktop VEs. This study revealed important observations concerning visual perception in VRML, which provided participants with sufficient information to maintain a space-based visual perception of smaller and well-defined spaces rather than larger less-defined spaces. VRML was found more efficient on representing information and perceptual cues that enabled the participants to develop a better understanding of space-based visual perception. Another outcome of this study is that abstracting spatial elements in VRML might enhance their perception by participants’’. The latter outcome might point at the potential of VRML simulation in enhancing object-based visual perception of landscape settings.

This study suggests that perception of the desktop VEs used to represent this specific environmental context was replicating the perception of the real environment. This research was, however, limited to the typology of a specific example of urban landscape (a university campus). It has also been limited to the hardware and software available for this investigation. Further empirical investigations are needed to apply using desktop VEs, as representation media, to measure the visual perception of various types of environmental settings. The development of hardware technology might provide environmental researchers with more enhanced and affordable desktop VEs tools.
References


Ayman Hassaan A. Mahmoud
Ayman Mahmoud is currently an associate professor in the department of Architecture Engineering, Cairo University, Egypt. He received his BSc. in Architecture
with highest honours followed by MSc. in Urban Design from Cairo University and Ph.D. in landscape architecture from the University of Sheffield, UK. His research interests include design visualisation in environmental design, thermal comfort in outdoor spaces, and aesthetic resources in landscape. He can be contacted at AMahmoud@bue.edu.eg.
AN ALTERNATIVE APPROACH IN SUSTAINABLE PLANNING: SLOW URBANISM.

Ilknur Turkseven Dogrusoy and Ahu Dalgakiran

Abstract
The “speed” concept, as being one of the significant phenomena that shaped industrial cities, creates a significant obstacle for sustainability. The speed that was gained with mechanization and industrialization resulted in disintegration in urban environment, disrupted the relation between place and the individual, and caused the rapid transformation of cultural and environmental values that once belonged to the place. At this point, “slowing down” emerges as a significant concept in the quest for sustainability and for regaining the relationship between the urban environment and the individual. This study puts forward Slow Urbanism as an alternative approach in sustainable planning as it forms the antithesis of “speed” and confronts the deformations of global culture shaped by fast consumption. Following a brief discussion of the transformations caused by “speed” in built environments; this study aims to draw attention to new challenges of “Slow Urbanization” model by highlighting its adaptability and flexibility through focusing on three different slow city experiences: Midden-Delfland (The Netherlands), Hersbruck (Germany) and Seferihisar (Turkey). The evaluation of these cases displayed that the adaptability and flexibility of the model makes it unique as it can be implemented in settlements that have different characteristics. The findings also revealed that the model focuses on originality, diversity, heterogeneity, a sense of belonging and appropriation instead of homogeneity, monotony, and uniformity. It replaces the “destroy and construct” philosophy of consumption culture with “re-explore and reconstruct” approach and in this way encourages cities to use and develop their distinctive social, economic and cultural potentials.

Keywords
Sustainable development; slowness; Slow Urbanism; slow city movement.

Introduction
With industrialization and mechanization in the twentieth century, our cities had to face a great number of problems such as noise, pollution, unplanned construction, poverty, crime and many others, and the livability parameters started to be questioned in many cities which have difficulty in developing proper solution proposals. Using the cities’ own potentials for development forms the most basic precondition for the sake of transferring the economic, social and environmental values to future generations, and thus creating sustainable and livable cities. By entering into our life as a result of mechanization and industrial capitalism, and
carrying its effects into city planning as much as it did into our communal life, the “speed” concept stands ahead as one of the most basic problems that creates an obstacle towards sustainability.

While modern cities of post-industrial revolution era formed the spatial counterpart of fast production, today’s cities undertake a new function as being the place of “fast consumption” in the information age. However, the reality that did not change historically is that the social, cultural and environmental dynamics that shape the cities are determined by the “speed” concept. Increasingly car-dependent urban development, environmental and noise pollution, homogeneity, and the lack of the sense of belonging are closely related to the fact that the “speed” has been shifted to a dominant and a top priority situation in urban planning. Recently, awareness has developed regarding the negative vital and urban effects that point to the instantaneous consumption and rapid transformation arising from speed. First, a “slow” movement regarding to food culture started in socio-cultural sphere, and the developments in question maintained their effects in urban dimension as well. The mentioned effects are the reflections of “Slow Urbanization” that approaches to sustainable planning not only from environmental, but also from economic and social aspects, and attaches importance to preserving the local differences and developing a sense of belonging.

The aim of this study is to put forward Slow Urbanism as an alternative approach in sustainable planning as it forms the antithesis of “speed” and confronts the deformations of global culture shaped by fast consumption. The focus of the study will be initially on the “speed” concept which survived both in industrialization and information ages and the resulting deformations and transformations in socio-cultural and physical spheres such as uniformity, homogenization and loss of sense of belonging, fast consumption of natural sources and global warming. Secondly, the slow concept as the antithesis of speed and slow urbanization will be introduced within the context of the paper as an alternative approach in sustainable planning through examining three cases from different countries. One of the selection criteria of the cases is that they interpret the “Slow” philosophy and “Slow Urbanization” through different practices and the other criterion is that these cases are the very first Slow City of their countries. The motives of the settlements in adopting slow urbanism philosophy differ as:

- Midden-Delfland (The Netherlands), which is located between densely populated cities, adopts the model to conserve its unique values and existing green pattern in coordination with the central government as a response to growth pressures of nearby metropolitan cities.

- Hersbruck (Germany), which is surrounded by traditional pastures that served as green buffers, abandoned by the early 1970s and turned into waste lands, uses the model to protect and rehabilitate these pastures and

- Seferihisar (Turkey), which has a low level of tourism popularity though is a coastal settlement, utilizes the model as a branding strategy in marketing the settlement as a tourist destination as well as a tool for developing local economy.

As a part of the methodology, on-site and
literature surveys were realized in the evaluation of Midden-Delfland and Seferihisar cases while only literature survey was utilized in Hersbruck case.

**Why and How Did We Speed Up?**

**Speed and Speed-Based Transformations**

The speed concept is defined as “swiftness, velocity; the power arising from a movement, force, exertion, power; measuring of distance taken by effort, power, exertion by the time spent” in the Turkish dictionary (Türk Dil Kurumu [TDK], 2010). Within this definition, the fact that speed implies positive as well as negative meanings within itself and also its relationship with time draws the attention. Today, speed and acceleration started to take a more significant place in our lives after the Industrial Revolution and modernization, and despite its affirmative impacts on technological developments it inevitably caused negative transformations on socio-cultural and physical spheres. It is striking that “speed” and socio-cultural, economic and technological fields reciprocally affect each other. Therefore, in order to comprehend the speed and its effects on urban environment better, this relationship will be examined initially, and then the negative outcomes of speeding up which affect the formation of urban environment and life will be sought to be put forward.

One of the most important factors that foster the development of speed within the socio-cultural and psychological contexts is the organic relationship between the “speed” and “pleasure”. Kundera (2008) and Honore (2008) emphasized that speed is pleasure-based, and is so easily accepted by the society, because it provided pleasure and it gradually turned into a habit. We cannot ignore the effect of the relationship between speed and pleasure on the adoption and placement of the culture of hastiness, which entered into our society along with industrialization and modernization. On the other hand, speed adopted a very shaping and homogenizing role in cultural sphere as cultures are being easily transferred through the possibilities of information age and the emerging economic patterns between world cities. In this way, cultures have the chance to interact with each other and transform cities into new physical spaces where world cultures meet (Aslanoğlu, 2000).

**Industrialization, Industrial Capitalism, Technology and Speed**

The Industrial Revolution that took place in the 19th century became a significant breaking point that caused speed-based transformations in economic, technological, cultural and urban contexts. Since industrialization and industrial capitalism are based on additional product and profitability, the traditional production types radically changed and were replaced by Fordist production. On the other hand, technological developments accelerated the production-consumption cycle in order to increase the rates of capital return and profitability (Aslanoğlu, 2000). The invention of the modern clock was one of the most fundamental tools in the organization of fast production by increasing the work discipline through an hourly rate policy within Taylorist working practice. Slowness in such a work order was declared as one of the greatest deficiencies while speed and functionality were blessed to a great extent (Honore, 2008).
Technological developments, mechanization, profitability/productivity principles and class divisions of industrial capitalism affected and transformed the design of industrial cities. The emergence of fast transportation modes required for rapid distribution of the manufactured products facilitated spatial zoning. In such an order, commercial areas were located in downtowns and regional segregation between the high- and the upper-middle class and the workers’ housing areas were created. Additionally, the increase in private automobile ownership resulted in the emergence of suburbs (Thorns, 2004). Transformation from a compact structure to a more extended city form led to the disintegration of urban areas and living spaces transformed into dead areas especially during working hours. Thus, small-scale settlements characterized by diversity and liveliness disappeared, and the pleasure brought by speed ironically gave rise to monotony, boringness and lack of communication in urban life. As a result, connection between the environment and place was detached; nature of the relationship between the individual and the place was damaged; and the individual’s sense of belonging was harmed on the most fundamental basis.

**Speed in the Information Age**

Industrial Capitalism and technology have been maintaining to hold the speed in a very significant place in communal life since the Industrial Revolution. The industrial production-based economy in modern age has transformed into an information-based economy in the post-modern era (Thorns, 2004). While the economy mainly based on production and aimed at increasing the production speed in the Industrial era, increasing the consumption speed along with the production speed became important as well in the post-modern era. As a result, despite the fact that the nature of production types and production-consumption cycle is different, speed maintained its importance both in modern and post-modern periods.

The most significant period in terms of the improvement of consumption in modern capitalism was the decade of 1950 during when mass consumption gradually spread from the United States to European countries. Education level, occupation groups, and social stratification in accordance with income level began to determine consumption patterns. With transition from Fordist to flexible production, the product range expanded and brands started to be perceived as an indicator of the individual taste and lifestyles. The expansion of consumption in a way that it encompasses the lifestyles caused every value and commodity to gain a feature of being quickly consumed. In this sense, fast consumption commenced to determine the lifestyles in global scale by turning them into to fast but uniform and monotonous ones (Bocock, 1997; Harvey, 2006).

In parallel to the transformation process emerged in lifestyles, cities lost their identities as a result of consumption, temporality and hastiness culture and began to seek for brand and image for the sake of prestige and competition through a “destroy and construct” approach. As a result, besides problems in cities such as uniformity, homogenization and loss of sense of belonging, fast consumption of natural sources and global warming indicate that slowing down is inevitable for a sustainable world. In this sense, “Slow Urbanization” as an extension of the philosophy of slowness provides us a challenge in the
improvement of sustainable values in cities.

Why and How Should We Slow Down?

**Slow Concept as the Antithesis of Speed**

The slow concept is defined as “not fast, sluggish, opposite of quick”, and the slowness as “the state of being slow” in Turkish dictionary (Türk Dil Kurumu [TDK], 2010), while in Western dictionaries, the concept is covered as “not prompt to understand, think and learn; hesitant in doing something, lazy” (http://oxforddictionaries.com, http://www.ldoceonline.com, http://www.oxfordadvancedlearnersdictionary.com). It is clear that a defective and negative meaning is attributed to slowness in Western societies which have been the centre of industrialization. Slowness is also perceived as “a state of idleness to be avoided” in daily life in view of speed and punctuality as the two glorified concepts of the modern era. It is initially necessary to remove the prejudices on the existing perspective towards the slow concept, which has been stated as the antithesis of speed and the solution for speed-originated deformations and to clarify what is really meant by slowness.

Rather than perceiving the slowness as simply the opposite of being fast, it will be useful to define it as a relative concept that represents the reaction to speed and stress phenomena that characterize the modern existence (Parkins & Craig, 2006). Rather than a life model that denies any type of convenience that the technology and modern life bring with, slow movement is in a quest for a balance regarding the maintenance of sustainability in an increasingly accelerating world (Honore, 2008). Slow City Movement replaces the “destroy and construct” philosophy of consumption culture with “explore and reconstruct” approach that mainly focuses on originality, diversity, heterogeneity, sense of belonging and appropriation.

The philosophy of slowness has also inspired some social movements in time that include the slow concept in life practices such as voluntary simplicity, downshifting, slow food, slow city, slow home, slow travel and slow design. Among those trends, “Slow Food” movement has a special place in terms of “Slow City” movement as it aims to protect the local taste from the fast food culture that surrounds the world and from the uniformizing effect of life, and promotes gastronomy, taste education and ecological farming (Pink, 2008).

**Slow Urbanization - Slow City Movement**

Consumption culture and urbanization policies created homogeneous communities with low attachment to local values, landscape, history and culture, and caused the over-consumption of natural ecosystems and local communities (Wheeler, 2004). On the other side, these changes in the social structure led to a reaction in the form of reverting to core values and to the rediscovery of the culture of “place” (Knox, 2005). At this point, as the preliminary stage of Slow Urbanism, a brief focus on New Urbanism will be useful as a movement that emphasizes the distinctive local characteristics of “place”.

New Urbanism movement that aims to deal with problems such as traffic congestion, air pollution, and social segregation in cities is inspired by many various design approaches such as City Beautiful and Garden City (Bressi, 1994). “New Urbanism”, also known as “neo-traditional development”, aims at restoring the social connections that are believed to have disappeared (Parker, 2004) and seeks to create
a city order that might be an alternative for cities where automobiles have the priority (Landry, 2006). Moreover, while opposing to suburban sprawl that characterizes the American residential areas since 1950s, New Urbanism promotes mixed use and aims at improving the suburbs by creating settlements with pedestrian priority (Parker, 2004). However, much criticism occurred given the fact that New Urbanism specifies little about the relationship between the individual and the place, revitalizes neo-traditional styles within the urban patterns (Knox, 2005) and disregards low-income groups by designing living spaces mainly for the high-income groups (Parker, 2004).

The most basic difference of Slow City movement from New Urbanism approach is that it replaces the seeing, smelling, tasting, hearing and touching experiences brought by global capitalism with the authentic ones. The Slow City is not a purely conservation movement, but rather asks the question of how cities can make progress without losing their spirit in their journey towards modernization and globalization (Miele, 2008). The Italy-based movement attracted great attention on international scale and gained recognition in many European countries such as Germany, United Kingdom, Belgium and Poland as well as overseas countries such as New Zealand, Australia, South Korea, and the United States and turned into a network of 135 members by November 2010 (Cittaslow International, 2010a).

**How to Become a Slow City?**

Slow City membership is an international accreditation given to settlements with less than 50,000 inhabitants, which provide top quality in protecting the environment, infrastructure, culture and identity in living environments, landscape and local products. For membership; at least half of near 60 criteria that are categorized under environmental policies, infrastructure policies, technologies and facilities for urban quality, safeguarding autochthonous production, hospitality and awareness are required to be fulfilled (Cittaslow International, 2010b).

Environmental policies include issues such as verification of the quality of air, water and soil, development of systems for the dissemination of refuse collection and composting, use of alternative sources of energy, and programs for reducing light, noise and electromagnetic pollution. Infrastructure policies mainly include criteria regarding conservation and improvement of cultural and historical values, support of sustainable transportation forms, development of programs that facilitate family and social life, and improvement of green areas. Technologies and facilities for urban quality include topics such as encouraging bio-architecture, reorganizing infrastructural systems that create visual pollution, taking measures for controlling noise, and using plants that are peculiar to region in landscape architecture in public and private areas. Policies regarding the criterion of safeguarding autochthonous production include the improvement of local and organic farming, organizing educational programs in taste and nutrition in collaboration with Slow Food and cooperation with educational institutions, creation of market places where local products are sold, preserving and improving the cultural activities and festivals. Under hospitality heading, the criteria include the organization of training courses regarding hospitality, development of reception methods to facilitate the arrival of guests and their access.
to information, service and other activities. The awareness heading includes informing the public about the aims and procedures of being a Slow City, encouraging the adoption of “slow” philosophy (Cittaslow International, 2010b).

The general framework outlined by “Slow City” movement offers a general theme for settlements which adopt “Slow Urbanization”, but how and based on which weight the criteria would be interpreted depend on the potentials of the settlements. The adaptability and flexibility of “Slow City” movement enable the settlements to draw a road map that is peculiar to them.

**Slow City Experiences**

In this part of the study, “Slow Urbanization” policies are evaluated through different urban experiences, which emphasize distinctive local features by basing on the aforementioned qualities of Slow City movement. The common characteristics of the cases are that they were the first Slow Cities of their countries, which were accepted to the CittaSlow network. In this context, Midden-Delfland from the Netherlands, Hersbruck from Germany, and Seferihisar from Turkey are the selected cases (Figure 1).

Midden-Delfland: Located in the most densely populated Randstad area with 1.3 million inhabitants, the city has a population of 18,000, and was accepted to Slow City network in June 2008 (Cittaslow The Netherlands, 2010). The city located between Delft and Rotterdam, has been under intense urbanization pressure and hence has been losing its green areas in the last 20 years. Therefore, it was given the task of preserving and improving the current green areas by the central government. The basic principles of “Slow City” Movement overlapped with the planning vision of Midden-Delfland and
naturally, the “slowness” policy was based on the mission of preserving and improving the existing green areas. This mission has meant preserving the agricultural character of the settlement and improving its tourism potential by allowing for more recreational activities such as canal tours (Figure 2 and Figure 3). Including Midden-Delfland in “Slow City” membership network was not limited to the preservation of the green patterns; it also provided a significant motivation for making the hallmark architectural pattern and local values sustainable (Municipality of Midden-Delfland, 2009).

Within the scope of “Slow Urbanization”, local youth were provided with educational and recreational resources, authentic city centers were created, and various regulations were made regarding the use, preservation and improvement of the characteristics of local products such as grapes, cheese and honey that are already present in the culture and tradition of the settlement. Accessibility has been increased with the help of international sign systems, and the tourism potential has been improved through the organization of canal tours in the region. Furthermore, new routes have been created for bicycle access and walking activities that are widely used in the transportation practice of the Netherlands. Moreover, environmental sustainability potential of the area has been improved via the suggestion of various systems.
for the recycle of environmental waste and use of renewable energy sources in lighting. Contribution margin provided to building owners facilitated the maintenance and improvement of historical and cultural environment and in this sense paved the way for cultural sustainability (Municipality of Midden-Delfland, 2009).

As a result, it is obvious that Midden-Delfland, as the very first Slow City of the Netherlands, has adopted the “Slow Urbanization” approach in order to preserve its green pattern and unique values as a response to the growth pressures of nearby metropolitan cities. The settlement has been focusing on the criteria particularly regarding the improvement of tourism and environmental quality in accordance with its planning policies. In this sense, it is striking that the city has been following a route that conserves and improves the existing cultural, historical, social and landscape values which also may be defined as “protecting by improving”.

Hersbruck: The very first Slow City outside of Italy is historical Hersbruck which was accepted as a member in May 2001. Located in the south of Germany, the city holds a population of 12,500 and has the characteristics of a medieval city with squares and narrow tree-lined roads. Traditional pastures have been serving as green buffers between the city borders and agricultural areas and therefore hold a special

Figure 3: The environmental quality in Midden-Delfland is enhanced by improving landscape in residential areas (Source: Doğrusoy Archive, 2009).
importance since they provide an open area for nearby locations (Figure 4). However, those pastures had been abandoned by the early 1970s and had been either used for construction facilities or transformed into waste lands in time. Consequently, not only environmental quality, but also the information regarding the traditional use of the land disappeared on a large scale. In the beginning of 1980s, a local environmental group aroused awareness in society in regards to the importance of pastures and collaborated with farmers, local governments, and small businesses to protect these areas and orchards. In this context, “Slow Urbanization” practices

Figure 4: Hersbruck developed its Slow City concept through protecting its traditional pastures along the city borders (Source: http://www.frankentourismus.de/orte/hersbruck).
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intertwined with the aim of improving and strengthening the local economy in the region.

As for encouraging the region-specific food, local products, farmers and producers have become the suppliers of restaurants as the first step and a collaboration network of farmers and restaurants was created. Education of nutrition and raising awareness for the improvement of local food were initiated and prohibiting the cultivation of genetically modified organisms and products within city limits were aimed at. In addition to improving local products and food, alternative energy systems have been utilized in the region and studies in order to protect the historical environment still continue (Mayer & Knox, 2006; Mayer & Knox, 2009).

The town of Hersbruck has adopted the “Slow Urbanization” through social awareness and sensitivity regarding to environmental protection that was formed by non-governmental organizations in the region. Improving the environmental quality and protecting the pastures were placed special importance due to both ecological reasons and the significance of these areas in urban memory as well as their positive contributions to the sense of belonging and local identity. Moreover, efforts to improve the local economy for the sake of economic sustainability form the “Slow” policies peculiar to the town of Hersbruck. The approach of the settlement, which considers the environmental quality as a whole with the development of the local economy, has encouraged many

Figure 5: A view from Seferihisar-Sigacik settlement (Source: Doğrusoy Archive, 2009).
other cities in the country in the direction of developing similar models.

Seferihisar: The settlement of Seferihisar is located in the southwest axis of Izmir which is the third largest city located in the west part of Turkey. Seferihisar was accepted to the Slow City network in December 2009 and became the first slow city of Turkey. The city is a coastal settlement with approximately 27,000 inhabitants and has geothermal water resources as well as rich cultural and historical values. Agriculture, animal husbandry and tourism are among the main economic activities in the settlement.

Seferihisar’s city centre has lost its original architectural characteristics on a large scale due to global architectural trends and unplanned developments that constitute a major problem in many other cities in Turkey as well. However, Sigacik district, located 5 km. away from the city on the settlement’s coastal fringe, stands out as a place which maintains its strong historical and architectural identity on the contrary to the city centre (Figures 5 and 6).

“Slow Urbanization” practices implemented in Seferihisar were initiated by the local government and took its motivation from its will to vitalize the local economy and increase its tourism potential. In this sense, the international recognition of “Slow City” logo corresponds with the tourism goals and branding strategies of the city. During the course of “Slow City” candidacy,
the local government organized communal meetings and raised the awareness of inhabitants about the philosophy of “slowness”. Furthermore, making the citizens a part of the “Slow Urbanization” process and eliminating the negative meaning attached to “slow” concept were the major goals of the movement.

The most important local project realized was the transformation of the open area facing the old municipal building into a village market where local producers and craftsmen can sell their products (Figure 7). Organizing local festivals about local products such as tangerine and grape, and documenting the local cuisine through oral history are among the attempts

Figure 7: The old municipal building allocated to village market (Source: Doğrusoy Archive, 2009).
in protecting and maintaining the settlement-peculiar cultural and economic heritage. The rehabilitation of Sigacik Castle in a way that it enables the hosting of cultural activities, organization of an another village market within the castle where handcrafts, organic and home-made food are sold, and the enactment of conservation plan for Sigacik are crucial steps taken towards the protection and improvement of the historical heritage. Providing gastronomy and organic farming in educational institutions, opening of two Slow Food restaurants in Sigacik, establishing “Women Centers” and “Youth Centers” for social solidarity, economic contribution and individual development are the recent implementations of the local government (Dalgakiran & Doğrusoy, 2009). Moreover, increasing the number of avenues closed to traffic within certain hours, and promoting the use of phaetons and solar energy-powered bicycles in transportation are among the short term plans for enhancing sustainable transportation as part of Slow Urbanization policies (http://www.seferihisar.bel.tr).

It should be emphasized that all slow urbanization practices must be developed in accordance with upper scale planning decisions. It is clear that interventions that function independently from planning decisions and concentrate only on “Slow City” principles are inadequate for sustainable urbanization. Plan revisions and legal regulations in order to prevent unplanned construction developments in the city are necessary promptly. Additionally, rehabilitation of Sigacik Castle and the inner bailey traditional residential pattern is very important. Improving public places and environmental quality through introducing urban equipments, appropriate street furniture, signs and direction systems are also recommended in the settlement.

Additionally, thermal reserves located in the coastal line of Seferihisar hold a significant potential in the integration of health tourism into the prevailing tourism activities. Using the thermal reserve as an alternative energy source in heating systems will be vital in achieving environmental sustainability as well. Planning small-scaled tourist facilities along the coastline in the form of boutique hotels would be consistent with the settlement’s natural and architectural characteristics. Increasing the incentives for offering region-specific food prepared by organic products in those facilities and restaurants may contribute to sustainability of cultural values.

**Concluding Remarks**

This study was put together with the assumption that modern urban development models characterized by fast consumption culture create a significant obstacle in achieving sustainability. In this sense, slowing down seems inevitable for the sake of regaining the relationship between the urban environment and the individual, protecting the local values, improving the environmental, cultural and social potentials, and transferring them to future generations. The Slow Movement that emphasizes the use of alternative and renewable energy sources and improvement of the local producers, local products and their production techniques, adopts the social, economic and environmental sustainability principles. In this context, Slow Urbanization brought about by Slow City Movement emerges as an alternative model in sustainable planning as it replaces the “destroy and construct” philosophy of
consumption culture with “re-explore and reconstruct” approach.

Slow Urbanization mainly focuses on originality, diversity, heterogeneity, sense of belonging and appropriation instead of homogeneity, monotony, and uniformity. In this way, it serves for the re-exploration of local values, which have been forgotten or disregarded for a long time, and uses these values as a tool in economic development. With the new lifestyle it envisages, it also resists the global culture expansionism that assimilates and homogenizes the “places” and cultures (Dalgakıran & Doğrusoy, 2009). Additionally, “Slow City” movement does not exclude the current technological developments; in fact, it uses technology as a tool in protecting and improving the existing values. The three different slow city practices mentioned within the study have revealed that slow urbanization is a unique model by being flexible and hence can be easily adaptable to settlements that have different characteristics.

Globalization trends and consumption culture that affect the entire world inevitably bring the risk of using the “Slow City” membership as a branding strategy in order to increase the tourism potential and competitiveness of cities. However, the different and distinctive quality of the movement is that it focuses on sustainability, local experience and also on production rather than consumption. The most basic point that creates hesitation though is that, in a situation where tourism potential grows uncontrolled, “Slow Cities” specifically in developing countries may have the risk of transforming into “Fast Cities” that lose their characteristic qualities and quiet lives, and struggle to cope with problems such as noise, pollution and crowdedness.

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References


Ilknur Turkseven Dogrusoy
Ilknur Turkseven Dogrusoy graduated from Dokuz Eylul University, Department of Architecture, Faculty of Architecture in 1994, completed her Master’s Thesis in 1996 and Ph.D. thesis in 2002 in the Graduate School of Natural and Applied Sciences of Dokuz Eylül University. Her major research areas focus on the relationship between architecture and city, transparency in architecture, daylighting in architecture and environmental psychology. She has many national and international publications, proceedings, authorship of book chapters, and has an award taken in “National Ideas Competition for the Shelter and Street Furniture for Kemeraltı Bazaar” in 2008. Since 2002, she has been working as Assistant Professor in the Department of Architecture and giving lectures on both theoretical courses and design studios. She can be contacted by e-mail at ilknur.turkseven@deu.edu.tr.

Ahu Dalgakiran
Ahu Dalgakiran graduated from Department of City and Regional Planning, Faculty of Architecture, Dokuz Eylül University in 1996, completed her Master’s Thesis in 1999 in Izmir Institute of Technology and Ph.D. thesis in 2005 in the Graduate School of Natural and Applied Sciences of Dokuz Eylül University. Her major interest areas focus on urban design, tourism developments in historical environments, urban retail structure, revitalization of industrial heritage, and public use in coastal areas. She has many national and international publications, papers presented and published in congresses and symposiums and authorship of book chapter. Since 2006, she has been working as Assistant Professor in the Department of City and Regional Planning and giving lectures on both theoretical courses and design studios. She can be contacted by e-mail at ahu.dalgakiran@deu.edu.tr
Sustainable Squatter Housing in the Developing World: Changing Conceptualization.

Mahbubur Rahman

Abstract
Squatter settlements providing housing to a large part of the urban population in many developing countries have grown due to lack of affordability created by widespread poverty and inadequate housing finance and land development systems. Governments mostly assisted by the international aid agencies have improved income, resources, environment and tenure security in many settlements, but could not eradicate the problems as benefits did not multiply due to lack in institutional development, policy implementation, governance, participation etc. Moreover, the squatters’ capability to bring affordable and sustainable solutions through their own ‘process’ was ignored. Accordingly, they were not enabled to make best utilization of their capability and available resources towards sustainable housing. This paper discusses the changing approaches to the issues of low-income groups housing in the developing countries in the above context, and discusses ways to bring about a more sustainable solution. It emphasizes on spontaneous building, and sees how as a process it could be exploited to bring a viable solution to the unabated housing crisis. In doing the above it includes discussion on specific issues like affordability and enablement.

Keywords
Affordability; enablement; in situ upgrading; self-help; squatter settlements; sustainability; urban development; World Bank.

Introduction
The rapid urbanization taking place in the cities of the developing world will double their size by 2030; since 2007, there are more people living in the urban areas than in rural. The world-transforming phenomenon has been accompanied by dramatic growth in the number of slums; nearly a billion people today live there—a number to double in the next three decades (UN-Habitat, 2003). The Millennium Development Goals targeted significant reductions in slum dwellers' number; yet an additional 50 million people have been added to the slums of the world during 2005-07 (UN-Habitat, 2007). Over the last few decades, there has been greater appreciation of the growing importance of the cities in the national economies as development became dependent on their ability to meet the essentials like housing where the government should
play a major role— a view endorsed by the UN. Moreover, a rising standard of living and political ideologies have increased the awareness of human needs and social values, putting the onus of addressing housing problems on the government.

Many developing countries' governments have attempted to solve the above problem by clearing old decrepit housing and replacing it with modern buildings. The settlers were not involved in such renewal projects; and the property rights of many of those displaced were not recognized (Rahman, 1994). Relocation to new projects on the fringe areas far from opportunities for generating livelihoods as well as schools, clinics etc., was often opposed by slum dwellers. They also rejected support for traditional sustainable agriculture to reverse the in-migration (Pugh, 1997). Despite many projects, more often with assistance and guidance from international agencies, problems of a large number of urban low-income families in the developing countries were not addressed as either affordability was wrongly perceived (Lee, 1985), or their capabilities were overlooked. Moreover, the projects did not link with other development sectors, and could not multiply into wider reforms.

This paper attempts to establish the changing approaches to the low-income groups housing worldwide starting from the 1950s. It examines the role of the international bodies led by the World Bank in setting the core themes of housing policies and projects. This paper highlights the advantages of self-built incremental in situ upgrading, and argues that it is a form of affordable and hence sustainable housing for the low-income groups in the developing countries.

In this context, the issues of housing process, affordability and enablement, which are often overlooked in finding a sustainable solution to housing problems, are also discussed.

**Housing Policy and Practice**

Of many international agencies involved in shaping housing policies and projects in the developing countries, the World Bank with substantial grants was the most influential. Pugh (2000) identified 1972–82, 1983–93, and post-1993 as the phases when the Bank modified related strategies. Abrams and Turner, advocates of self help housing, have influenced the theories and policies of low-income housing for decades. Abrams brought the gross housing shortages and huge squatter settlements lacking in basic utilities in the cities of these countries into the world’s notice in the 1950s, and suggested incremental building to upgrade slums in situ. Identifying the aspects of self-fulfillment of the slum-dwellers and their commitment to housing expressed in things that they value, Turner advocated sites and services and slum improvement schemes (Pugh, 2000).

He phrased ‘freedom to build’ or ‘housing is a verb’ to define a process, and supported people’s capability to participate and control environment (Harris, 2003). Turner argued that households could gradually improve their housing with available resources, in a way more affordable to both them and the government. Therefore, compared to typical public housing schemes that were mostly unaffordable, and did not reach the target groups, incremental building would be more sustainable (Rahman, 1999, 2004). The World Bank leading project assistance in the developing countries adopted
Turner’s ideas in the 1970s, but drifted from a focus on self help to a holistic development, relating housing to other urban sectors (World Bank, 1993; Kessides, 1997), in partnership with the private sector. The 1992 ‘brown agenda’ laid down guidelines for sustainable urban development, followed by the UN calling the local governments to mobilize broad-based, participatory, and sustainable environmental improvement, and thus Turner’s ideas remained broadly valid.

The 1976 Habitat Conference recommended that the governments intervene to supply housing resources that involve large infrastructure and investment beyond low-income group’s reach. A new approach to environmental planning and management through public-private partnership in 1996 Conference meant involving the government agencies, business, professionals, and representatives of communities to identify and transform priorities into action plans, like creating institutions for urban environmental improvement, and building capacities to participate and cooperate, adopting Agenda 21.

In the 1970s, international agencies based support for sites and services and in situ slum upgrading projects on the principles of affordability, cost recovery, and replicability (Choguill, 1987). Accordingly, capital costs were not to be set by planning ideals and design standards, but by the target group’s ability and willingness to pay. But cost recovery formula followed old convention where all had to be paid for, matching the Bank’s priority for repaying the international credit and making socio-economically responsible use of grants (Rahman, 2004; Pugh, 2000). At the end, the successful projects could be replicated in similar situations elsewhere (Choguill, 1987; Pugh, 2000). By then, it appeared that sustainability could be brought by making the economy, environment and society parts of an overall development (Barbier, 1988).

Yet project-oriented theory, practice and policy of self help schemes not translated into overall changes remained strong due to available funding, and instant benefits satisfying all (Rahman, 1999). Such conventional low-income group’s housing was largely impotent as costs could be seldom recovered, self-help building or relocation sites in reality were sometimes remote from employment opportunities and unaffordable, compounded by gentrification and weak institutional capability and expertise to implement and monitor (ADB, 1983), corruption was often rampant, and the projects did not lead to wider socio-economic development (Pugh, 1990; Nientied & van der Linden, 1985; Skinner et al., 1987; Turner, 1980), and the limited outcome failed to make any impact (Rahman, 1999).

By the 1980s, it was evident that self-limiting site-based projects did not multiply benefits, address the issues of subsidy, eradicate poverty, and strengthen the land policy components that could increase the Poor’s access to these essential housing resources, and hence were not replicable (World Bank, 1993). Also planning and building regulations based on western ideals were inhibiting an expansion of affordable mass housing, with scope for extension and remodeling, employment generation, etc. Institutional reform had to be backed by comprehensive urban policies to sustain programs in the long run; yet the Bank
redirected its policies in only the 1990s.

Focusing on policy and reform, the Bank gradually withdrew from direct involvement in sites and services projects, but continued with on-lending funds through specialized institutions, the NGOs and CBOs, or any organized groups, into social housing programs that would have some self-help components. It found alternative means of involvement in housing and urban development, for example by building and channeling funds through purpose-built institutions to disburse fund faster, reach target groups better, and increase recovery by involving small groups, mainly in countries with already developed housing finance system (Rahman, 1999). This was useful in the backdrop of weak financial security markets in many developing countries. Thus the upgrading of squatter settlements continued, not just building houses. Some of them retained a majority of the self-help housing units by reorganizing layouts through participation.

For example, the Bank in 1988 gave the Housing Development Finance Corporation in India US$ 250 million to extend its coverage to the bottom layer, and stimulate housing finance institutions. In another project in 1983–88, a few Brazilian towns created a revolving municipal fund around the World Bank’s seed fund. The local governments and households could have their own sub-projects, select the price according to their need, priority and affordability, through participation (World Bank, 1994). Cross-subsidization in land pricing and allocation enabled sites and services and squatter improvement programs to reach the poor in the 1970s and 1980s in Chennai. Housing investment and wealth of all income groups increased; the contracting between the World Bank, state government, and the project authorities blended state, market, and household self-help roles (Pugh, 1990, 1997). In the Kampung Improvement Program, US$ 439 million was lent to improve living conditions, housing investment, incomes, and health that led to wider participation and deeper reforms (World Bank, 1995).

Such a more holistic approach set to develop finance more, reduce the backlogs, increase inadequate infrastructure, reform negative land management and land policy, introduce financial transparency to accelerate supplies in low-income housing, increase competitiveness of the construction industry, provide targeted subsidies only to the poor, and establish or reform institutions (Pugh, 2000). The projects recovered the cost by setting target by affordability, thus remained financially sustainable, and met the Bank’s priorities. Social effectiveness in the local government-owned programs was brought by decentralizing responsibility of maintenance and cost recovery through the beneficiaries’ groups, CBOs, etc. Thus compared with the earlier shelter-oriented approach, that in the late 1980s was inclined to broader and deeper institutional reforms and development, reaching and sustaining, and thus creating a strong base for future reorientation.

Broader urban issues were emphasized in the late 1990s to enhance and sustain economic growth and modernization. Thus improvement of living qualities, poverty reduction, job creation and production, environmental sustainability, and enhancement of agglomeration economies were included as strategies to strengthen a balanced urban development (World Bank,
1999). This gave priority in program finance and management to improve squatter settlements. Despite identifying the relation between poverty alleviation and environmental issues, development agenda revolved around macro-economic stabilization and market-led growth of the early-1980s. However, countries succumbing to international speculation and bad market governance in the 1997-98 financial crises exposed the limitations of the absence of a broad basis in the politics of socio-economic development (Pugh, 2000).

The World Bank-instigated development policies that favored economic stabilization through relentless export-led growth and market liberalization were followed by many developing countries. Stiglitz (1998) favored medium-term strategic development policies to alleviate poverty and make socio-economic transformation. Rather than development of individual sectors in isolation, he advocated holistic societal changes that can be understood specifically as development transitions, for example, improving the environmental, the health dimension, the changing volumes and characteristics of poverty, etc. In an overall context, such development policies could use transitions in a combination of varying emphasis on different sectors, based on the pragmatic context-based realities of socio-economic opportunities.

**Economics of Self-Help Settlements**

The dynamics of self-help housing economics that produces large individual and social assets in the housing stock cannot be ignored. Change in unpaid self-help labor is affected by the changes in formal sector wage rates, controlled by competing forces and better use of time. Jimenez (1982a, 1982b) argued that self-help can be regarded as implicit saving and investment which creates an asset of economic value for social functioning. The value of a house accumulates through use, rent, and being production locale. Rooms subdivided or added to a house can be a source of income—the low-income groups rent out or use these as a workshop for productive activities (Rahman, 2004; Setshedi, 2006; Mai, 2008).

Housing was also treated as productive item that multiplies employment and generates income instead of as consumptive item. Accordingly, growth in the sector can increase employment (Klaassen et al., 1987), especially among the low-income people, and with lower marginal import, tax or saving propensity than the higher-income groups, greater multipliers of low-income housing would play a more important developmental role during economic stagnation. Low-income settlements provide a pool of unskilled and semiskilled labor for urban economic development, to keep alive the informal sector activities, and make under-utilized labor productive at low cost (Rahman, 1990; Raj & Mitra, 1990).

As housing investment did not contribute directly to the growth of output or foreign exchange earning (Jorgensen, 1977), priorities were placed on sectors like agriculture or industry. But apart from the social benefits, housing multiplies production, income, employment, savings and consumption (Burns & Grebler, 1977). Its real importance is greater as self-help construction and contractors’ activities are usually under-reported, enhanced by subsidized housing and hidden rents of the owner-occupiers. While
housing investment leads to increased output of labor and added investments in non-housing, the opposite in low-cost housing is not significant though it required a low import; yet incremental investments generate a higher domestic multiplier than import-sensitive investments (UNCHS, 1995). The price elasticity is thus higher for housing services than for the dwelling as a capital good alone.

Upgraded squatter settlements with improved environment instigate many benefits. Grimes (1976) estimated that the economic multiplier for the low-cost housing construction is about 2. Improved housing lowers work absenteeism and incidence of social deviation, raises level of health, increases labor and educational productivity, absorbs surplus labor, and reduces traffic congestion and commuting expenses (Grimes, 1976; Burns & Grebler, 1977). Increased land values, raised incomes, better health, and skill upgrading through training and gender programs in an Indian upgrading scheme demonstrated the individual and collective returns as benefits of the increased land values were distributed to regularize households by giving tenure (Abelson, 1996). While average incomes in the settlements rose 50% in 3 years, the value of housing and land rose 82%, reflecting increased economic efficiency and social effectiveness of upgrading informal settlements. In Mexico, the escalated value of a developed settlement was recouped to pay off the capital cost (Ward, 1980a).

The value of a demolished property was included in renewal project costs, investment appraisal and costs-benefit analysis (Mao, 1966). However, these had to consider redevelopment and rehabilitation options on the particular settlement’s context. Needleman (1965) adapted the appraisal formula to take account of the variable needs of public policy, including area rather than single property analysis, variable densities, and different forms of redevelopment. Economics of housing improvement and redevelopment favors rehabilitation extending life where the existing structure has a real value, the rental differences between old and new buildings are narrow, the rate of interest is relatively high, and other options are costly. Therefore, Pugh (2000) supported renewal as a better alternative that offers a substantial improvement. Its occurrence incrementally in the developing countries over a long period increases its affordability and sustainability.

The private sector financiers often make rigid and infeasible demands for collateral, and their costs and profit structures favor economies of large scale and low credit risks that the poor cannot meet. Regressively spread repayment and no grace period make cost recovery in low-income housing often difficult (Pugh, 1990; Smets, 1999; Ward, 1984a). Meanwhile, the informal moneylenders are more flexible with small loans, but tough repayment control and high interest rate. Yet, these fit the immediate needs of the poor for flexibility and economizing shaped by small budgets and survival strategies (Pugh, 2000). Organized community self help has often been successful in stimulating savings and investment, with social co-operation and peer control securing financial sustainability.

**Housing Process**

A majority of low-income houses is built gradually over time as needs are felt, resources are
available, and communities take shape (Angel & Benjamin, 1976); until then, these people can live in incomplete shelters. Compared to formal sector that ignores the needs of survival and flexibility of the low and intermittent income patterns of the poor (Smets, 1999), incremental building and improvement distributes the affordable consumption and saving over time to make that sustainable. Thus the low-income group can house itself at much less than the formal sector cost, often at down to 25% (Benjamin & McCallum, 1985). The housing ‘process’ allows a reduction in initial cash requirements for building, often half of usual construction costs, in exchange for social obligations. The sweat equity of the self-managing ‘process’ replaces up to a third of the labor cost (Payne, 1983); the participatory environmental improvement is also a saving (Pugh, 1994). Materials cost is reduced by buying recycled and used items in informal sector. Family labor is usually free; skilled labor can be bartered for. Gerrul (1979) calculated that in lower-income housing, 35% labor is self-help; another 60% is semi-skilled.

House building is normally an apocalyptic event for a low-income family, even though the result is humble. It is an occasion of co-opting as many family members as could be for marshalling all the physical and monetary resources, collecting all debts, and calling upon the community and the family for assuming new debt and obligations to be met over a long time. Extended over many months, this is the beginning of a longer commitment to constantly make improvements and additions. Though the self-help and self-built units provide below-standard housing, these turn out to be more acceptable and suitable to the socio-economic needs of lower-income people (Turner, 1976), and so more affordable and sustainable. Self-management with skilled crew and hired laborers, a popular system among the middle and upper-income groups, works well with incremental building process too. The least common way is by the small informal contractor, and seldom by large builders/developers used by the wealthier people or organizations; better-off a society is more of such houses emerge (Peattie, 1992).

Residents' motivations regarding tenure change the expression of built form in squatter settlements. While extending shelter according to their need and affordability, they mark own identity and aesthetic on it, brought by a feeling for the home and neighborhood, perceiving the improvements as a part of wider resident activities in localized sustainability. Although the resourcing and organization of improving infrastructure and making personal investments to squatter houses has been discussed, little literature is found on enhancement of aesthetics and cultural amenities. Marcus (1995) focused on the personal meaning low-income residents attach to their home that leads them to improve design and mark the meanings against such functional dominance of housing studies. These improvements represent a commitment to place and home (Turner, 1976). The deeply human expression is instigated by secured occupancy rights or expected tenure regularization (Rahman, 1999), which is found more over a longer period (Pugh, 2000).

These expressions of environmental change, local culture, and design and construction knowledge shows color, adaptability, and space for rituals and festivals; and create specific and varied living environments (Rapoport, 1988). A makeshift shack using available resources
is a product of rational thinking. It also reveals beliefs, aspirations, and the world-view, simultaneously impacting the political, the visual, and the cultural. Thus intricacy, variety, accomplishment, and resource efficiency in squatter settlements and built forms have simultaneous social, cultural, economic, political, and architectural implications (Pugh, 2000). Hence it is ‘architectural’ same way as a ‘designed’ building that is about human drive, vision, interest and the identification of place. Designers and planners could learn from these spontaneous open-ended, multi-sensory, semi-fixed settlements adding on elements.

**Housing Affordability**

Many housing projects failed as the authorities decided affordability, though evidences show they are not able to determine housing costs, resources available to project household, or amount households will be spending (ADB, 1983). They based financial calculations on recorded income rather than proven expenditure. Many households often have more than one earner. Yet only formal income of the head used to be considered instead of earnings of all members that may increase with time. Such narrow and rigid criteria unjustifiably excluded some of the households from the projects, those with access to additional finance were inhibited from paying more for housing if they were willing, or required others to commit to unaffordable housing. Wrongly judged affordability excluded those who prioritize housing and so would spend beyond what seemed affordable, and thus could afford better housing (Bourassa, 1996).

This channeled scarce public fund into areas where other sources were available, and reduced the effectiveness of the programs. This tantamount to subsidies, inviting gentrification, benefiting the well-off, and suppressing the people’s ingenious and cost-effective solutions (CIVIS, 2003). What depends on external assistance, and increases the government burden, cannot be sustainable. Affordability could be extended with the help of finance based on domestic savings; but institutional finance was mostly availed by the better-off (Moss, 2003) as the others had no collateral.

Financial contribution to housing tied to ownership would be at the cost of other needs, which reflects the willingness, priority and high esteem to owning home (Peattie, 1987; Rahman, 1999, 2004). Though low-income families have little cash savings, some of them could amass wealth in kinds for housing (Keare & Jimenez, 1983), often by selling essential items (Rahman, 1999). With ownership in sight, household would be ready to devote more of their meager resources, both monetary and commitment of non-monetary like spare time (Ward, 1984b). Thus many families appear to be living in housing well above their apparent means, build to a level above what was possible within the assumed affordability as they saved to extend homes beyond the project limits; others could borrow informally from unconventional sources.

Most housing solutions focused on reducing the capital costs of housing and infrastructure to bring them close to the households’ ability to pay. But this ignored their willingness to make extra effort to match payment needs; simple averages conceal extent of affordability, enhanced by homeownership prospect (Rahman, 1999). It also ignores each household’s preference and desire, as affordability would vary within
apparently uniform groups (Lee, 1985). Even in a narrow range, amounts available for housing vary according to demographic and economic characteristics (Hulchanski, 1995) as household propensity to pay and access to resources vary, and high cost limits options.

The low-income group improves affordability by using allocated space (CIVIS, 2003), for example as workshops, often involving more family members. Therefore, some projects were designed to integrate productive use enhanced by incentives like space and credit in Cairo, Mexico, Nairobi and Senegal (Ward, 1984a), or use future income sources to assess affordability (Lee, 1985). As construction sector absorbs many of the squatters, they could be engaged in the projects to reduce the cost and enhance affordability. Occasional remittance also affects housing affordability; irregular cash flow from either rural areas or overseas, much of which is invested in housing (Awaal, 1982), is an important supplementary source (Keare & Jimenez, 1983).

**Enablement**

Against the government being the 'provider', the idea of 'enablement' since the late-1980s involved creation of a congenial legal, institutional, economic, financial, and social frameworks to enhance economic efficiency and social effectiveness so that capability to solve own problems could grow. This came on the heel of changing attitude towards development, and an urge to make it more broad-based. Therefore, 'enablement' in next decade encompassed not only institutional-led reforms, but also put governance into central positions in virtually all development agendas in economic, education, health, environment, housing, urban and other sectors with a focus upon state–market–society relations, as it was evident that benefits were not sustainable without good governance (Rahman, 1999). This encouraged community-based elements in upgrading the squatter settlements and owning community assets so that processes are more transparent and accountable and people are enticing to improve themselves instead of waiting for the government (Rahman, 1999).

Such enablement can bring together technical know-how, a broad inclusive participatory approach among residents from all strata, capacity of development agencies, use available resources, and recognize and define responsibilities of all stakeholders. The roles of each such partner in the multi-institutional and multi-organizational environment could be guided by the underlying socio-economic rationale. For example, private enterprises contribute efficiency and entrepreneurship, CBOs mediate between households and government agencies that provide urban management expertise, and participants provide various finance, self-help resources, and localized relevance in the upgrading efforts. These represented a complex process with risks of failure out of weak institutions, narrow coterie interests, corruption and market manipulation.

Such enablement framework was also relevant to new housing for others where such structure could supply housing as builders access development finance in a competitive market. Implementation of proper land policies by coordinating with the infrastructure and utility agencies could ensure adequate supplies of well-placed ready land at affordable price. The
legal system could protect property rights of all, developed finance institutions could manage flows of funds and various risks, including liquidity, credit, interest rate and recovery. The overall policy and enablement framework could have pro-poor and egalitarian elements for social-relevance and sustainability.

There are examples where sustainability was achieved through enablement, for example, in sites and services schemes in India, and in the small loans program in Singapore and Chile (Pugh, 1997), which alleviated their housing crises. However, most developing countries could not achieve same effectiveness or comprehensiveness or meet the targets due to poor finance sector and institutions, and institutional incapacities. Hence, squatter settlements and slums kept growing, occupying a good part in many cities.

**Discussions**

The spontaneous and informal self-help housing has remained in focus in last half century, though their implications varying in theoretical, economic and technical characteristics, and role in overall housing and urban development in the developing countries, were recognized very late (Lawrence, 1997; Ling, 1997; Dyer, 1994). Though the funding agencies have been assisting self-help [re]housing programs from early-1950s, advocacies by Turner and Abrams were decisive. Through practical experience, the Bank changed its methods from site-specific projects to programmatic approach mediated through formal institutions, and subsequently to new directions in developing policies, cooperation and participation. Some of the projects provided ‘good practice’ examples. They have also added economic and often aesthetic value to urban assets.

While some see squatter settlements as aesthetic output, the authorities see them as eyesores and loath such view (Peattie, 1987) — such attitude has led to demolition of shelters and destruction of communities. However, since international policies now favor in situ improvement and regeneration of older settlements (Rahman & Mai, 2010), the self help and the modern technology can co-exist and accept the cultural-aesthetic form. Such houses are necessary and important in terms of both product and process, and use in built form and socio-economic evaluation (Kellett & Napier, 1995). The people living in these settlements are set in specific institutional conditions and processes that influence their housing and social status. For example, the Santa Marta settlement in Colombia was gradually transformed, consolidated, recognized and accepted into the formal sector. In Durban, spontaneous settlements are juxtaposed near formal settlements, being impermanent and temporarily linking kith and kin.

Though self help, household economics, affordability, and home sense could define the roles of individuals and households, only market exchange value, the design and impact of subsidies, or social questions of poverty and inequality interest the economists (Pugh, 1990, 1997; Stretton, 1976). They ignored non-economic resources, time and energy used for home building, domestic chores, income generation, housing and environmental improvement, human capital formation, and use of time in personal and community activities. Most of these, e.g. the value of the product and human capital formation, including that of time
and equivalent market products, and attribution of childrearing in human capital formation, can be quantified.

Self help, central in socio-economic, political, environmental and developmental sustainability, goes beyond the construction and management of housing and the surrounding. This is generally more sustainable as it uses own resources to produce home-based goods and services, and depends less on imported materials and technology. The domestic, commercial, and the public sectors are interdependent in bringing overall socio-economic development of the low-income groups. Access to housing is like an ‘entry fee’ (Peattie, 1987), providing a foothold to the poor that facilitate human development through access to services and the security of a safe and healthy environment.

Economics of affordable housing and environmental improvement supplements other areas by contributing to the human and labor development, and contributes to sustainable development. Squatter settlements too cannot be retained and regenerated in isolation of other urban development sectors. Though all communities have rights to improve their settlement, squatter upgrading is not readily accepted, and the legal system, and professionals and participatory processes may not concur in its modality. However, social homogeneity, good community leadership, prior social co-operation experience, visible outcome, prospective ownership, and the affordability can help to achieve consensus regarding development objectives and means (Rahman, 1999).

Stable growth of income, recognition of squatters housing rights, affordable in situ improvement, and the development of social capital and empowerment bring housing and environmental improvements for low-income groups. Thereon, social, ethical, and aesthetic expressions cover the full range of living, and encompass environmental, social, economic and political facets, and those that encourage people to value lives. Given a chance for one to participate and express attachment results in more commitments to bring affordable and sustainable improvements in a varied socio-political context.

Proper land policy and housing finance systems based on innovative schemes can facilitate the target groups’ access to the two most essential housing resources (land and finance) (Rahman, 1999). The Grameen Bank has developed credit and technical advice for women’s enterprise, housing, and transforming social development among the poor; international agencies are supporting such initiatives (Rahman, 1999). Despite differences, all settlements require development of socio-economic, leadership and institutional capabilities (Rahman, 1999). The problem of converting environmental improvements into action plans and partnership can be removed by distributing responsibilities, attribution of costs and self help, and participatory and transparent management. In essence, both the process and the project need good governance, organization, management, and policy (Pugh, 2000).

The large informal sector providing for the low-income groups in most developing countries, legitimized and assisted, can contribute in socio-economic developments (de Soto, 1989; Fernandez & Varley, 1998), in conserving
economy, construction, environment, and health, and hence beckon for sustainable improvement. Regeneration schemes improving living conditions and providing social opportunities for millions add more socio-economic and environmental values than high-profiled projects, and hence is the more sustainable. As income increases and needs arise, households upgrade houses in terms of materials, space and utilities, often personalizing them; low quality makeshift shacks are transformed gradually into more substantial and homely structures, encouraged by improved tenure and amenities.

Potentials for conservation and regeneration of squattersettlements vary with their characteristics. Some expect imminent redevelopment, in others de facto occupancy rights seem secure. Sometimes a settlement generates its own leadership and organizational structures to negotiate with politicians and bureaucracies for installing infrastructure; others have either apathy or powerlessness. Improvement can take place either spontaneously in well-established settlements with future tenure security, or in formal planned settlements. Political skills and pressures often influence the selection of improvements and the distribution of costs and benefits among households. State-assisted regenerations often involve redesigning and re-aligning layouts (Potter & Lloyd-Evans, 1998), which disrupt socio-economic network and identity. It can be avoided by making it part of overall housing development and urban macro-spatial planning.

The layout may contain a variety of housing options (size, orientation, payment methods, level and standard of services) to suit all. Commercial uses could cross-subsidize housing. While the repayment for infrastructure could be set at an affordable level, residual cost could be recovered by subsidizing optional elements. The lack of financial sophistication of the participants and the concern of the soundness of the projects could be augmented by monetary guarantee and readiness to intervene by the authority in case of default (ADB, 1983). Instead of binding public housing programs tightly, the rules can be redefined so that more of those households previously excluded as being too poor can participate and benefit from the program. Higher income limits increase scope for cross-subsidizing and reduce the political resistance to projects.

**Conclusion**

Unprecedented urban growth in the face of increasing poverty and social inequality means that the number of people living in the slums...
will be about 2 billion by 2030; the international community should aim improving the lives of at least half of them by 2020 (UN-Habitat, 2007). The absolute number of poor and undernourished in urban areas is increasing through ‘urbanization of poverty’ (Whelan, 2004). Slum clearance actually ignores the social causes behind it, and redistributes poverty to less valuable land. However, cultural heritages and sustainability have been expressed in the living conditions of the world’s poor amidst squalor. Their housing, the locales for the life’s drama and human contributions of millions in enormous urban and socio-economic transformations, will remain a dominant form of dwelling on a world scale for many decades.

Value of housing depends on many limited and indispensable resources like the quality of design, density, size, materials, neighborhood amenities, access to education and health facilities, human development, security, etc. This composite social good cannot be produced or consumed piecemeal; one must share the land, which defines the community, and the capital jointly created by it. Substantial improvement in the standard requires extensive restructuring of the economy, as the structure of the community’s social, moral, legal and business systems refers to that. Long life and high cost of housing combine with its visibility and diversity to make it a unique way to become important in the socio-economic development of which it is a pre-requisite as well as an objective (Klaassen, et al., 1987). Hence sustainability in housing approaches cannot be brought without considering it holistically in the background of other interrelated urban development sectors.

Poverty is about the deprivation of capability to expand social opportunity in markets, in state policy, and in households, and that all of these development requisites focus on the freedom of individuals to choose values and lives of worth to them (Sen, 1999; Sen & Wolfensohn, 1999). Poverty reduction can follow from personal commitments and appropriate human bondage generated in low-income housing. Fogel (1994) argued that improved nutrition, the advancement of medical knowledge, and the qualities of housing increase health and economic productivity over long-term development transitions. The principles are evident in low-income housing requiring social co-operation to improve environmental conditions in a sustainable way, to start with poverty eradication.

Notes

Slum population in India has more than doubled in the past two decades. In 2001, 54.1% of Mumbaian
lived in slums (NIHFW, 2006): Dharavi, Asia’s second largest slum in Mumbai, houses 800,000 people (Davis, 2006). A quarter of Sao Paolo population lives in poor conditions. Kolkata has more slum dwellers living in higher density. Based on water and sanitation access, 99% of Afghan and 94% in Central African Republic live in slum condition; even a third of the Argentines experience the same. 175 mil China, 158 mil in India, 42 mil in Nigeria and 36 mil in Pakistan live in slum conditions (UNFPA, 2007). 327 million people live in slums in Commonwealth countries – 15% of its citizens (Comhabitat, 2006). In 11 African, 2 Asian and 1 Pacific countries urbanizing rapidly, over two third urbanites live in slums.

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**Mahbubur Rahman**

Mahbubur Rahman is an architect, currently teaching architectural design and housing at the North South University in Dhaka. He has also taught at several other universities in Oman, Saudi Arabia, Malaysia and Bangladesh since 1985. Trained in the UK and Bangladesh, Prof. Rahman specializes in urban design and housing, and has researched, published and provided advisory services on areas such as Housing Policy, Building Code, Master Plan, Heritage Conservation, etc. His current interest is on affordable and sustainable housing, preservation and heritage tourism, iconic architecture and competitive city, and waterfront and inner city revitalization. Prof. Rahman has also been involved with accreditation process, curricula preparation, and professional societies. His third book ‘Old but New :: New but Old’ was published by the UNESCO last year. Prof. Rahman is currently working on two other books – ‘City of an Architect’ and ‘Dhaka 2011: an urban reader.’ He can be contacted at mmrahman@northsouth.edu.
THE STORY OF “ONE-STORY-NESS.”

Mohammad Reza Shirazi

Abstract
This article focuses on the old houses of Tabriz, northwest of Iran, and studies their structural transformation during the Qajar and early Pahlavi period (18th and early 20th centuries). Here, these dwellings are studied as some already written texts with hidden narratives concealed in the lines of the buildings in order to reveal their syntactic as well as semantic implications. In this regard, ideas of some leading thinkers—such as Heidegger, Bachelard, Bollnow, Norberg-Schulz and Pallasmaa—about home and non-physical, spiritual, and existential aspects of dwelling will be reviewed to show how a house narrates us about its multidimensionality. Then, considering the traditional houses of Tabriz it will be shown that how the structure of the houses and consequently their existential and ontological implications have been transformed into a kind of “typelessness” and thus narrate the story of contemporary “one-storey-ness.”

Keywords
Dwelling; house; home; narrative; Tabriz.

Architecture as a Narrative
Architecture is full of sayings. Every window, every stone, every wall and all the elements of a building tell us a story. As Baillie-Scott puts it “few things are indeed so strange as this thaumaturgic art of the builder, he places stones in certain positions – cuts them in certain ways, and behold, they begin to speak with tongues – a language of their own, with meanings too deep for words” (cited in: Norberg-Schulz, 1985, p. 111). The buildings speak, but to hear them it is necessary to be open to them and listen carefully. “Over and over again those who have been open to listen, have beheld the ‘saying’ of works of architecture” (Ibid.). A building is an honest narration. If we are open to it, it will communicate with us. As Mark Rakatansky says, “There is no mute architecture. All architects, all buildings ‘tell stories’ with varying degrees of consciousness. Architecture is permeated with narratives because it is constituted within a field of discourses and economics (formal, psychological, and ideological), to any one aspect of which it cannot be reduced, from any one of which it cannot be removed” (Rakatansky, 1992, p. 199).
A work of architecture, thus, tells us both structural and spiritual stories. For example, a traditional building not only tells us how it has been built (tectonics, structure, methods of construction, etc.), but also it narrates about the world inside (the relationship between the occupants, their mentality, etc.) and also the world outside (which means the social, economical, and cultural characteristics of the society). In sum, architecture is always rhetorical and story telling.

In this context, a house is a multidimensional narrative. It is not simply a shelter for preserving the inhabitants, but also an ontological being full of existential connotations. From the phenomenological point of view, the house has been investigated and considered by different scholars.

**House and the Question of Dwelling**

In his seminal work “Building Dwelling Thinking” Martin Heidegger points to the ontological aspects of building and explains the essence of dwelling. He states that although every building provides a shelter for us, it does not necessarily allow for dwelling. Bridges and stadiums are buildings, but not dwellings; “These buildings house man. He inhabits them and yet does not dwell in them” (Heidegger, 1993, p. 4). In order to find the essence of building and dwelling, Heidegger listens to the language.

According to him, the world “bauen” (building) means to cherish and protect, to preserve and care for, in the sense of preserving and nurturing, or cultivating. On the other hand, the word “wohnen” (dwelling) means to be at peace and remain in peace, and the word for peace, “Friede,” designates preserving from harm, to spare. Thus, “To dwell, to be set at peace, means to remain at peace within free, the preserve, the free sphere that safeguards each thing in its nature. The fundamental character of dwelling is this sparing and preserving” (Ibid., p. 5). Thus, building and dwelling have similar implications and connotations; they refer to the existential aspects of human life manifested in the house as the first and intimate dwelling-place of human beings. We build and dwell in the house, and thus preserve, cultivate, and remain in peace.

As an example, Heidegger refers to a farmhouse in the Black Forest, built some two hundred years ago, and explains how the peasants used to dwell in that house in an authentic way. His explanation reveals that, to dwell in a authentic way is not only rooted in building according to the material implications of the place, such as topography and climate, but is also based on the spiritual needs and existential feelings of the inhabitants, such as birth and death.

**Oneiric House, House as the Center**

Gaston Bachelard believes that the house is our corner of the world, our first universe. According to him, the chief benefit of the house is sheltering the daydreams. He writes that “the house shelters daydreams, the house protects the dreamer, the house allows one to dream in peace” (Bachelard, 1969, p. 6). Moreover, the house is related to the existential behaviors and actions of the human beings. The house shelters all the physical and spiritual aspects of the life and makes the universe understandable: “Without it, man would be a dispersed being. It maintains him through the storms of the heavens
and through those of life. It is body and soul. It is the human being’s first world” (Ibid.).

In a similar way, Bollnow understands the house as the center of the world. He talks about the necessity of a “reference point,” a center of lived space, without which man is not able to live. This “foothold” is the place to which we human beings return and from which we departure. “Man needs such a center, in which he rooted in the space and all his relationships are related to it” (Bollnow, 1963, p. 8). A house provides us such a center.

Bollnow gives a deep explanation about the ontological and anthropological implications of the house, and describes how a house grants us security by means of separating interior and exterior: “[The space of the house] is the realm of peace and calmness in which man is able to give up his continuous attention to the possible threats. It is a space to which man returns and can relax in it” (Ibid., p. 9).

Four Modes of Dwelling

Norberg-Schulz distinguishes between four modes of dwelling: settlement as the “natural dwelling,” urban space as the “collective dwelling,” institution as the “public dwelling,” and house as the “private dwelling.” Norberg-Schulz remarks that a house is the place of everyday activities: “In the house we find the things we already know and which are particularly meaningful to us” (Norberg-Schulz, 1988, p. 10). According to him, the task of the house is “to reveal the world, not as essence but as presence, that is, as material and color, topography and vegetation, seasons, weather and light” (Ibid.). In this way, we become friends with the world through the house, and it gives us security and a foothold to act. “When we enter inside, we are finally ‘at home’. In the house we find the things we know and cherish. We have brought them with us from the outside, and live with them because they represent ‘our world’. We use them in our daily life, take them in our hands and enjoy their meaning as representations of ‘Erinnerungen’. The interior therefore possesses the quality of interiority, and acts as a complement to our inner self. When we thus realize private dwelling, we experience what is known as ‘domestic peace’” (Ibid., p. 12).

Phenomenology of Home

Juhani Pallasmaa argues that a home is not merely a manifestation of an architectural work or an aesthetic object, but a psychological, psychoanalytical, and social phenomenon. Differentiating between home and house he writes that “Home is an individualized dwelling, and the means of this subtle personalization seem to be outside our notion of architecture. Dwelling, a house, is the container, the shell for home. The substance of home is secreted, as it were, upon the framework of the dwelling by the dweller. Home is an expression of personality and family and their very unique patterns of life. Consequently, the essence of home is closer to life itself than to artifact” (Pallasmaa, 2007).

Thus, house is a frame, shell, and protector for the home, which is the multi-dimensional atmosphere and realm of the existential lived space of the dwellers within the house. Home is not an object and a simple building, but a complex multi-layered condition that integrates memories and images, desires and fears, the past and the present. Home makes us to remember all the warmth, protection and love of our childhood as well as the distress and fear
that we may have experienced. “Home is a staging of personal memory. It functions as a two-way mediator - personal space expresses the personality to the outside world, but, equally important, it strengthens the dweller’s self-image and concretizes his world order. Home is also a mediator between intimacy and public life” (Ibid.). Home is the realm of our private personality, the treasury of secrets and private self. The nooks and corners of the home are the comfortable places for us. Everyone has his own intimate corner at home.

Four Narratives of Tabriz Old Houses

This study intends to read the already written text of the Tabriz old houses and reveal the hidden narratives concealed in the lines of the texts by means of listening to its words. Unfortunately, Tabriz old houses have never been investigated exactly and deeply. Despite this inattention and neglect, they have survived during the time and still live within the old texture of the city. This study concentrates on more than 20 old houses built at Qajar and first Pahlavi dynasties, from mid 19th century till early 20th century. Here, I would like to be a good listener and report their narratives carefully.

First Narrative: Transparency

Transparency is a significant concept in Iranian architecture. Spatial transparency means extending depth of the space and broadening its dimensions. To achieve a more transparent space necessitates dematerialization; reducing materiality and enhancing spatiality. As a prominent example, we can refer to the Shazdeh Garden in Mahan and Aga Khan Mosque in Kashan. In the latter, the harmony of light, water, underground garden (Godal-Bagche), verandas, etc. intensifies the transparency of the building and creates a complex full of dignity and lightness.

Early Qajar houses, following the rules and principles of traditional Iranian houses were organized according to the interior/exterior axiom. Thus, they possessed a high degree of transparency following the special arrangement of the traditional architecture.

In fact, the narrative of transparency is narrated through following sub-narratives:

Courtyard. Courtyard is an emptiness within the house which calls, invites and admits. As a subtle microcosm, it gathers all the surrounding elements—natural as well as architectural—in its emptiness; water, wind, earth, greenery, sky, rain, sound, and reflections. So, a courtyard may appear empty, but is full of presence (Figure 1).

As a “full empty” at the heart of the building, a courtyard lightens the materiality of the house and makes it transparent; all the rooms look at the natural vista of the interior. On the other hand, the courtyard is the realm of the family activities and collective memories: childhood plays, stories of grandmother under the shade of a tree in summer evenings, the access to the mysterious cellar, etc.

In Mojtahedi house, there is a terrace (Mahtabi) at the center of the house, in north of the main hall (Tanabi) flanked by two siding rooms, which makes it more transparent, a true microcosm within the microcosm of the house.

Water. Water is the principle factor of the gathering character of the courtyard. It reflects all the natural and architectural elements and thus enlarges the dimensions of the courtyard;
columns of the Ivan, colors of the Orosi, trunk of the tree, and the tired face of the father.

Water grants happiness and pleasure to the underground spaces of the house through the pool-house. Different in the shape and the size—cruciform, quadrangular, etc.—it is located at the basement (Salmasi, Haj Sheikh, Mojtahedi, Gadaki, Heidarzadeh) or even at the ground floor (Mashrootiat).

Orosi. Orosi, the huge window with stained glasses, is mostly used in the main hall of the houses. It is a colorful designed window at the southern side of the rooms which grants variety to the interior. The atmosphere of the interior is changed due to the various reflections of the sunshine. It disputes radiations of the sun into the space and awakens us to the happenings of the exterior. Sliding its tiles up in summer times, nature comes into the room and the separation
of the interior and exterior fades. (Figure 2).

Ivan (Veranda). Ivans intensify vertical and horizontal transparency of the houses. In early Qajar houses, overall Ivans play a vital role in configuration of the buildings. They appear in the main façade of the house, embrace interior rooms including Tanabi (mail hall) and siding rooms (Kalleii), and preserve them from the rain, snow, and intensive sunshine. Thus, direct contact of the built and natural environment is mediated by the semi-close, semi-open space of the veranda.

All the above-mentioned factors lose their dignity during the time and consequently the houses become more and more opaque and heavy. Introverted structure of the houses changes to extroverted one, and the interior courtyard as the focal microcosm of the house is transformed to a surrounding yard around the massive volume of the building. Consequently, water of the courtyard loses its gathering character and is reduced to a superficial surface of the

Figure 2: Interior Space of Behnam House (Source: Author).
water. Pool-house is no longer at the center of the house: it is either omitted or put out of the range of the main axis. Orosis are converted to multiple simple windows devoid of letting the outside to come into the inside. They are mostly for separating than inviting and uniting. Overall ivans are divided to single, projected ivans. Thus, all the necessary factors for transparency are weakened and thus the houses become more and more massive.

Second Narrative: Hierarchy

In Iranian architecture, the goal is always suspended and postponed; there are a number of mediatory spaces between the beginning and the goal. To catch the interior, to understand the within, and to feel the inside, one should pass through mediatory rooms and spaces. This hierarchy highlights the separation between interior and exterior, guaranties the privacy of the house, makes it more protected and secure, increases the mystery of the interior, and intensifies the cosmic character of the house.

In the Qajari Tabriz houses, like other typical traditional edifices, the approach to the main space (main hall, Tanabi) is through a hierarchy of spaces: threshold, door, Hashti, exterior courtyard, corridor, and finally Tanabi. In Salmasi house, one should pass through the entrance gate, then an octagonal Hashti, and then via a corridor to the courtyard. Access to the main hall is through another corridor and room. (Figure 3: Salmasi House, approach to the main hall) In Behnam and Gadaki houses the hierarchy of approach is more complicated. There is a joint entrance gate and Hashti for both of them. From the Hashti, there is a direct access to the exterior courtyard of the Gadaki house, but the access to the Behnam is through a long open passage which leads to another entrance gate, and then via a Hashti to the exterior courtyard. To reach the main hall one should walk along the courtyard and enter into the Tanabi through a corridor.

In the late Qajar and Pahlavi era, together with the transformation of the typology of the houses from introverted to extroverted, the hierarchy of approach is neglected and the distinction between within and without fades. In Segat-ol-Islam and Ordoobadi houses there is no entrance gate and Hashti, but a direct visual and physical access to the building. This fact weakens privacy of the interior and opens it to the exterior.

Figure 3: Salmasi House, approach to the main hall (Source: Author).
Third Narrative: Privacy

Privacy is based on the differentiation between inside and outside; it delineates two distinct realms of interior and exterior, within and without. What is running outside remains out of the door, and what is happening inside is kept within the house. The story of privacy, which points to the existential behavior of Iranian society, has affected the spatial structure and configuration of the Iranian houses. In other words, Iranian houses allow privacy and preserve it. Within the Iranian house there is a clear hierarchy of privacy formed by a sequence of architectural spaces.

The narrative of privacy is rooted in the arrangement of the neighborhoods. In Qajar era, most of the houses are enclosed by three sides except the side of entrance. (Salmasi, Ganjiej Zade, Haj Sheikh, Qadaki, Sharbat Ogloo). This fact strengthens the interiority of the houses and makes them completely protected. Moreover, the entrance space is located out of the range of the main and secondary axes of the house and this blocks the straight access and view to the interior.

The first manifestation of privacy is the threshold, the entrance space. Insider and outsider, male and female are distinguished at the gate; they should announce themselves differently by knocking ‘koobe’ or ‘halge’ of the door . The excess to the house is not immediate; there is a hierarchy of approach. Hashtti plays a significant role in this procedure as the mediatory room between exterior and interior. In Qajar houses the existence of Hashtti is prominent. Different in size and shape – octagonal, semi-octagonal or quadrangular – they provide access to the outer courtyard or other nearby rooms.

In late Qajar and Pahlavi eras, entrances are located in the range of the main and secondary axes, and thus the introverted character of the house is reduced. Pahlavi houses are more extroverted and the façades are highly important. For example, in the Ordoobadi house, which is completely extroverted, main and secondary gates are highlighted by the stairway and veranda. A similar character is visible in Rastegar house. Moreover, the importance of the Hashtti is reduced, so that in the extroverted houses there is an immediate access to the courtyard. (Segat-ol-Islam, Ordoobadi).

As the result of the deformation of hierarchy in the houses, the importance of privacy fades. The lack of doorway and Hashtti opens the house to the exterior, and the transformation of the structure of the building weakens interiority of the house. The story of transformation of the privacy is obviously visible in the case of Amirnezam house, built in the late Qajar era. Unlike other houses, an Orosi located at the middle of the main hall (Tanabi) divides the space into two northern and southern parts so that opening the Orosi changes the Tanabi to an integrated space for collective ceremonies and traditions. It can be said that the siding-rooms (Kalleii), which were normally located on the upper floor of the house dedicated to women, have been transferred to the ground floor, but isolated with a sliding window. Thus, women could participate directly in the happenings of the main hall. This fact was either the result of the social changes in the upper class of the society and cultural revolutions, or because of providing a more flexible space; the southern part is served in the winter and the northern one in the summer.

Fourth Narrative: Axis

Iranian architecture is an axial architecture; axes play a vital role in the composition and configuration of the buildings. In fact, the story
of Iranian architecture is already a story of axes. Iranian houses, like other buildings, have been organized according to main and secondary axes. Qajar houses are not an exception.

In most of the early Qajar houses, the principle spaces are along with the main axis; Tanabi, southern and northern verandas, siding-rooms (Kalleii) and pool-houses are all in the range of the main axis (Salmasi, Behnam, Haj Sheikh, Alavi, Mojtabehdi, Gadaki, Heidarzadeh, Amirnezam).

In late Qajar and Pahlavi the importance of the abovementioned spaces is reduced and consequently, their position is changed. (Ordoobadi, Rastegar, Segat-ol-Islam, Laleii). Moreover, some new elements such as stairways—which did not exist in early Qajar houses—are located as a significant architectural element alongside the main axis. The absence of the stairway in early Qajar houses and its immediate presence in late Qajar and Pahlavi implies that it has been borrowed from European styles. This kind of stairway appears in different characters in Sharbat-Ogloo, Heidarzadeh, Ordoobadi, Segat-ol-Islam and Sehhati houses.

In addition, in late Qajar and Pahlavi eras overall Ivans are substituted by the small, single projected Ivans. These single Ivans concentrate the attention to the exterior façade. (Rastegar, Ordoobadi, Segat-ol-Islam, Laleii) Thus, axial configuration of the houses is transformed; stairways are located in line of the main axis but Tanabi as the center of the house is put away and pool-house is dislocated or even disappeared.

Narrative of Narrative

These four narratives narrate a grand narrative: narrative of deformation. Whatever the reason of this deformation is, its existence is undeniable. To understand this deformation, it is not necessary to make a scientific study; rather, it is perceivable even through walking in the city. There is an obvious “typelessness” in the contemporary architecture of Tabriz, and consequently in the architecture of new houses, which narrate a sense of “disorder” and “hubbub.” The current text of the Tabriz city does not narrate something. It is an amalgamation of different sources, old, new, alien, and foreign, written in different languages and scripts. The more we listen, the more we get blind. Tabriz new houses do not let dwelling. They prepare “one-storey” shelters for “one-storey” persons. They are incapable of building a home; they are some “homeless” covers. Bachelard and Paul Claudel’s explanation of Paris is completely valid in the case of today Tabriz and prescribe this inarticulate situation in a proper way:

“The houses are fastened to the ground with asphalt, in order not to sink into the earth. They have no roots and, what is quite unthinkable for a dreamer of houses, sky-scapers have no cellars. From the street to the roof, the rooms pile up one on top of the other, while the tent of a horizonless sky encloses the entire city... Home has become mere horizontality. The different rooms that compose living quarters jammed into one floor all lack one of the fundamental principles for distinguishing and classifying the values of intimacy” (Bachelard, 1969, p. 15).

References


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Mohammad Reza Shirazi

M. Reza SHIRAZI is an Alexander von Humboldt postdoctoral fellow and works as a guest researcher at Department of Urban and Regional Planning, Technical University of Berlin. He is an Iranian architect who taught and practiced in his home country for five years. From fall 2005 to summer 2009 he did his PhD in BTU Cottbus, Germany. Shirazi’s dissertation is entitled, “Architectural Theory and Practice and the Question of Phenomenology: The Contribution of Tadao Ando to the Phenomenological Discourse.” His postdoctoral research focuses on the idea of ‘Sustainable Critical Regionalism’ to propose a more ‘place-specific’ and ‘situational’ interpretation of Sustainability in the context of Middle Eastern cities. Shirazi is co-editor of Cloud-Cuckoo-Land, an international journal of architectural theory. Currently he works on a ‘Phenomenological Series’ in Farsi. The first book entitled ‘Architecture of the Senses and the Fragile Phenomenology of Juhani Pallasmaa’ is now under publication. He can be contacted at m.shirazi@mail.tu-berlin.de
‘Transformative Pedagogy in Architecture and Urbanism’ authored by Dr. Ashraf M. Salama is published by Umbau-Verlag in 2009. This is a new updated version of ‘New Trends in Architectural Education: Designing the Design Studio’ by the same author and published in 1995 by Tailored Text Publishers and Unlimited Potential Publishing, Raleigh, NC., with the incorporation of concepts, concerns and practices that Dr. Salama has researched, wrote and introduced in the past 15 years.

Dr. Salama’s thoughtful writings and research for the past two decades have argued for more effective means of teaching architectural design. In his words, ‘the design studio is the kiln where the future architects are molded’. Across the world the studio is the backbone of architectural design education. And it is here that transformation needs to set in. The book calls for expansion of knowledge base in architectural design studio.

In the scramble to ‘progress’, societies across the world, especially in the developing worlds, continue to bear the brunt of facelessness and incongruousness of the ‘built’ in their environs.
As fallout of globalization, a shrinking world is yet to come to terms with the rapid transformations that are in its wake threatening to rent apart the delicate weave of the socio-economic fabric and the ethos of the people coupled with a total disregard to local climate, materials and resources.

Build to impress and sell is a contemporary strategy gripping the architectural profession. As a natural response, ‘Architectural education is dominated by subjective, elitist, ideological and master apprentice models that aggrandize invention over innovation and radical individualism over collaborative processes’ states Prof. Nikos Salingaros in the preface to this book. The result is that most of what the architect does is invisible since it occurs in a ‘private sanctuary’ rather than a public domain as Prof. Henry Sanoff pens in the forward to the book. Needless to say, the congruency between education of architects, their role in the society and its justification lies in the commitment and ability to provide better environments for contemporary societies; therein also lies the sustainability of the profession.

It is a dire need of our age to transform the education of architects so that their contributions are responsive, sensitive and humane. This is especially true since contemporary societies are in a continuous process of transformation and their learning system should respond to these changes in order to be proactive and relevant. It is imperative to adopt an inclusive, participatory and democratic approach as a panacea to the present situation. This position draws affirmatively from the community participation methods in design and planning proposed by Prof. Henry Sanoff. This shall reinforce the weak link between the society and its involvement in its own architecture.

In his introduction, Dr. Salama very succinctly portrays this ground situation. Penned with a natural flow, the sequential build up for the necessity of such an intervention helps put the pertinence of this publication into focus. Presented in five chapters, the first three put forth a new theory for transformative pedagogy in architecture and urbanism, contextualizing through a discussion on the multiple roles of an architect in society and analyzing conventional pedagogies inherited from the past. Taking support of worldwide and regional surveys, the consequences of the traditional pedagogies are discussed threadbare.

For the reader thus far, the most natural question is ‘What next?’ The last two chapters address exactly that. They manifest in them the positive signs found in the constructive reactions to the conventional design pedagogy. Herein are demonstrated models, tools and techniques that empower the incorporation of transformative pedagogy along with its integral mechanisms.

The introduction to each chapter bears in it a concise description of the chapter, acquainting the reader in a nut shell to the structure and content of the chapter to follow. I appreciated this thoughtful inclusion, although at points I felt it to be repetitive, for it puts one in a comfortable position with the overall framework of the book and helps build a comfort level with respect to each oncoming chapter.

Chapter 1 titled, ‘A New theory for Transformative pedagogy in Architecture and Urbanism’, is spaced into five sub-divisions. The author mandates a comprehensive understanding of the role of knowledge in creating meaningful environments and goes on to a systematic identification of emerging issues of our
contemporary age. The theory proposed bases itself on the changing contexts and surrounding circumstances to enable architects to create livable environments.

This chapter contains an interesting comparison between virtues of systemic pedagogy over the pitfalls of the present mechanistic pedagogy and enlists knowledge content areas, which have emerged as a reaction to paradigm shifts in investigating, understanding and designing built environments.

Chapter 2 titled, ‘The Architect, The Profession and The Society’, initiates with a recall of the profession in times historical, when architects were patronized only by the top echelons of society and the method of design solution was intuitive and relied heavily on experience, judgment and individual talent of the architect. Great individual works of art were created by this process. But gone are those days when ‘form development’ and ‘art alone is architecture’ was the principal concern of the profession.

Post industrial revolution came the transformation of the social order; and the focus now is on service to a new clientele: the citizens. Emergence of complex activities, technologies and services that were not previously identified, as specific skills of the architect are now an integral part of professional services. Since the scope of services has widened so, there is also rising competition from other arenas such as the engineers, interior designers, landscape architects and non-design professionals with competency in building process. The spate of specializations that the 20th century brought about is responsible for the creation of specialty firms for designing specific typologies and facilities.

The field of architecture has graduated from just being an art to being a science and an industry. The art-based emphasis of traditional pedagogy makes an incomplete architect, unable to render services that are expected of him. I quote Dr. Salama’s very pertinent observation, ‘….this sense of artistic entitlement empowers a few to design a few brilliant individual buildings. Yet, it has produced fragmented and illegible urbanism’.

Chapter 3, ‘The Conventional Approach to Studio Teaching Practice’, is structured in 7 sections. The main concern discussed here is to trace the roots of the traditional or conventional approach to design education. Rightly so, it analyses the various points of view in architectural education: academic, craft, technological and sociological. The evolution of the two major schools of educational systems: the Beaux-arts and the Bauhaus are discussed at length. Although their approaches seem different, their emphasis was on the formal aspects of architecture and fundamentals of form and its dynamics, but both showed little concern for socio-cultural issues! Design teaching in contemporary times is reminiscent of these two traditional approaches.

In a sequential manner the author critically examines the pitfalls of design studio with supporting references from a number of researchers. If you have been involved in the studio as an instructor, the identification with issues in the book is almost total, pointing to the universality of the phenomena. A world wide survey of architectural teaching practices conducted by the author in the past decade makes for this observation, ‘……..there is a need to bridge the gap between what is introduced
in the design studio and what the society needs, expects and deserves’.

This chapter goes to great extent to highlight the missing knowledge components in architectural education and design teaching practices. The critical discussion in this chapter points to the fact that understanding of design has expanded from a view of design as an intuitive experience with an aesthetical end product to a view of design as a process of investigating, reasoning and testing.

Chapter 4, ‘Against the Conventional Studio Pedagogy’, is structured in three sections. The first presents a systematic critical analysis of ten revolutionary models in which the instructors have attempted to expand the role of the architect to be more responsive to environmental needs of contemporary societies. Some methods have been developed as a reaction to the conventional approach and its consequences. But the baseline in each is the incorporation of knowledge with its application in particular design situations. Each model is crisply described with its underlying concept, the design process and the way in which it is taught. A flow chart summarizes the process in a nutshell at the end.

In the second section, building on the acquaintance the reader now has to the models, Dr. Salama, presents a preliminary reflective comparison to clarify the basic characteristics, features and the theories underpinning the models and points pertinently that these have at their base the search for more humane architecture, while bridging the gap between profession and education by introduction of more realistic issues in design. And each model stresses on one or two aspects of architecture such as social, political, formal, functional, economical or ecological as integral parts of design.

In the third section, Dr. Salama proposes his ‘Process Oriented Studio Pedagogy’. He emphasizes the essential aspects of studio teaching as ‘what to design and how to design’. Implemented by him in different settings and levels since 1995, the highlight of this studio process is its effort to fully utilize the student’s capacity by drawing upon both: inferential logic (a function of the left side of the brain) as well as intuition and imagination (a function of its right side). The implementation of this process by Dr. Salama, in his studio is explained through two student projects.

Chapter 5, ‘Empowering Transformative Pedagogy: A Knowledge-Based Architectural and Urban Design Studio’ is a fit finale to this book. I personally appreciated this chapter the most. Naturally so, for after a consistent buildup of concepts, theories, the many supporting arguments, one is ready for ‘leaping to action’. And that is what this concluding chapter does in full measure.

Dr. Salama highlights three concepts that empower transformative pedagogy: architectural and urban programming, post-occupancy evaluation and user participation. Together these encompass a wide spectrum of techniques that are student centered, process oriented and knowledge based. These make the much-needed link between the artistic paradigm and the social paradigm, paving way for a new evidence based culture in design studio teaching practices. These techniques help build a knowledge base which has a capacity to empower students with more control over their design actions and decisions while still learning.

This chapter sectioned into four, starts with a
summary of issues dealt with in past chapters. Constituents for a Transformative Pedagogy are identified and some such as: knowledge, creativity and critical inquiry are dealt upon in detail. To channelize a liberal understanding of these, the chapter is woven through requisite theories and relevant quotes.

Dr. Salama puts forth some generic scenarios and details out the mechanism for achieving them. He strongly emphasizes environmental evaluation as a strategy for acquiring knowledge, programming for nurturing serialist and holistic modes of thinking of a design problem and participatory design to go beyond available literature and foster in the student sensitivity to listen to users and filter relevant information necessary for designing. The incorporation of each of these strategies in the studio is discussed further.

The systematic build up to Transformative Pedagogy most appreciably ends where it rightly should: in the studio. The last sub section is devoted to outlining the different hands on techniques that can help integrate three basic components of design, ‘what, how and why’ and get closer to an evidence based design. These are aimed at expanding the knowledge base in the design studio by various explorations.

I would strongly recommend ‘Transformative Pedagogy in Architecture and Urbanism’ to every individual who is concerned about the pathetic state of our contemporary built environs. In spite of a high level of awareness of the many issues that affect our urban built environs, the fact that a faulty education system is only adding to the mess, as many researches are pointing to, makes one want to make haste and leap to action. So convincing is Dr. Salama’s ‘Transformative Pedagogy’.

I wish to particularly put on record the ability of this book to establish a rapport with the reader especially if he/she is from related fields, and very specially from academics, for it targets issues that are universal, issues that are our primary concern, issues that need urgent attention so that with particular reference to the ‘wonder and wish list’ of the author, we are able to stem the insane uncontrolled spoiling of the built environs even after ‘being educated’, expand our ambit to serving a wider section of the society, nurture in us the ability to protect our heritage, democratize our design practices and at a more humane level, be able to innovate and bring about a positive change even in the lives of the poor and the under privileged.

As in the words of Dr. Salama, ‘……return architecture to its former position of being an expression of society; and arising from within it…..’

Smita Khan
Smita Khan is an Assistant Professor in Architecture. Currently faculty at the Department of Architecture and Planning, Visveswaraya National Institute of Technology at Nagpur, India, she has a Masters degree in Architectural Design from the University of Illinois, Urbana-Champaign. She is presently pursuing doctoral study in the field of post occupancy evaluation and human-environment interaction. She has presented papers on cultural continuity, aesthetics and heritage. She engages the Visual Arts studio and teaches History and Theory of architecture. She is also involved in designing of projects that are contemporarily vernacular: contextual, climate sensitive and conceived of local and recycled materials. She can be contacted at: smitakhan@gmail.com
THREE HOLY MYTHS OF ARCHITECTURAL EDUCATION IN INDIA.

Srinivasan Badrinarayanan

This paper addresses the largely prevalent practice of architectural pedagogy in India. There may be few exceptions to these predominant trends and they stand as important beacons of hope. The predominant pedagogy suffers from many ‘myths’ or fallacies. This paper identifies three of these myths as fundamentally deadly which need to be urgently exploded in order to pave the way to reform the education. The first myth deals with the ‘content’ or ‘what’ is taught. The second has to do with ‘how’; i.e. pedagogic bias. The third has to do with the overall philosophy of knowledge or “epistemology”. The myths are:

Myth 1: Architectural education= Design education= Iconic form making.

Architectural education is ostensibly geared to producing the ‘ideal’ or the ‘model practitioner’. However we need to look at who is this ideal and examine if the lurid calendar image of the model practitioner is indeed realistic, sustainable or appropriate given the ground realities of conditions in India. Internationally, there has been a trend to hold up iconic objects created by “signature architects” such as Frank Gehry or Zaha Hadid as exemplars of “creative” architecture. Hyped by the media, such projects might pander to the novelty seeking nomadic tourists who might animate their plazas but their impact on the daily lives of ordinary people remains minimal. Global corporations have further promoted this facetious, self-indulgent approach to design and have created architectural “Disneylands”; be it in Dubai or Shanghai. These are being aped in India, in Gurgaon or Bangalore, where huge energy guzzling monuments stand proudly in steel and glass surrounded by forgotten, torn fabric of cities, where average people struggle to live with basic human dignity.

Myth 2: One can pull up average competence levels across the class by concentrating on a few geniuses in the studio.

Myth 3: Delivery of knowledge can be fragmented. Integration of knowledge happens ‘automatically’ inside learners.

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John Habraken points out that historically, specifically since the Renaissance, there has been a shift in what is perceived as the architect’s role and his domain of operation. Earlier, architects worked within the seamless fabric of the city and enriched the “everyday environment”. Since Renaissance, there has been a preoccupation with creating “villas” and “iconic monuments” that were isolated from the city, surrounded by open landscape. He argues that this significant break makes us all modern architects “Palladio’s children”, as this legacy of the architect’s self-image as the isolated genius who creates aloof, sculptural monuments has completely taken over and dominated architectural discourse and continues to do so till date. The real loss resulting from this unfortunate shift of focus has been the quality of the public, civic domain of our habitat.

Traditional cities had a vibrant, friendly public realm that nurtured communities as well as individuals. Compact, self sufficient neighborhoods had a sense of ‘place’ and catered to every human need and activity, be they for living, work, trade or recreation. Each new additional built intervention respected an unwritten civic code of gracious generosity for its immediate neighbors and for the public space around it. Over the years this natural code of human civilities seems to have broken down and replaced by greed, indifference and mindless “planning codes” that have lost sight of the whole picture. Now every “plot”, large or small, is treated as an isolated parcel of land plugged parasite-like to the city only by a “vehicular access road”. The architect’s sole expertise is now reduced to that of the creation of a self-referential object-monument within this “plot”. This encourages unabashed individualistic architectural self-expression and aggrandizement that passes off as “creativity”. The interstitial public spaces between these “compounds” or parcels of land seem to be no-man’s land and nobody’s baby.

As our villages boom into towns and towns grow haphazardly into metros with dispersed suburbs, citizens are bewildered as to why going to work, sending children to school, shopping for one’s daily needs or meeting friends which were once their daily pleasures have become such daunting nightmares; and why is that only private gated realms are designed, manicured and maintained while civic urban spaces such as streets, pavements, open spaces and urban ‘edges’ are chaotic, neglected and in shambles.

While evaluating architectural standards in India, Indian architects are quick to point to the grand iconic monuments and feel complacent about their achievements. The truth is that the quality of the “average built environment” in the fast transforming fragmented fabrics of our towns and cities remains shockingly poor. As architects further specialize into ‘experts’ such as Planners, Urban designers, Landscape architects and Transport planners, each vying to leave their lasting mark on the cityscape they often work at cross purposes only leading to more confusion and chaos. Architectural education must address this fundamental problem and take responsibility for the quality of the total built habitat to challenge the status quo. The argument that architects do not make the larger decisions is self-defeating. The only way architects can influence policies is to become politically aware and become pro-active in the decision making process. This calls
for a different kind of training.

It means that politics of power relations, be it of economic systems, social hierarchies, cultural practices, environmental ethics or gender equations must be critically examined and understood as the primary forces that actually dictate our built form and not just “artistic self-expression”. To do this one must adopt a wider perspective of the architect’s role in society and in the development processes and problematize these issues in the design studio projects. In other words architectural studio problems cannot only remain as “problem-solving” exercises of how to ‘fit’ a given area program on a site and to create interesting forms from whimsical ‘concepts’ but should be seen as exercises in discovering the ‘connections’ between theoretical, political issues and technological solutions. It means critically examining and learning from precedents of healthy, sustainable settlement models and not inventing for invention’s sake.

As educators, perhaps it is also time we reconciled ourselves to the fact that not every architect that graduates becomes or needs to aspire to be a Howard Roark or a Frank Gehry. A majority of architects become part of and contribute significantly to larger design teams, remaining unseen and unsung by the star-hungry media. Many become competent “service providers” to small and medium clients who in fact shape and sustain the very fabric of the everyday environment. “Genius-architects” who build monumental projects are but an insignificant minority. Education so far has refused to see and acknowledge this important reality and is geared to pushing every student into being a primadonna. The message seems to be “either you are a genius building big iconic projects or you are nothing”.

Also the fact that architects on an average, spend only 20% of their total professional time designing and the rest in managing and coordinating their services is not being addressed in education which continues to remain stubbornly “design-centric”. Thus important professional skills such as listening to clients and users, collaborating and team working with other consultants and agencies, negotiating, managing time, finances and people are not “taught” but are expected to be “learnt on the job”. This is condoned on the basis that not everything can be taught in four and a half years. However there could be another reason for maintaining a blinkered, half-baked approach to architectural education in India which is far more sinister.

Since architectural education has been conceived, and administered and regulated as technical-vocational, most of the teachers happen to be drawn from practicing professionals. Insecure about competition, many professionals find it acceptable to groom office-assistants through education and are reluctant to share “trade secrets” which they have struggled long and hard to learn in their own private practices with students and other faculty. This smug reticence has only led to stagnancy, redundancy and dilution of education to absurd levels over the years. Realities of how a project is pitched for, how it is negotiated, coordinated among the various agencies and executed are seldom shared as case-studies. This presents a warped, one-sided picture of the profession to the learners.

The latest “social-situational” theory of learning indicates that learners gradually move from the
periphery to the center of a community of practice through “conversation” and “association”. This can only happen if the community is reflective, cohesive, and transparent and is willing to share its experiences and knowledge with its next generation. If the profession has to legitimize its credibility and survive in the longer run, it better recognize the need to renew and reproduce the next generation which is better at coping with complexities of change. We need to produce better ‘thinking’, and more ‘competent’ architects in larger numbers. One would like to re-write the first myth as:

Architectural education is much more than just Design education which is much more than just iconic form-making.

Myth 2: One can pull up average competence levels across the class by concentrating on a few geniuses in the studio

Design tutors often confuse the term “competence” with “competency”. According to Terry Hyland, ‘competence’ is a more holistic and integrative term involving social, moral, and intellectual qualities and focuses on the overall person and his/her virtues. In contrast ‘competency’ is simply a skill, a particular ability that only refers to an activity. ‘Competency-based’ education is now being increasingly questioned globally on its dubious educational values. It is more like vocational training, where a particular ‘shopping list’ of skills is developed through mechanical repetition and training, the problem being that these skills do not add up to a ‘whole’.

The other apprehension that is widely shared amongst teachers is that the pursuit of high average competence in the studio will lead to overall ‘mediocrity’ in design and blunt the geniuses. Steven Hurtt clarifies that while both “Genius’ and “Competence” are valid objectives of studio education; they have far-reaching implications on the students’ and teachers’ development. The following table attempts to compare the pros and cons of both the approaches.

It is clear from the table that for the novice learner, the advantages of competence-based pedagogy far outweigh those of genius-based pedagogy. It also appears that the disadvantages of genius-based pedagogy (clearly visible in studios today) are far more damaging than those of competence-based pedagogy. Recent research into the phenomenon of ‘creativity’ has shown that in any domain of knowledge, it is necessary for novices to master the abstract language of the domain and achieve competence first before creative breakthroughs can occur. The larger the ‘base’ of competence in a domain, the greater the ‘peaks’ of creativity. ‘Genius’ or ‘excellence’ in architecture has to be based on the firm foundations of overall ‘competence’.

In India while studio projects are agreed among the faculty, the pedagogic objectives are not articulated and shared thus remaining largely ‘implicit’. Because the “body of architectural knowledge” is not made explicit, it cannot be and therefore is not holistically structured as a sequence. Novice learners, especially from non-urban-elite background find it hard to assimilate design knowledge from one episode to the next, giving rise to the “hit or miss” approach to design. This is further compounded by the
teachers’ preoccupation with the ‘geniuses’ or ‘stars’ in the class, as it is believed that the production of a few “brilliant designs” will pull up the average students and make them perform better. A corollary of this is another widely prevalent premise that more the formal variety in design solutions, the more successful the studio as there is more ‘creative freedom’.

<table>
<thead>
<tr>
<th>Competence-based Pedagogy</th>
<th>Genius-based Pedagogy</th>
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<tbody>
<tr>
<td><strong>Pros</strong></td>
<td></td>
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<tr>
<td>A carefully developed pedagogy teaches the body of knowledge while introducing students to the most current critical thought related to that body of knowledge.</td>
<td>The professor is making significant contribution to the field, and engages the students in the development of that contribution, exposing the students to the leading edge of critical or design thought.</td>
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<tr>
<td>Students benefit from a strongly developed sense of increasing competence and the ability to learn, from being productive in design and problem solving, and from understanding their work within the framework of a larger body of knowledge.</td>
<td>Faculty who are developing new ideas can test them through studio teaching, engaging students in postulating results, reflecting on the critical perspective and results.</td>
</tr>
<tr>
<td>Students and faculty alike benefit from an agreed upon and explicit body of knowledge and pedagogy that provides basis for constant improvement.</td>
<td>The genius assumption fits the university model of significant contribution to the field, particularly regarding the professor as artist-architect.</td>
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<tr>
<td><strong>Cons</strong></td>
<td></td>
</tr>
<tr>
<td>Individual faculty members can give up the pursuit of rigorous intellectual agenda and testing of ideas for the good of larger group or curriculum. This is sometimes the result of impatience with an effort to work diligently and responsibly towards common goals.</td>
<td>Unbounded belief in the individual professor can lead to a child’s play masquerading as critical or innovative thinking. This could result in neither the competence offered by exposure to the body of knowledge, nor innovative thought resulting from profound intellectual engagement.</td>
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<td>Faculty can readily agree to an individual faculty member’s strategy for a given studio if it relieves them of the responsibility for it. When the results are of an acceptable level it is easier to acquiesce than to push for clarification or alteration of pedagogy.</td>
<td>Faculty are not required to work through a curriculum in detail, and therefore critical engagement among faculty is not developed.</td>
</tr>
<tr>
<td>While the body of knowledge is emphasized, there may be a disconnect between it and the most current critical thought or development. Students may not be engaged at the leading edge of critical thought.</td>
<td>The lack of structured and holistic sequence fails some students—those who don’t sort it all out. Their failure is rationalized on the basis that they weren’t potential geniuses after all.</td>
</tr>
<tr>
<td>Naive self-interest and self-expression can introduce blocks to real learning and to the body of knowledge because it is seen as irrelevant to self.</td>
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<td>‘look at me’ can dominate over ‘look at the body of knowledge’</td>
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Table 1: Competence-based vs. Genius-based Studio Pedagogy
(Source: content by Steven W Hurtt, tabular form by author)
Genius based approach is implicit, exclusive, teacher-centered, unstructured and so privileges the already gifted. The resultant lack of basic competence is frustrating for teachers in the senior years who might want to explore ‘cutting edge’ research in their studios, often leading to a cascading blame-game. There is an urgent need to switch to Competence-based, explicit, holistically structured design pedagogy that is student-centered and inclusive. It will enable a larger cross section of novice learners to make sense of what they are learning through the sequence of the course. This means that one needs to explore better alternatives to prescriptive, implicit, over-the-shoulder-desk crits that is the norm today as the predominant vehicle of teaching.

The present system of breaking down the design problem into a linear episodic sequence of “stage submissions” such as ‘concept’, ‘program analysis’, ‘site analysis’, ‘site zoning’, ‘sketch design’, and ‘final presentation’ is highly questionable. Experience has shown that as each stage is separately graded, learners feel that once “reward” or “punishment” is received, the learning episode is over and are not motivated to “transfer” learning from one episode to another. According to Bigge and Shermis, “the goal of all learning is to make information portable, so that learning travels with the learner to new locations. In the new locations, the learning is transferred and applied in novel, interesting, and innovative ways. When transfer of learning occurs, it is in the form of meanings, expectations, generalizations, concepts, or insights that are developed in one learning situation being employed in others”. Given the fact that architecture is an ‘integrative’ discipline, at present the biggest problem with the curriculum seems to be the complete fragmentation of learning in to various ‘subjects’, ‘tests’, ‘studios’, ‘submissions’, each of which seem to exist in water-tight compartments with no transfer of learning occurring ‘automatically’ in learners although it is assumed that it would. There is no ‘horizontal integration’ of various subjects and studios across one year, neither there is ‘vertical integration’ of one learning episode from one year to the next, etc. Yet every few years new subjects are added to the syllabus. This brings us to the next myth underlying our entire education system, a myth so big that it remains invisible and unchallenged; that knowledge can be delivered in isolated fragments.

One would like to replace the second myth with: Genius–based pedagogy cannot raise average competence, but competence-based pedagogy can not only achieve high average competence, but also produce more geniuses in the long run.

**Myth 3: Delivery of knowledge can be fragmented. Integration of knowledge happens ‘automatically’ inside learners**

Underlying every current practice is a hidden belief system or philosophy. If experience shows that practices do not work, it is the underlying philosophy which needs to be examined and reviewed. What is the philosophy of knowledge (or epistemology) that current practices are based on? Epistemology involves concepts of knowledge, its production and transfer from teacher to learner which naturally also involves the question of what is a teacher and who is a learner. It has been widely observed that in contemporary India, ‘education’, (especially professional education) is perceived only as
a prized ticket to employment and personal prosperity and not as the means to comprehend reality; be it physical, social or environmental, and shape it for the better. This ‘commodifies’ and ‘objectifies’ knowledge as ‘precious’ and so creates an artificial disparity between the ‘haves’ and the ‘have-nots’; between the teacher and the learner. The unequal power equation in the traditional Hindu notion of the ‘guru-shishya’ as well as a strong patriarchal family structure in society further contribute to vesting of unquestioned ‘authority’ and total ‘surrender’ of the self to ‘elders’ and to ‘those who know’.

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<thead>
<tr>
<th>Concept of the learner</th>
<th>PEDAGOGY</th>
<th>ANDRAGOGY</th>
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<td>The role of the learner is by nature a dependent one. The teacher is expected to take full responsibility for determining what is to be learned, when it is to be learned, how it is to be learned and if it has to be learned.</td>
<td>Because of the process of maturation a person moves from dependency towards increasing self-directedness, but at different rates for different people and in different dimensions of life. Adults have a psychological need to be self-directing.</td>
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<th>Role of learners’ experience</th>
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<td>The experience learners bring to a learning situation is of little worth. It may be used as a starting point. The experience from which learners learn is that of the teacher, the textbook writer, etc. The primary techniques of teaching, accordingly, are transmitted techniques—lectures, reading, etc.</td>
<td>As people mature they acquire an increasing reservoir of experience that is a rich source for learning, for themselves and others. Adults attach more meaning to learning they gain from experience than what they gain from passive methods. The primary methods for adult learning are experiential.</td>
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<th>Readiness to learn</th>
<th>PEDAGOGY</th>
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<td>People are ready to learn what society says they should learn, provided the pressure put on them (i.e. fear of failure) is great enough. Most people of the same age are ready to learn the same things. Thus, learning is to follow a standard curriculum with a uniform progression.</td>
<td>People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems. The educator has a responsibility to help them discover their ‘need to know’.</td>
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<th>Orientation to learning</th>
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<td>Learners see education as a process of acquiring subject-matter content, most of which they understand will be useful only at a later time in life. Thus the curriculum should be organized into subject-matter units which follow the logic of the subject. People are subject-centered in their approach to learning.</td>
<td>Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply what they learn today to living more effectively tomorrow. Thus learning experience should be organized around capacity development categories.</td>
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Table 2: Pedagogy vs. Andragogy (Source: www.infed.org).
Recent research has shown that such deeply held beliefs can affect one’s learning abilities. “Personal epistemology” is one’s ideas about knowledge, its source, its structure, etc. According to Schommer, with maturity, personal epistemology evolves from “simple” to “sophisticated”. “Learners with simple epistemological beliefs view knowledge as absolute, black or white, handed down by authority, acquired quickly or not at all and that the ability to learn is fixed at birth. With sophisticated epistemological beliefs, learners embrace knowledge as complex and tentative and the source of knowledge shifts from the simple transmission of knowledge from authority to processes of rational thinking”.

The evolution from simple to sophisticated personal epistemology needs to be supported by a corresponding shift in pedagogy. Malcolm Knowles distinguished “Pedagogy” (art of teaching young children) from what he termed “Andragogy” (art of teaching adults). This fundamental shift brought about the development of Humanistic learning theories that greatly influenced the practice of teaching and learning in the universities in US. The following table compares Pedagogy and Andragogy based on four main assumptions that can be found within each approach.

<table>
<thead>
<tr>
<th>Pedagogy</th>
<th>Andragogy</th>
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<tbody>
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<td>Treats learners as ‘blank slates’</td>
<td>Treats learners as having prior knowledge</td>
</tr>
<tr>
<td>‘Need to know’</td>
<td>‘Want to know’</td>
</tr>
<tr>
<td>‘Passive’</td>
<td>‘Active’</td>
</tr>
<tr>
<td>‘Memorization’</td>
<td>‘Construction’</td>
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Thus Andragogy emphasizes the creation of ‘need to know’ so that learners can ‘actively’ seek out and discover the knowledge for themselves (active learning), rather than be ‘spoon-fed’ or ‘force-fed’ (passive-learning). Here, there is an important distinction to be made between the two kinds of learning.

Passive learning is where the student just takes in what the tutor teaches. This is said to be less effective than active learning, where the student seeks out and discovers what he or she wants to understand. Passive learning is said to encourage surface learning rather than deep learning. Surface learning concentrates on the words rather than the meanings of what is being studied, whereas deep learning looks for the meaning of what is being learnt, and is insightful.

The philosophy or theory that underlies the fragmentation and ‘objectification’ of knowledge is “Objectivism”. Objectivists believe that knowledge is universal, exists in books and with the teacher, and is transmitted to the students. Teachers are considered ‘full vessels’ and learners are considered to be passive, ‘empty vessels’ or ‘blank slates’. This paradigm is being challenged globally and is being replaced by the more recent “Constructivist” theories of knowledge. Constructivists believe that knowledge does not exist independently ‘out there’ but is actively ‘constructed’ by the learner. Latest research into the workings of the human brain confirms that humans actively build on ‘prior knowledge’ through association and in the process construct an internal ‘narrative’.

Since Objectivism treats learners as ‘blank slates’ it does not take into account their prior knowledge or cultural backgrounds. It in fact ‘neutralizes’ the learners and is therefore clumsy for exploring diversity of ‘self’, ‘lived experience’, culture and contexts in architectural education. It is no wonder that education is reduced to memorization of ‘facts’ and at best, their ‘analysis’. There is little room for subjective interpretations or insights, which are crucial for producing new theories and arguments.
It is interesting that while in the Objectivist paradigm the teacher is seen as a ‘master’, in the Constructivist paradigm the teacher is seen as a ‘liminal servant’ who facilitates learners in the construction of their knowledge. Both teachers and learners are seen as ‘learners’ producing new knowledge through dialogue and interaction. The principles of Constructivist pedagogy are:

- Learning should take place in authentic and real-world environments
- Learning should involve social negotiation and mediation
- Content and skills should be made relevant to the learner
- Content and skills should be understood within the framework of the learner’s prior knowledge
- Students should be encouraged to become self-regulatory, self-mediated, and self-aware
- Teachers should provide for and encourage multiple perspectives and representations of content
- Students should be assessed formatively, serving to inform future learning experiences

One would like to replace the third myth with:

Knowledge can be specialized but not compartmentalized and transmitted. The Fundamental role of a teacher is to create a ‘need to know’ in learners and to facilitate their own construction and integration of knowledge.

It is interesting now to see how all the three ‘myths’ are inter-related and reinforce each other. The first myth is about the ideal architect as an isolated artistic genius operating outside society and disconnected from the city’s everyday environment. The second myth serves the first and is reflected in current studio pedagogy, which is predisposed to producing such ‘geniuses’ through implicit and unstructured teaching methods. The third myth underlies the second as the basis of the lack of overall structure, coherence and continuity in the delivery of knowledge which forces all learners into being either a ‘zero’ or a ‘master’. All the three are based on utopian ideas; the ideal architect, the ideal student and the ideal of universal, canonical knowledge; that have nothing to do with contingent realities of habitat, the context of the profession, the learner or the learning processes. As educators, perhaps it is time we re-acquainted ourselves with all these and relearn in order to teach.

References


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**Srinivasan Badrinarayanan**

Srinivasan Badrinarayanan graduated from The School of Planning and Architecture (SPA), Delhi in 1982 and worked with some leading architectural practices. In 1994 he started a multi-disciplinary consultancy which has been engaged in architecture, interiors, graphics, stage, exhibitions, and product design. He began teaching design part-time at the TVB School of Habitat Studies, Delhi in 1991 and at SPA since 2001. In 2010 he was awarded PhD for his thesis at SPA titled “Architectural Education in India: Reforming the Design Studio”, in which he conducted several studio teaching experiments, applying Kolb’s Experiential Learning Theory to design studio pedagogy. Badrinarayanan has several publications to his credit and is currently professor at the department of Interior Architecture and Design, Pearl Academy of Fashion, Delhi. His interests include transformation of traditional crafts and architecture, inter-disciplinarity, learner-centric design education, Indian classical music and Buddhist philosophy. He can be contacted at narayan.badri@gmail.com.