DELIVERING THEORY COURSES IN ARCHITECTURE: INQUIRY-BASED, ACTIVE, AND EXPERIENTIAL LEARNING INTEGRATED

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Abstract

Advocating the integration of interactive learning mechanisms into theory courses in architecture, this paper responds to the misconceptions that continue to characterize the delivery of knowledge content in architectural courses. Such misconceptions are identified as: a) science as a body of knowledge versus science as a method of exploration, b) learning theories about the phenomena versus getting the feel of the behavior of the phenomena, and c) the real versus the hypothetical. Based on reviewing the literature on pedagogy the paper explores the value and benefits of introducing active and experiential and inquiry-based learning (IBL) in theory courses in architecture. A framework is developed and employed to demonstrate the way in which these types of learning can be incorporated. The development and implementation of a series of in-class and off campus exercises in two different contexts reveal that structured actions and experiences help students to be in control over their learning while invigorating their understanding of the body of knowledge delivered in a typical lecture format.

Keywords

Architectural education, inquiry-based learning (IBL), experiential learning, active learning.

Introduction

Recent discourse on built environment education asserts that a course mission should foster a learning environment that nurtures exploration and critical thinking. Inquiry and investigation are now viewed as activities central to architectural pedagogy. This presents new opportunities for us as academics in architecture to strengthen our courses, to enhance our role in shaping architectural design education, and to improve the quality of that education (Salama, 2006 b). However, in the decade, the level of concern has intensified and the flood of reports and position papers has crested at an alarmingly high level (Schaffner et al., 1999).

Within the discipline of architecture influential reports have been introduced to the international community including "UIA-UNESCO Charter of Architectural Education-1996," the Carnegie Foundation's report on "A New Future or Architectural Education and Practice-1996 and the AIAS report on "the Re-design of Studio Culture-2002". These reports indicate that architectural education does not take full advantage of the unique opportunities

available in higher education institutions. On the one hand, links between education, professional practice, and academic research are often oversimplified; opportunities to enrich and strengthen professional education through exposure to the research processes are missed. On the other hand, recent research on pedagogy indicates that the attention span of the average adult during a lecture is 8 to 10 minutes. Since most lectures are at least 50 minutes and some lectures are scheduled for up to two hours, there is a serious disparity between our ability as educators to lecture nonstop and our students' ability to learn. According to Judith Liebman (1997), although some students learn best by listening, others have difficulty but find it easier to learn in more active learning environments that involve visual and critical thinking.

Arguing for a fresh look at theory courses in architecture, this article illustrates the implementation of a number of in-class and off-campus exercises that foster interactive learning and communication through active and experiential mechanisms as forms of inquiry-based learning. The exercises involve individual and group work and class discussion. In-class exercises range from 15 to 45 minutes and address issues that examine and translate students' understanding of the topics introduced, including relating culture to architecture, recognizing building types, developing responses to different building images, and understanding building objectives and requirements. While off-campus exercises promote the utilization of the built environment as an open textbook—as an effective teaching tool, they enable students to get as close as possible to the realities being studied.

The results of conducting these exercises corroborate that inquiry-based learning invigorated students' understanding of the topics, sensitized them into the understanding of course objectives, while creating excitement in the classroom. In light of these results, the article calls for the need to incorporate active and experiential learning strategies into classroom instruction in theory and lecture based courses. Students' feedback on these experiments reveal that checklists and survey tools for investigating the built environment helped them structure their understanding, recognize what to look for in the building or an environmental setting, understand relationships between different design factors, while comprehending the impact of one factor over others. Based on the findings and results of implementing these exercises a number of concluding remarks are introduced to highlight the need for integrating inquiry-based learning into architectural design pedagogy.

Misconceptions in Teaching Lecture-Based Courses in Architecture and Design

In traditional architectural pedagogy, architecture students are typically encouraged to engage in site visits and walkthrough the built environment in order to observe different phenomena. Unfortunately however, research indicates that these visits and exercises are simply casual and are not structured in any form of investigation or critical inquiry (Bose 2006, Fernando 2007, Salama 2005, and Salama and Wilkinson 2007). Moreover, in large classes, the proposition of a site visit is often met with logistical difficulties, with little opportunity for individual student mentoring (Salama and Osborne, 2009).

While architectural educators strive to impart

the requisite knowledge necessary for successful practice, the approach to this is often divergent, depending on the priorities and ideals of the educator. What and how knowledge is transmitted therefore has significant professional and social implications (Mazumdar 1993, Salama 1998). Concomitantly, there is an urgent need to confront issues that pertain to the nature of reality ("what") and the way in which knowledge about that reality is conveyed to our budding professionals ("how"). Traditional teaching practices suggest that gaps exist between "what" and "how". Along this line of thinking, Amos Rapoport (1994) argues for the need for the discipline of architecture to develop a quantifiable body of knowledge by calling for a dramatic departure from the art paradigm that the profession and its education are based upon to one based on science and research. Rapoport introduced a number of questions underlying the heading of "knowledge about better environments"; these are: "what is better, better for whom and why is it better?" (Rapoport 1994:35).

Three major misconceptions can be envisaged in the context of this critical discussion based on reviewing the literature on architectural education and professional practices (Fisher 2006, Salama 1995; 2005; 2008; Salama and Wilkinson 2007, Seidel, Eley, and Symes 1995). They continue to characterize teaching practices of lecture based modules in architecture, and can be labeled under the headings of: a) science as a body of knowledge versus science as a method of exploration b) learning theories about the phenomena versus getting the feel of the behavior of the phenomena, and c) the real versus the hypothetical.

Science as a body of knowledge versus science as a method of exploration

When teaching any body of knowledge, educators tend to present it as a body of facts and theories and as a process of scientific criticism. The processes that led up to this product are always hidden and internalized. Therefore, there should be a distinction between the types of knowledge resulting from research in architecture and students should be made aware of them and experience them as well. First, knowledge that results from research that seeks to understand the future through a better understanding of the past, research that tests accepted ideas. Second, knowledge that results from research that develops new hypotheses and visions, research that probes new ideas and principles which will shape the future.

Learning theories about the phenomena versus getting the feel of the behavior of the phenomena

Knowledge is usually presented to students in a retrospective way where abstract and symbolic generalizations used to describe research results do not convey the feel of the behavior of the phenomena they describe (Schon 1988). The term retrospective here means extensive exhibition of the performance of the work of an architect over time. In essence, the analysis of precedents as part of the curriculum should be introduced. How projects were created and in what context, what was the client nature and intentions, how the building was delivered, and how construction was undertaken are integral parts of learning. The story telling teaching mode carried out by educators in lecture and theory courses tends to ignore these issues.

The real versus the hypothetical

Educators tend to offer students hypothetical

experiments in the form of hypothetical design projects where many contextual variables are neglected. In this respect, learning from the actual environment should be introduced. Real life experiences can provide students with opportunities to understand the practical realities and different variables that affect real-life situations. Typically, educators focus on offering students ready-made interpretations about the built environment rather than developing their abilities to explore issues that are associated with the relationship between culture and the built environment. If they do, they place emphasis on one single culture, which is their own.

In the context of discussing the preceding misconceptions, it should be noted that recent years have witnessed intensive discussions on the value of introducing real life issues in architectural education teaching practices (Morrow 2007, Romice and Uzzell 2005, Salama 2006a and b, Sanoff 2003 and 2008, and Sara 2000). However, while published experiences have debated innovative practices exemplified by exposing students to primary source materials in generic terms; little emphasis has been placed upon how structured experiences could be introduced in theory and lecture courses.

A Sketch of Inquiry Based, Active, and Experiential Learning

Inquiry-based learning is an instructional method developed during the 1960s but continues to characterize current interests in higher education (Bruner, 1961, Ackoff, 1974, Salama, 2009). In essence, it was developed in response to a perceived failure of more traditional forms of instruction, where students were required to simply memorize and reproduce instructional materials (Ackoff, 1974). Active and experiential learning are sub-forms of inquiry-based learning (IBL), where students progress is assessed by how well they develop experiential, critical thinking, and analytical skills rather than how much knowledge they have acquired.

Over the past decade several studies have emerged to challenge university educators to develop teaching approaches that represent transformative pedagogies, simply moving away from thinking of students as passive listeners to active learners (Salama, 2009). However, this would seem "easier said than done." According to Bonwell (1999), gradually and especially in recent years, the incorporation of active learning strategies into the daily routine of classroom instruction has become a necessity. While there is a surge in the development of knowledge on active learning (Judith S. Liebman http://education.forum.informs.org/active.htm), one would limit this discourse to the characteristics of and the need for active learning.

The major characteristic of active learning is that students are engaged in individual or group activities during the class session including reading, discussing, commenting, and exploring. While these activities are carried out by the students, they are facilitated by the professor, and students can receive immediate feedback (Bonwell 1996). Notably, in active learning students are involved in higher order thinking that simultaneously involves analysis, synthesis, and evaluation of a wide spectrum of issues and phenomena. In the context of university classroom, active learning involves students in doing things and thinking about what they are doing.

The value of active learning becomes evident

when looking at the literature and research findings that were developed over the past several decades. The amount of information retained by students typically declines substantially after ten minutes (Bonwell 1996). The results of research comparing lecturing versus active discussion techniques indicate that students favor discussion methods over lecturing and the one way mode of knowledge transfer. Dean (1996), Bonwell (1999), and Liebman (1997) all accentuate that students do not learn much by sitting in class, listening to faculty, memorizing pre-packaged and ready-made interpretations; they all agree that students must talk about what they are learning, write about it, and relate it to past experiences.

In terms of experiential learning, several education theorists including Benjamin Bloom; David Kolb; Jean Piaget; John Dewey; and Paulo Freire voiced the opinion that experience should be an integral component of any teaching/learning process. Their work can be traced back to the famous dictum of Confucius around 450 BC "Tell me and I will forget. Show me and I may remember. Involve me and I will understand." Experiential learning refers to learning in which the learner is directly in touch with the realities being studied (Keeton and Tate 1978).

Experiential learning is contrasted with learning in which the learner only reads about, hears about, talks about, writes about these realities but never comes in contact with as part of the learning process. Mistakenly, some educators equate experiential learning only with "off campus" or "non-classroom" learning. However, in architectural pedagogy a class in history or theory of architecture might incorporate periods of student practice on theory exercises and critical thinking problems rather than consisting entirely of lectures about theories of architecture and the work of famous architects (O'Reilly 1999; Salama 2006b, Salama et al., 2002). Similarly, a class in 'principles of architectural design' or in 'human-environment interactions' might involve critical analysis exercises on how people perceive and comprehend the built environment. Both classes might involve field visits to buildings and spaces where students are in close contact with the environment, exploring culture, diversity, people's behavior, while being part of that environment. All of these mechanisms involve an experiential learning component (Salama, 2006b).

Learning through experience involves not merely observing the phenomenon being studied but also doing something with it, such as testing its dynamics to learn more about it, or applying a theory learned about it to achieve some desired results. Assessment of environments as a valuable research vehicle needs to be introduced in lecture courses, establishing a knowledge base about the built environment that has the capability of endowing students with more control over their learning, knowledge acquisition, assimilation, and utilization in future experiences (Salama, 1999; 2007). This argument corresponds with an eloquent statement made by John Habraken when he argues that:

We need to teach knowledge about everyday environment. How it is structured, what we can learn from historic and contemporary evidence, how different examples compare, how it behaves overtime and responds to change of inhabitation or other circumstances... Teaching architecture without teaching how everyday environment works is like teaching medical students the art

of healing without telling them how the human body functions. You would not trust a medical doctor who does not know the human body. Knowledge of everyday environment must legitimize our profession... (Habraken 2006: 18)

Active and experiential learning as concepts and instructional strategies appear to be two sides of the same coin underlying the inquiry-based learning method. While they differ in terminology they represent interactive learning mechanisms and share similar aims and qualities. They both aim at increasing students' motivation, place emphasis on the exploration of attitudes and values. In both of them, less emphasis is placed on knowledge transmission but greater emphasis is placed on developing students' critical thinking abilities.

Linking assessment research and active and experiential learning as interactive learning mechanisms, one can argue that architecture students need to be involved in assessment processes that should be conducted objectively and systematically - not through casual interviews or observations that may only reveal what is already known. In this context, they learn about problems and potentials of existing environments and how they meet people's needs, enhance and celebrate their activities, and foster desired behaviors and attitudes.

The results of the literature reviews convey that while there have been several attempts to incorporate assessment research into architectural pedagogy; it would appear that they did not go beyond individual attempts of committed scholars and educators. Thus, one could argue that traditional teaching practices do not utilize interactive learning mechanisms that address the dialectic relationship between people and their environments and that help students understand and comprehend the multifaceted nature of the built environment. Therefore, the need for both in-class and off campus active and experiential learning seems to be on the rise.

Contexts for Integrating Inquiry Based Learning (IBL) into Theory Courses

As a continuous effort to introduce inquiry based learning into theory courses, a series of tools were developed by the author and were implemented as exercises during his teaching in two different contexts as follows:

- Socio-Behavioral and Socio-Cultural Factors in Architectural and Urban Design, 1st Year, M. Arch.-RIBA-II at the School of Planning, Architecture, and Civil Engineering--SPACE, Queen's University, Belfast (academic year 2008-2009).
- Community Design Workshop, 3rd Year, Bs. Arch., Department of Architecture and Urban Planning at Qatar University (academic year 2009-2010).

While the exercises were introduced in different grade levels of students' learning, there was one shared aspect; that is the nature of the courses in which they were introduced, specifically—courses that address person-environment interactions, explore the relationship between human behavior and different types of environments and the impact of those environments on individual, community, and societal attitudes. In essence, this reflects the amenability and implement-ability of the exercises on different levels and in different contexts. Despite the fact that each course is introduced in a context aimed at achieving specific objectives and learning outcomes, an integral component in the two courses is

an intensive discussion of issues that pertain to ways in which information about socio-cultural factors and environment-behavior knowledge can be applied to design projects. However, it should be noted that the objective here is not to compare between the two different contexts, but to illustrate they way in which inquiry based learning was introduced and implemented. The shared objectives of the courses offered in the two contexts can be exemplified as follows.

- To increase students' sensitivity to the built environment and to break any habits of taking the environment for granted.
- To acquaint students with particular knowledge of a variety of environments including residential, work, learning, and urban environments.
- To enhance students' understanding of the core concepts regarding human-environment relations and how these concepts vary by different cultures and sub-cultures.
- To develop students' critical thinking abilities about the role of the built form in fostering, enhancing, or inhibiting cultural behaviors and attitudes.

"In-Class" Inquiry-Based Learning Mechanisms

The selected examples of exercises were envisioned to complement different types of knowledge offered to students in the typical lecture format. All exercises were explained to the students, and the way in which they are linked to the body of knowledge and experiences they have already gained in the course and also in other courses. While some exercises were performed in groups of two or four, others were individual exercises based on the nature of each and the type of issues involved. Each exercise was followed by a class discussion moderated by the tutor where all students have opportunities to voice their thoughts to the whole class. The following are three examples selected from a wide variety of exercises utilized as in-class inquiry-based learning mechanisms.

Culture and Environment: Relating Visual Attributes of Buildings to Culture

- Purpose: The purpose of this exercise is to offer students the opportunity to translate their understanding of a building image into some responses that relate culture to architecture and that link the built environment to the community within.

- Prior Knowledge: Students have been introduced to the dialectic relationship between culture and environment and how culture is manifested in human artifacts, and buildings/built environments. The basic premise in this context is that culture appears in objects and in the environment as a result of people's interpretation of such an environment and based on a set of values and beliefs. In essence, it adopts the view that any object is designed in the sense that it embodies human choices and preferences.

- Requirements: Three different images that represent different cultures were presented. Students were required to describe each image in one or two sentences (only); think of what culture each image belongs to; and state at least three visual/formal attributes that influenced their answer (Figure 1). The exercise is conducted in 15 minutes and is performed in teams of two, as each two neighboring students have to articulate an answer based on their agreement.

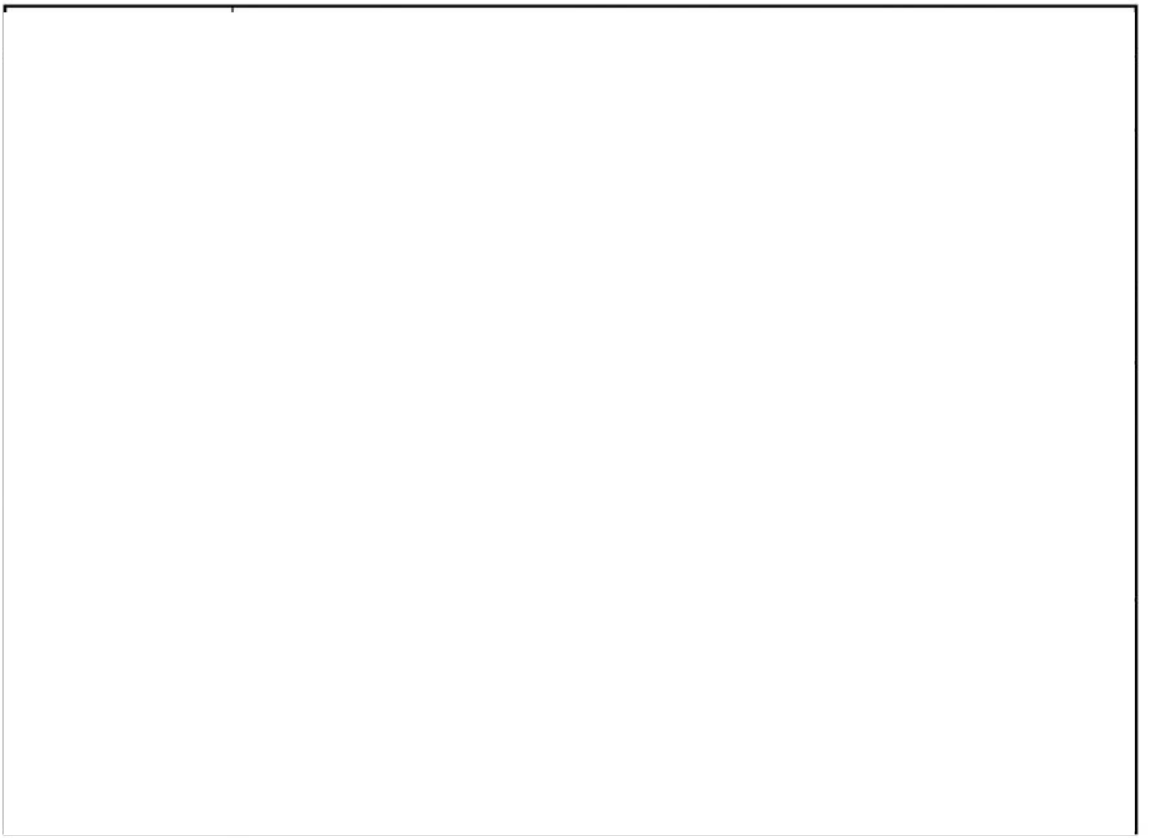

Figure 1: Relating visual attributes of buildings to culture (Source: Author).

Recognition of Building Types: Relating Building Images to Functions and Users

• Purpose: The purpose of this exercise is to develop students' visual perception abilities on how to recognize different building types based on their understanding of their visual characteristics and the messages they convey.

• Prior Knowledge: Through a series of lecture presentations preceding this exercise, students were introduced to notions that pertain to "expression" in architecture, how buildings have certain characteristics that convey messages about the use, functions, activities that take

place inside them, and how they offer some clues about who uses them.

• Requirements: Students were offered a sheet that includes 12 images of different buildings selected from different environments. They were required to look carefully at the images, and then state the type, activity, and the age group for each of the images utilizing the two left columns given in the sheet (Figure 2). The exercise is conducted in 45 minutes and is performed in teams of two, as each two neighboring are required to discuss the images and reach an agreement on identifying the building type, activity, and user type of each image.

Figure 2: Relating building images to functions, activities, and users. (Source: Author).

Seeing and Verbalizing the Environment

• Purpose: This exercise is developed to elicit evaluative comments about students understanding of different environments. The aim is to help them recognize the importance of the terminology used by the public and the terminology used by architects and designers. Another aim is that students can express their concerns of different environmental settings, and eventually be able to work toward improving existing environments or designing new environments.

• Prior Knowledge: Students were introduced to the way in which buildings relate to the psychology of the users. Knowledge delivered and discussed prior to conducting this exercise included issues that pertain to the fact that in any given environment there are certain physical features that evoke good or bad feelings. It is critical for them as users and as future designers and architects to become aware of perceived environmental effects. This is a first step in understanding the delicate balance between different aspects of a built environment and their impact on people psychologically.

• Requirements: Students were offered 6 images and were required to look at each of the images and consider which of the paired adjectives better describes them. They were to check the box closest to the more appropriate adjective in each line. If they think neither adjective applies, they were to check the box in the middle (Figure 3). As well, they were required to write generic comments based on their understanding of each environmental setting shown in each image. The exercise is conducted individually and is performed over a period of 30 minutes where each student was expected to spend 5 minutes only on each image.

After conducting each of the three exercises students were asked to elaborate on what benefits they have gained out of their engagement and reflect on their experience. The findings point out that the students were able to make judgments about the built environment and to give reasons for those judgments through a wide spectrum of exercises. However, a few students were not able to recognize similarities and differences between the building images or to fully comprehend the crux of each exercise. Never-the-less, they commented that utilizing checklists and discussion tools for relating the content of the course to the exercises helped them recognize what to look for exactly in the building images. Students reported that they were excited during the discussions. In their comments, the majority felt that their experience of the buildings in a structured manner invigorated their understanding of many of the concepts typically delivered in a lecture format without exposure to generating discussions or debates in the classroom. As well, writing and presenting were felt as important skills they need to further develop. The discussions that followed each exercise corroborate the value of introducing in-class inquiry-based learning mechanisms while creating an atmosphere amenable to responsive reflection and critical thinking.

The Built Environment as an Open Textbook: "Off-Campus" Inquiry-Based Learning Mechanisms

In the two contexts outlined earlier, continuous efforts were made to integrate assessment research through experiential learning in order

Figure 3: Seeing and verbalizing the environment. (Source: Author).

to get students involved in the production of knowledge while exposing them to primary sources of information. This took place by assigning two major "off campus" inquiry-based learning mechanisms in addition to the in-class exercises; the first was "Contemplating Settings," and the second was the "Walking Tour." The two exercises adopt the concepts of the built environment as an open text book—as a teaching tool.

Contemplating Settings

In the first part of the course, students were introduced to a number of socio cultural and behavioral phenomena that include privacy, personal space, territoriality, crowding and

density and how these concepts relate to people as individuals and in groups. Examples describing these phenomena were displayed to students to illustrate what each phenomenon encompasses (Figure 4). The purpose of the exercise was to complement the body of knowledge acquired in lectures by exposing students to real life conditions. They were required to take concepts underlying each phenomenon in abstract terms and turn them into concrete terms through description and interpretation of the situations observed.

Students were to record and document cultural and behavioral phenomena by photographing selected settings. Two photographs that illustrate each phenomenon were required. A number of rules were established where photographs should be taken for a real life situation to represent indoor or outdoor spontaneous settings. Students write one statement describing the setting in physical, cultural and/or behavioral terms. Simple questions such as: who is doing what, where, how, for how long, and with whom represented the structure of each statement. Assessment criteria were delivered to students; these included how accurately their text and photographs reflect the meaning of the phenomena as discussed in the lectures. How their interpretations show a scholarly understanding of the term, the

Figure 4: Different environmental settings illustrating behavioral phenomena that were discussed with students. (Source: Author).

selection of the setting, and the overall quality of photographs and graphic layout of their submissions were important criteria for assessing their work and the overall learning outcomes.

An important finding indicates that while all students were able to observe, document, and interpret the information, most of them could not phrase concise statements that describe each setting. However, in a group discussion for debating students' work among themselves with the facilitation of the author, they were able to recognize how people behave in a specific environmental situation, their body gestures, degrees of socialization, how they attempt to control their environment, regulate their interaction with others, how they shape and transform the physical aspects of the setting to support their activities, enhance their position in space, create views, or block distraction.

The Walking Tour and the Multiple Factor Building Appraisal

To introduce the walking tour mechanism, a survey tool was devised; the purpose of which is to develop students' ability to have control over their learning by establishing links between visual and functional issues of a building or a group of buildings. The exercise is devised to facilitate a deeper understanding of the built environment through self-guided tours. Checklists were provided to offer students a procedure for taking a structured walkthrough and around a building. The assessment strategy in this context is considered to be impressionistic which increases students' awareness by focusing on specific factors (Salama, 1996, 1998; Sanoff, 1991).

Students were divided into groups; each conducted a walkthrough exercise utilizing the multiple factor building appraisal tool. A number of key factors were identified and included: context; massing; interface; way-finding; socio-spatial elements; and comfort. Checklists were phrased in the form of questions underlying each factor. The process included the use of notes, sketches, diagrams, and verbal description. Matrix 1 illustrates an example sheet used to conduct the procedural assessment exercise.

Questions were designed in a generic manner that reflects the essence of each factor. However, students' attention was drawn to the fact that the list of questions underlying each factor is not exclusive and is introduced to help structure and guide their tours for the purpose of the exercise. Numerical scores were then assigned to the questions to represent the degree of appropriateness underlying each factor using a point scale method. Scores were averaged and an overall score for the building was then computed. Students were required to develop a report that would consider the following:

- Description of the building appraised with the support of photographs and illustrations;
- Appraisal of the building using the checklists with numerical scores assigned for each question;
- Analysis of numerical ratings by computation of an average score for each factor and for the overall score;
- Writing comments or remarks based on their impressions and understanding of the building.

Across the two different contexts, the findings point out that the students were able to make judgmental assessment about the built environment and to justify their assessment. However, students' analyses reveal some

shortcomings in their abilities to comment, where some of them could not express their concerns verbally and could not write an understandable reporting statement. Also, a few students were not able to recognize similarities and differences between the questions. However, they commented that checklists and survey tools for investigating the built environment helped them recognize exactly what to look for in the building and to understand relationships between different factors, while comprehending the impact of one factor over others.

Factor 3: INTERFACE	
A building is essentially an enclosure that separates an interior private space from exterior public space. The interface is the crucial meeting place where the inside of the building connects with the outside.	
Highly Appropriate 1 2 3 4 5 Highly Inappropriate	**Score**
How clearly or effectively does the exterior of the building indicate its interior functions?	----------
How effectively does the interior of the building connect with the outside of the building? Are the connections appropriate and functional?	----------
Are the exits and entrances easily accessible?	----------
Are the various openings related to thoughtful planning of interior? (Consider entry of light, view, privacy, noise, heat, glare, etc.)	----------
Are the exit-ways appropriate from a safety point of view?	----------
When moving from the exterior of the building to the interior by means of the main entrance, is the experience pleasant, interesting, or special in anyway?	----------
Has the designer, in your opinion, handled the problem of interface well in his/her design of this building?	----------
	----------
Photographs or other forms of illustrations that represent the factor of "Interface"	*A Summary paragraph should be written describing how well the design of the building has addressed the factor of "Interface"*

Matrix 1: Example sheet utilized to conduct the walking tour exercise. (Source: Author).

Conclusions: Analytical Reflections and Way Forward

By and large, the results implementing in-class or off campus inquiry based learning exercises are not exclusive, ye they accentuate the value of introducing structured interactive learning mechanisms in lecture courses while utilizing the built environment as an educational medium. Students developed a deeper understanding of the relationship between visual and functional factors and focused on critical issues that go beyond those adopted in traditional teaching practices.

The two widely held conceptions of the built environment; the conceptual/subjective and the physical/objective, are embedded in the exercises. While the first set of in-class exercises place emphasis on knowledge acquisition based on students' perceptions and interpretations of the building images that are driven by the knowledge delivered in the classroom, the second set of off-campus exercises attempt to develop students understanding of how qualitative aspects of the built environment could be translated into quantifiable measures. However, on the one hand, while the exercises are aimed at introducing structured experiential learning through some form of assessment research, they do not provide comprehensive panacea to the misconceptions that characterize traditional teaching. On the other hand, the exercises do not address the complexity of the physical environment, but they helped students focus on specific aspects of the built environment that pertain to a specific knowledge content while bridging the gaps between "what" and "how" types of knowledge.

A considerable portion of students' education in architecture and design is based on "experience", "making" and "active engagement." Students are typically encouraged to study the existing built environment and attempt to explain it through theories or typologies, always looking at outstanding examples. However, underlying these theories, there are assumptions about the built environment and the people associated with it, and usually these assumptions remain hidden. It is in this relationship lies the "lesson" to be learnt. Whether people associated with the environment were the actual users of it or were students acting as observers and users at the same time, the incorporation of exercises similar to the ones introduced in theory/lecture courses would foster the establishment of links between the existing dynamic environments, the concepts and theories that supposedly explain them, and the resulting learning outcomes. Concomitantly, the contribution of inquiry-based learning to architectural and design pedagogy lies in the fact that the inherent, subjective, and hard to verify conceptual understanding of the built environment is complemented by the structured, documented interpretation that is performed in a systematic manner in a classroom or off campus setting amenable to critical thinking and reflection.

The built environment is variant, diverse, and complex. Buildings and spaces are major components of this environment: planned, designed, analyzed, represented, built, lived in and occupied. They are also experienced, perceived, and studied. They should be re-defined as objects for learning and need to be transformed into scientific objects. In this respect, one should emphasize that in order for an object to be taught and learned, its components

should be adapted to specific pedagogic and cognitive orientation that introduces issues about specific bodies of knowledge.

It is the perception and position of this author that the incorporation of critical inquiry—through active and experiential learning—into architectural education represents a true frontier and a learning paradigm in architecture that integrates the real and the hypothetical, the process and the product, the objective and the subjective, and ultimately the behavior of the phenomena future architects are exposed to in their education. In this respect, it is firmly believed that introducing and implementing tools that utilize the built environment, buildings, and spaces as a teaching tool and as open textbooks foster the capabilities of future architects to be critical thinkers while designing new buildings or introducing any change in the environment.

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