SKILL-BASED / KNOWLEDGE -BASED ARCHITECTURAL PEDAGOGIES: *AN ARGUMENT FOR CREATING HUMANE ENVIRONMENTS*

KEYNOTE ADDRESS

7th Intl Conference on Humane Habitat-ICHH-05 – The International Association of Humane Habitat IAHH
Rizvi College of Architecture, Mumbai, India, January 29-31, 2005

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Abstract
This paper argues for a more responsive architectural pedagogy that enables future architects to create humane environments and that emerges from and responds to societal, cultural, and environmental needs. A critical analysis of a number of thematic issues is provided to delineate the gaps between skill-based and knowledge-based pedagogies in the educational process of architecture. The paper provides a number of scenarios that help bridge these gaps while integrating knowledge contents necessary for creating humane environments

PREAMBLE

Debates on higher education assert that a university mission should foster a campus environment that nurtures exploration, enlightenment and critical thinking among all students. Inquiry, investigation, and discovery are now viewed as activities central to undergraduate programs. These debates present new opportunities for us as academics to strengthen our programs, to enhance our role in shaping undergraduate education, and to improve the quality of that education.

Reports with catchy and compelling titles continue to roll off the presses with increasing regularity at international, regional, and local levels. Examples of these titles are: "*Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering and Technology*," "*Physics at the Crossroads*," and "*UNESCO Declaration on Higher Education.*" The reports, in turn, have generated lively and vibrant discussions in the literature of just about every discipline. Most important is not the quantity, but is the focus of this new round of debate; an emphasis on issues central to our own mission as architectural educators that simply involves the development of research skills and critical thinking abilities through active learning, while imbibing values in future graduates who are capable of creating humane environments.

Architectural education, as one of the distinctive branches of education, requires the development of creative capabilities. The primary concern of architects is to produce three dimensional space and form to accommodate related human activities. Like other types of education, architectural education conveys, conserves, and transmits the values of the profession and society at large. The position of this author is that humane environments are those that enhance, celebrate, and support human activities, those that reflect behavioural and cultural norms defined by society, those that ultimately integrate economy, ecology, and society into "Urbo systems," or are simply those everyday environments. Since humane environments are created in a field of tension between reason, emotion and intuition, architectural pedagogy should be viewed as training toward the manifestation of the ability to conceptualize, coordinate, and execute the idea of building rooted in humane tradition. This mandates a comprehensive understanding of two different but related types of pedagogies in architecture: skill-based and knowledge-based.

THE CRUX OF THE PROBLEM

Recent years have witnessed a number of phenomenal and continuous changes in the structure of contemporary societies, the emergence of housing problems and squatter settlements, the deterioration of the built heritage, and the rising complexity of large structures and new building types. While these phenomena continue to exist, demands for multiple types of knowledge are clearly on the rise: knowledge of how to create better environments for poor societies; how to involve people affected by design and planning decisions in the process of making those decisions, how to protect

the built heritage, how to deal with problems associated with special populations that form major parcels of contemporary societies; the children, the disabled, the poor, and the under-represented. A critical question can be posed here: Does current architectural pedagogy introduce these knowledge types? A preliminary answer would be: Current architectural education still socializes its members into a predominantly artistic paradigm that emphasizes personal feelings, intuition, imagination, and subjective judgments at the expense of other paradigms capable of fostering the creation of humane environments.

Other critical questions can be posed: Does the current system of architectural education place high value on knowledge and research in architecture as an educational discipline and profession? Has it responded to the dramatic changes of the profession? Has it responded effectively to the demands placed in the profession by society? A preliminary answer to these questions would be: Architectural education system still views its mission within the conventional perspective of architecture as an art related discipline. Architecture in the past was concerned with producing individual works of art on individual sites, where the method of design was intuitive and relied heavily on the experience, judgment, and talent of the individual designer. Although this approach has resulted in some of the most enduring noteworthy achievements of the previous generations, the profession and its education today face severe challenges that threaten this traditional role of the architect. Physical development of contemporary cities, towns, and communities corroborate that while architects manage individual well enough the overall built environment is increasingly mismanaged.

THE CRUX OF THE ARGUMENT

In response to the preceding problematic concerns, this paper outlines a comprehensive understanding of how architectural pedagogy can foster the development of skills and knowledge necessary for creating humane environments, and how architectural pedagogy can enhance the development of professionals who are socially, culturally, and environmentally responsive.
The idea of the paper is culled from a wide spectrum of issues the author has explored over a period of two decades. However, it envisions five thematic critical issues that juxtapose traditional teaching practices (skill-based) with new alternatives that invigorate the development of humane environments (knowledge-based). Thematic issues are clustered around the following themes: paradigmatic shifts, admission policies, knowledge contents, knowledge delivery methods, and studio teaching practices. The discussions of these thematic issues are based on literature reviews and the results of a number of surveys conducted by the author and others. The paper outlines a number of scenarios for balancing knowledge-based and skill based pedagogies that are necessary for creating humane environments.

ON PARADIGMATIC SHIFTS

In his manuscript, *The Structure of Scientific Revolutions*, Kuhn (1970) bases his theory of a scientific revolution on paradigms that relate to rules and some necessary specifications of common ground in the corresponding area. Along the same theory, De-Bono (1991) argues that a paradigm changes in the way we think and approach problems. Based on the concept of paradigms, four shifts or shifting attitudes about the environment can be identified (Salama, 1999 & 2002). The following is a brief discussion of these shifts.

Things versus Relations between Things

According to Capra et al. (1992), the reductionism of the old paradigm was reflected in the belief that the dynamics of the whole could be understood from the properties of the parts. But, in the new paradigm, the properties of the parts can be understood only from the dynamics of the whole. John Turner affirms this view when he argues that there are no parts at all, what we call a part is a pattern in an inseparable web of relationships. Tracing back the literature that has been developed in the sixties, one can find that this view has been introduced by Christopher Alexander (1966) who identified three basic abilities for investigating and understanding the physical environment. These are: a) the holistic behavior of the phenomenon which we are focusing on, b) the parts within the thing and the interaction among those parts which causes the holistic behavior we have defined, and c) the way in which this interaction among these parts causes the holistic behavior defined.

Taking housing as an example, this paradigm shift can be clearer. In the old paradigm, the value of housing is assumed to be in the quantifiable attributes of dwellings, sometimes including their

immediate environments. In the new paradigm, housing values lie in the relationships between the process, the product, the users, and the social and environmental contexts. In the old paradigm, housing has been conceived in terms of what it is, rather than what it does for local populations and the way in which people interact with built and natural environments (Turner, 1997). In this respect, one can assert that by focusing on relationships the new paradigm converts the insoluble problems into encouragingly practical tasks and promising ends.

Economy and Ecology: Isolation versus Integration
In the new paradigm, the concept of sustainability has emerged as a reaction to environmental depletion and degradation. Many theorists are voicing the need to harmonize economy and ecology. The old paradigm has been characterized by three basic assumptions: man is more valuable than nature; man has the right to subdue and conquer nature, and has no responsibility for nature. On the other hand, in the new paradigm the concept of sustainable development is conceived to value the environment alongside economic development, and to value social equity alongside material growth.

In the new paradigm, the same technology that has been employed to conquer and subdue nature needs to be employed for the benefits of nature and, in turn, for the long-term benefit of the human race. It is believed that this characteristic of the new paradigm creates the need for mature and competent professionals. Thus, the new sustainable society will need to identify non-material means for non-material needs. In response, professional development will need to include the practice of interdisciplinary and the practice of non-technical and lifelong learning skills.

***Fight versus Fit with Nature: Techno-development versus Eco-development*:**
The difference between techno-development and eco-development is the difference between a mechanical contrivance or tool and a living organism. Technology does not make built environments; people make them. Techno-development is based on the modernist illusion of technological determinism. It is an assault on nature. Eco-development is a package of concepts, ethics, and programs that provides designers and planners a criterion of social and ecological rationality that are different from the market logic (Sacks, 1987). It is rooted in the real need to fit human settlements within the patterns of nature. Politically, eco-development is decentralized and democratic. Socially and culturally, it reflects the diverse reality of human affairs and the tapestry of life, which makes every portion of the built environment work well. Economically, it adopts the premise that economy and ecology are both essentially to do with the flow of energy and materials through a system and that value is a social construct.

Mechanistic Pedagogy versus Systemic Pedagogy
Based on conductive an inductive analysis of a number of studies (Schon, 1971; Ackoff, 1974; Salama, 1991 & 1995), one can find that there is a strong evidence on the paradigm shifts in education and pedagogy. Following the mechanistic paradigm, the educational process of architecture is reduced to a large number of disconnected components. Education has been decomposed into schools, curricula, grades, subjects, courses, lectures, lessons, and exercises. In this respect, one can argue that formal education has never been treated as a whole, nor is it appropriately conceptualized as part of a process much of which takes place within society; a characteristic of the systemic paradigm.

The mechanistic orientation of pedagogy results in the treatment of students as if they were machines with the combined properties and characteristics of tape recorders, cameras, and computers. The student is evaluated with respect to his/her ability to reproduce what he/she has been told or shown. In turn, examinations are tests of the ability to reproduce material previously presented to the examined. They are designed to serve the system's purposes rather than the students' needs. In the mechanistic paradigm, educators make little or almost no effort to relate the pieces of information they dispense. A course in one subject does not refer to the content of another. This reinforces the concept that knowledge is made-up of many unrelated parts. Inversely, the systemic paradigm focuses on grasping the relationships between the parts of knowledge.

In the systemic paradigm, some alternative concepts have been introduced. These are exemplified by: 1) some subjects are best learned by teaching them to oneself, 2) some subjects are best learned by teaching them to others, 3) some skills are best learned through demonstration and instruction, and 4) some fundamentals are attained in seminar discussions guided by one specialized in the relevant area.

The preceding paradigm shifts delineate that the way we think about our environments has changed, that the interdisciplinary thinking is now taking place, that economy and ecology should be integrated, that eco-development in the very near future will definitely replace techno-development, and that the systemic pedagogy is replacing the mechanistic pedagogy. These shifts delineate the need to investigate how these concepts are introduced to our students, our budding professionals. Thus, the question that should be raised at this point is: has architectural pedagogy responded positively to these preceding paradigm shifts? The following thematic issues represent an attempt to answer this question.

ON ADMISSION POLICIES

The discussion of admission policies as a theme within the context of skill-based and knowledge-based pedagogies is to raise questions more than to provide answers. Architects receive their education and training in hundreds of schools of architecture around the world. Practice is usually locally regulated, sometimes licensed. The practice of architectural design education appears to be remarkably similar in many parts of the world due to the overriding primacy given to the studio as the main forum for exploration, interaction, and assimilation. Such similarity enables significant mobility of architects among firms, areas of expertise and locales, even where cultural differences are dominant.

It is still far from clear how similarities and differences between schools of architecture affect the experience and performance of graduates. Little is known about architecture students, and even less about ways in which schools exercise control over their intake of students via admission criteria they practice (Goldschmidt et al, 2000).

Tracing back the history of admission in schools of architecture, one can find three different mechanisms adopted by the Beaux-Arts in France, the Bauhaus in Germany, and the Vkhutemas in Russia. The Ecole des Beaux-Arts ran like a confederation of Ateliers. Each atelier had its distinct character through the leadership of a patron, usually an accomplished architect. Students joined the atelier where they are trained toward the entrance competition that consisted of three parts (Carlhian, 1979). The first two parts represented sketch problems, “Esquisse.” In the first part candidates were asked to design a simple architectural structure using classical motifs. In the second, candidates were asked to produce a large-scale accurate drawing of a decorative architectural element such as a capital of column (Salama, 1995). The third part of the competition was a comprehensive written test that examined the scientific knowledge of the candidate.

The Bauhaus and Vkhutemas adopted different policies. However, the focus was still on the skills required for carrying out different art and design assignments. In the Bauhaus, proof of adequate previous education was a determining admission factor to be complemented by what is called today “Portfolio” for those who wish admittance as apprentices. According to Wingler (1981), candidates with more experience could apply as journeymen or junior masters. In this case, they were required to submit certificates of previously completed training in the crafts. The Vkhutemas implemented an entrance exam policy where prospective students’ abilities in drawing, painting, modeling and technical drawings were tested. Entrance exams were not mandated by constraints of the school intake capacity as in the Bauhaus. According to Lodder (1985), they were meant to establish an adequate threshold of preparedness.

While these schools have influenced architectural education worldwide with varied degrees, it would appear that not much has changed as far as admission policies to architectural schools are concerned. What has changed is the complexity and diversity of tools used to determine suitability and appropriate performance. Eight admission criteria are now carried out by schools of architecture. These can be exemplified by high school records; general scholastic aptitude tests; special architecture aptitude tests; interviews; portfolios; essays; written statements; and letters of recommendation. Table 1 illustrates an analysis of admission criteria adopted by over 100 schools of architecture at the end of the 20th century.

Table 1: Admission criteria as adopted by 118 schools of architecture in different regions

Region	Country	Schools Responded	High school Records	Aptitude Tests	Special Exams	Interview	Portfolio	Essay	Statement	Letter of Recommendation
Africa	Egypt **	22	22	5	0	0	0	1	1	0
	Nigeria **	1	1	0	0	0	0	0	0	0
	Sudan **	1	1	0	0	0	0	0	0	0
	South Africa **	2	2	2	0	2	2	0	0	0
Asia	Bahrain **	1	1	0	0	0	0	0	0	0
	India *	3	2	1	3	1	0	0	0	0
	Israel *	4	4	3	4	2	1	0	0	0
	Kingdom of Saudi Arabia **	5	5	0	1	0	0	0	0	0
	Kuwait **	1	1	0	0	0	0	0	0	0
	Oman **	1	1	0	0	0	0	0	0	0
	Thailand *	2	2	2	2	2	0	0	0	0
	United Arab Emirates **	2	2	0	1	0	0	0	0	0
Europe. W.	Belgium *	1	0	1	0	0	0	0	0	0
	Denmark *	2	2	0	2	0	2	0	0	0
	Finland *	2	0	0	2	0	0	0	0	0
	Netherlands *	1	1	0	0	0	0	0	0	0
	Spain *	1	1	0	1	0	0	0	0	0
	Sweden *	1	1	1	1	0	0	0	0	0
	Switzerland *	2	2	0	0	0	1	0	0	0
	UK *	5	5	3	0	3	4	0	3	2
Europe. E.	Poland *	1	0	0	1	0	0	0	0	0
	Slovakia *	1	1	1	0	0	0	0	0	0
North America	Canada *	3	3	0	0	1	2	1	0	1
	USA **	44	41	37	2	8	22	9	4	9
Oceania	Australia *	5	5	1	0	0	0	0	0	0
	New Zealand *	1	1	0	0	0	1	0	0	0
South America	Bolivia *	1	1	0	0	1	0	0	0	0
	Costa Rica *	1	1	0	0	1	0	0	0	0
	Guatemala *	1	1	1	0	1	0	0	0	0
	Total Nos. Total %	118 100	110 93.2	58 39.2	20 16.9	22 18.6	35 29.7	11 9.3	8 6.8	12 10.2

* Survey results based on Goldschmidt et al (2000), in an unpublished manuscript, University of Delft, Netherlands
** Survey results based on a survey conducted by the author in 2001, in Architectural Education Today: Cross Cultural Perspectives (2002)
- A considerable number of schools utilize a combination of admission criteria

The results of the analysis reveal that some admission criteria are more dominant than others. Emphasis is placed on high school records (93.2%). About 40 % of schools adopt a skill-based aptitude test. While these numbers cannot be generalized, the different admission policies that emerged from the analysis reflect a sustained emphasis on the skills needed for enrolment while knowledge and critical thinking abilities of applicants as they relate to the built environment appear to take a back seat. By and large, admission policies reflect the tendencies of most schools of architecture to emphasize skills in drawing and form manipulation, an aspect of architectural pedagogy that continues to be emphasized throughout the duration of study in schools at the expense of other pedagogical aspects and learning outcomes.

Some responsive attempts are now taking place to balance the two categories in entrance tests and exams. One example to address in this context is the approach adopted by Rizvi College of

Architecture in Mumbai. While the first part of the exam heavily emphasizes the students' abilities in drawing and conceptualizing spaces, the second part of the exam measures the way in which applicants can critically understand issues that pertain to the city and its underlying social, cultural, and human elements. Another approach is adopted by Misr International University in Cairo where an aptitude test is developed in a manner that reflects students understanding of three dimensional objects while at the same time it tests students' backgrounds of art and architecture and their understanding of the environment in which they live.

While the preceding analyses shed light on some tendencies toward admission policies, the impact of those policies on the performance of students in schools and after graduation, and on their skills and knowledge needed for creating humane environments represent that challenge. Now very little is known about the success or failure of admission criteria and the way in which they may shape the attitudes of future architects to understand the true meaning of humane environments. Concomitantly, more in depth studies are urgently needed.

ON KNOWLEDGE CONTENT

In many parts of the world architectural education is accused of being largely unconcerned with the creation of human environments and with the debates and trends raised by the international community. Testing this hypothesis requires tracing two major paradigmatic trends: environment-behavior studies and sustainability and environmental consciousness as major areas of architectural curricula that may provide insights toward understanding of and dealing with humane environments. There is in fact a great deal of discussions in design and architecture circles on these trends, and widely varying opinions as to why and how they need to be introduced in architectural curricula. Taking the Middle East as an example, an investigation of 14 programs in 8 countries was conducted based on literature reviews and preliminary content analysis of the online and printed prospectuses. While this study is still under analysis (Salama, and Amir, 2005) a preliminary investigation reveals several results that are outlined below and illustrated in Tables 2 and 3.

Environment-Behavior Studies

- In 14 architectural programs in 8 Middle Eastern countries 29 environment-behavior related courses are offered under different titles; of these there are 24 offerings within the core curriculum while 5 are offered as elective courses. Philosophy statements and objectives refer to human environment interactions. Most programs offer at least one course that covers the dialectic relationship between culture, human behavior, and the built environment. The highest no. of courses is noticed in the curriculum of King Faisal University and Misr International University where each offers five mandatory courses as shown in Table 2.

- While environment-behavior paradigm appears to be well articulated in some programs, it appears that it did not reach a mature level in others. The architectural program at the University of Bahrain offers three elective courses but does not introduce any in the core curriculum. Environment-behavior issues appear not to be of concern at Beirut Arab University, Damascus University, and Sultan Qaboos University where no offerings exist either as core or elective courses.

- Architectural programming is addressed explicitly in the titles and course contents in the curriculum of Aleppo University, American University of Beirut, Kuwait University, and three Saudi universities. On the other hand, post occupancy and facility performance evaluation are heavily emphasized in the curriculum of King Faisal University, United Arab Emirates University, and three Egyptian universities. In some cases, these issues are introduced under research and design methods titles. One striking observation is that some programs realize the value of design research to undergraduate architecture students as in the cases of King Faisal University, Misr International University, and United Arab Emirates University where research methods is offered as a mandatory course.

- While the contents of environment-behavior courses seem to address the balance between theories as abstract knowledge and the contextual particularities of the local context, it is evident that studio description in all the programs does not indicate whether knowledge delivered in a lecture format is integrated into design assignments in the studio. Thus, it can be argued that knowledge contents are offered in a fragmented fashion.

Table 2: The status of environment-behavior related courses in 14 schools/departments of architecture from the Middle East.

Country	University	Environment-Behavior Related Courses
Bahrain	University of Bahrain	• Visual Perception (elective) • Behavioral Factors in Architecture (elective) • Research Methods in Architecture (elective)
Egypt	Al Azhar University	• Human Sciences and Architecture • Design Methods and Theories
	Cairo University	• Human Sciences and Architecture • Scientific Methods and Decision Making • Design Methods
	Misr International University- MIU	• Human factors in Design • Research Methods in Architecture & Urban Design • Design Methods and Theories • Applications of Socio-Behavioral Studies in Architecture • Community Design Studios
Kingdom of Saudi Arabia	King Fahd University of Petroleum & Minerals- KFUPM	• Man and Built Environment • Senior Project Programming • Socio-Cultural Factors in Design (elective)
	King Faisal University- KFU	• Design Methods I • Design Methods II • Design Methods III • Research Methods • Research and Programming
	King Saud University- KSU	• Man and Built Environment • Programming of Architectural Projects
Kuwait	Kuwait University	• Human Environmental Factors • Professional Practice I: Pre-design & Programming
Lebanon	American University of Beirut- AUB	• Architectural Programming • Sociology of Cultural Production (elective)
	Beirut Arab University	• ----------
Oman	Sultan Qaboos University	• ----------
Syria	Aleppo University	• Architectural Programming
	Damascus University	• ----------
United Arab Emirates	United Arab Emirates University- UAEU	• Design and Research Methods

Sustainability and Environmental Consciousness

- Within the sample investigated, there are only 17 courses that address sustainability and environmental consciousness paradigm in their content; of these there are 12 courses offered within the core curriculum while 5 courses are offered as electives as shown in Table 3. Philosophy statements and objectives of programs refer to relating design artifacts to the natural environment. However, it is noticed that this is not reflected in most of the programs, course contents, or even in elective offerings. Although it was expected that the more technical oriented programs under engineering colleges would have more offerings addressing ecological principles of sustainable design than other programs, the analysis reveals the opposite.

- Although reference is made to regional conditions in program structures, the terms sustainability, sustainable development, ecological design, eco development, humane environments did not appear at all in the course titles or descriptions. It should be noted that similar terms do exist such as “energy conservation” as in the case of the University of Bahrain, Cairo University, Misr International University, and Kuwait University; “ecological analysis” as in the case of King Fahd University of Petroleum and Minerals, or “eco-system” as in the case of King Faisal University.

- While programs at King Fahd University of Petroleum and Minerals and United Arab Emirates University offer one mandatory course that relates environmental concerns to the local context namely “hot-arid regions,” climatic issues are addressed in very generic terms at Aleppo University, Beirut Arab University, Damascus University, King Saud University, and Sultan

Qaboos University. This takes place under the heading of "climate and architecture," where discussions are centered on physical aspects at the expense of understanding their impact on people and the way in which they use the environment.

- The program of the American University of Beirut does not offer any mandatory courses that address sustainable design issues. However, up-to date terms appear in the electives: "energy and sustainable architecture, and intelligent building" though offered in abstract terms without reference to the local environment. Al Azhar University did not go beyond environmental controls issues since no offerings exist.

Table 3: The status of sustainability and environment related courses in 14 schools/departments of architecture from the Middle East.

Country	University	Sustainability and Environmental Consciousness Related Courses
Bahrain	University of Bahrain	• Climatic Architecture • Energy Conservation in Buildings (elective)
Egypt	Al Azhar University	• ----------
	Cairo University	• Environmental Design, Planning and Energy Conservation (elective)
	Misr International University- MIU	• Appropriate Building Technology • Energy Conservation in Architecture
Kingdom of Saudi Arabia	King Fahd University of Petroleum & Minerals- KFUPM	• Design Determinants in Arid Regions • Ecological Analysis (elective)
	King Faisal University- KFU	• Eco-system in Islamic Traditions
	King Saud University- KSU	• Climate and Architecture
Kuwait	Kuwait University	• Solar Energy in Buildings
Lebanon	American University of Beirut- AUB	• Energy and Sustainable Architecture (elective) • Intelligent Building (elective)
	Beirut Arab University	• Climate and Architecture
Oman	Sultan Qaboos University	• Climate and Architecture
Syria	Aleppo University	• Climatic Architecture
	Damascus University	• Climate Architecture
United Arab Emirates	United Arab Emirates University- UAEU	• Architecture of Hot Arid Zones

ON KNOWLEDGE DELIVERY METHODS

While architectural educators strive to impart the requisite knowledge necessary for successful practice, the way knowledge is transmitted has significant professional and social implications. Concomitantly, there is an urgent need to confront issues that pertain the nature of reality "WHAT" and the way knowledge about that reality is conveyed to our budding professionals "HOW". Common teaching practices suggest that gaps exist between the "WHAT" and "HOW". A set of idiosyncrasies and misconceptions can be envisioned (Anthony, 1991; Boyer and Mitgang, 1996; Cuff, 1991; Koch et al, 2002; Salama, 1995, 1998, 2002; Sanoff, 2003; Schon, 81, 83, 85, 1988; Stamp, 1994; Teymur, 1996):

- *Artistic versus Socio-Cultural Paradigms:* The current system of architectural education tends to socialize its members—teachers and students--into a predominantly artistic paradigm that emphasizes personal feelings, subjective judgments, intuition, and imagination at the expense of social and professional responsibilities. In order for future architects to function within cultural contexts and address societal realities and understand the true meaning of humane environments, the socio-cultural paradigm should be introduced. In essence, this requires the development of students' skills that go beyond the capacity of the artistic paradigm. The intention is to add and develop, not to replace or omit.

- *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 experiential and action learning should be introduced. Real life experiences can provide students with opportunities to understand the practical realities and different variables affecting

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. When they do, they place emphasis on one single culture, which is their own.

- *Science as 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. There should be a distinction between the types of knowledge resulting from research in architecture and student should be made aware of them and experience them as well. First, knowledge results from research that seeks to understand the future through a better understanding of the past; research that tests accepted ideas. Second, knowledge 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; the late Donald Schon emphasized this view. The term retrospective here means extensive exhibition of the performance of the work of an architect over time. There should be an understanding of the parts within the phenomena and the interaction among those parts, which causes the holistic behavior. In this context, the analysis of precedents as part of the curriculum should be introduced. How projects were created and in what context, what the client nature and intentions were, how the project was delivered, and how construction was undertaken are integral parts of learning. The story telling attitude tends to ignore these issues.

- *Knowledge versus Design:* The architectural design studio—the backbone of architectural education—rarely includes any research activity, based on the view that the content of design should be directed toward practical ends. It can be argued in this context that knowledge is not a substitute for architectural imagination but inadequate knowledge would handicap the general level of design. Being satisfied to manipulate formal configurations does not provide insights into the human experience. If the different types of knowledge which architecture requires are ignored, the profession will lose its credibility in the eyes of society. Simply, different types of knowledge should be integrated with design assignments.

ON STUDIO TEACHING PRACTICES

A continuous assessment of traditional studio teaching practices is carried out by this author based on surveys, reviews, interviews, and practice. This assessment process has resulted in a number of crucial issues-- stated in the literature-- that are integral to contemporary studio teaching. Such issues are classified into two categories; negative tendencies and positive attitudes—as outlined in Tables 4 and 5, each of which is decomposed into two components that represent the overall studio teaching approach. The two components are: the design process in the studio and the teaching style adopted by the studio director. This classification is based on the fact that the processes and procedures applied in the studio are governed by the way in which studio assignments are delivered in terms of content and key issues. On the other hand, instructors tend to approach each design assignment with a collection of ideas and techniques that, when coordinated, become a teaching style that is influenced by the route taken in the studio.

While the assessment corroborates very alarming negative tendencies and shortcomings, a number of positive attitudes are observed. By and large, the results reveal a growing interest and awareness of the importance of addressing the process as an integral component of studio teaching pedagogy, and of addressing the interaction with social and cultural issues, community groups, and with real life situations.

Table 4: Negative tendencies resulted from a preliminary assessment of architectural design pedagogy.

Category	Author	Negative Tendencies
Design Process in the Studio	Kay J 1975 Watson D 1993 Watson D 1993 Weber C 1994 Salama A 1995 Salama A 1995 AIAS 2003 AIAS 2003	• The process of problem definition is crucial and needs to be addressed in the studio • Design experience is limited to concept formation and schematic design • Students have insufficient opportunity to attain the ability to explore the nature of design • Design studios place an emphasis on the finished presentation of a sketch design rather than the route taken in the studio • Design instructors focus on the how of design although what and why of design are unavoidable components in the design process of a real life project • Although many architectural educators believe that research should be introduced in the design studio, a large number of them do not have a clear definition of research, and how to introduce it in the studio • Students work side by side, but alone, often guarding their ideas from each other, competing for the attention of the studio critic • The synthetic processes of design in which negotiation and collaboration are most critical and difficult, are limited to individual efforts
Teaching Style	Schon D (80s) Cuff D 1991 Anthony K 1991 Weber C 1994 Seidel A 1994 Salama A 1995 AIAS 2003	• The design studio assumes the mastery of the instructor and the student has to believe in the power of the instructor • The design studio focuses on individualistic work eventhough the profession of architecture is a result of group work and a collaborative effort • Evaluating students performance encourages the view of architecture as a result of individualistic effort • The pivotal ritual of the studio is the desk critique, since it is based on the assumption that teachers know how to design and how to respond to particular problems • Design instructors are not clear about their studio goals or objectives and will change them right up from the beginning of the studio and during the assessment process • Design instructors tend to consider teaching practice to be an intuitive process based on subjective view points and personal feelings • Current studio culture rewards students with the best looking projects

Table 5: Positive attitudes resulted from a preliminary assessment of architectural design pedagogy.

Category	Author	Positive Attitudes
Design Process in the Studio	Simmons G 1978 Sanoff H 1979 Sanoff H 1979 Robinson J 1983 Robinson J 1983 Goldschmidt G 1983 AIAS 2003	• The process emphasizes acquiring knowledge while producing design alternatives • The process encourages group discussion for identifying design intentions • The process focuses on transforming behavioral information into architectural form • The process is to explore design rather than to simply reach a solution • The process represents the programming phase as a crucial part in the studio • The process includes information gathering and defining imperatives as primary steps • The ability to serve design as a process serves a graduate for a lifetime
Teaching Style	Simmons G 1978 Sanoff H 1979 Sanoff H 1979 Goldschmidt G 1983 Ledewitz S 1985 Davis H 1983 Wendler W 1983 Penny T 2003 Habraken J 2004	• The style is based on self and peer evaluation. • The style focuses on individual and group activities • The style permits learning about the process of change in a dynamic environment • The style is based on instruction and reaction modes of thinking • The style is based on teaching students how to differentiate relevant from irrelevant information • Students' individual differences are a major concern • Integrating knowledge generating ideas into design should be part of the everyday practices in the studio environment • If we want professionals to be confident contributing leaders in society, we should take every care in making sure that the educational system encourages confidence (not defensiveness), empathy (not self centeredness), and team work (not a star mentality) • We need to integrate knowledge about the everyday environment in design teaching

EPILOGUE: CREATING HUMANE ENVIRONMENTS AND THE SCENARIOS FOR BALANCING KNOWLEDGE-BASED / SKILL-BASED PEDAGOGIES:

The preceding analysis of the five thematic issues convey that gaps exist in the formation of future architects; gaps that are a direct result of the continuous reliance on skill based pedagogy while knowledge based pedagogy continues to be ignored or oversimplified or continues to rely on other disciplines. Knowledge about humane environments, the everyday environment in which lay people, workers, employees, school children, and senior citizens live, work, learn, and entertain is even viewed from a skill based perspective. Current admission policies, knowledge content and delivery

methods, and studio teaching practices corroborate the artistic side of architecture at the expense of society-based or environment-based side of architecture. In his key note address to EAAE conference in 2003, John Habraken argues:

> *"… We need to teach knowledge about everyday environment. How it is structured, what we can learn from historic and contemporary evidence, how different examples compare, how it behaves over time and responds to change of inhabitation or other circumstances. Teaching architectural design without teaching how everyday environment works is like teaching medical students the art of healing without telling them how the human body functions. You would not trust a medical doctor who does not know the human body. Knowledge of everyday environment must legitimize our profession… (Habraken, 2003):*

If the gaps between skill-based and knowledge-based architectural pedagogies be bridged then a number of scenarios can be a proposed. While these scenarios do not provide answers to all the concerns raised underlying the five thematic issues, they provide forms of panacea and represent attempts at balancing and harmonizing skill-based and knowledge-based pedagogies in the educational process of architecture.

- *Thinking Globally and Acting Locally:* The catch phrase of Rene Dubos who called for thinking globally and acting locally should be introduced. Educators should provide students with mechanisms through which they can see beyond their own space, time, and culture, and understand the larger context and processes of human habitation. On the other hand, when they encounter design problems they should be able to create concrete solutions for specific contexts that have specific social structure.

- *Reconciling Lectures and Studios:* This scenario emphasizes the integration of theoretical knowledge provided in the formal lecture into the process of making judgments in the studio. Design should be grounded on theories that should be tested with respect to the problem at hand. It should be conceived as a conversation between the materials of a given situation. In essence, it is an "action-reaction" activity where action is the process and reaction is the investigation of the result. The curriculum policy needs to encourage the incorporation of knowledge in different learning settings.

- *Utilizing the Built Environment as an Open text Book:* It is critical to make students of architecture aware of the fact that the built environment is designed to enhance and support human activities, and celebrate a desirable human behavior. By implementing the experiential learning model, students can learn through their urban experience. A wide spectrum of activities can be introduced to implement this approach, ranging from walkthrough evaluation exercises to presenting movies in order to illustrate how actors interact with the built environment.

- *Developing Students Abilities to Search and Think Critically:* An emphasis needs to be placed upon research, how it is conducted, how to use its findings in design. Cross case analyses linking between different local and international experiences are critical in this respect. Students' skills should be developed in a manner that allows them to comment, criticize, and debate international experiences, and about the role of architecture in enhancing or inhibiting cultural and behavioral attitudes. Immersing students in studying and designing in the local context only has not proved to be a panacea for understanding the local problems. Critical thinking abilities are a key to this understanding.

Environmental Evaluation as a Strategy for Acquiring Knowledge in the Studio

Evaluation research is intended to provide reliable and valid information to those who make decisions about the environment. Evaluation studies, in this sense, are intended to provide a knowledge base for improving the quality of decision-making. Evaluation belongs to the concept of values, where feelings, attitudes and beliefs are employed as a frame of reference.

The evaluation of existing environments provides architecture students in the design studio with insights into variations in the quality of different environments. It offers students the ability to identify emerging cultural problems and societal needs. Students can identify the adequacy of an existing environment and can conceptualize ways to renovate, rehabilitate and upgrade. Evaluation, as a

strategy for acquiring knowledge in the design studio, provides feedback, systematic learning from past experiences and guidance for the future.

Evaluation is a feedback process that seeks to identify values, needs, and problems, goals and objectives, and environmental domains, utilizing specific methods and tools for measurements.

Architecture students can be involved in the evaluation process before developing design solutions in the studio. However, this process should be conducted objectively and systematically – not through casual interviews or observation that may only reveal what is already known. Results of evaluation can be utilized and integrated in the design development process. The most important question in this process is what environment will be evaluated and what aspects should be taken into consideration. The answer to this question lies in the nature of the project at hand, and objectives of the design studio in which this process occurs.

Knowledge Acquisition and Developing Design Criteria

Developing design criteria in the design studio can be achieved by introducing the concept of programming. Programming can be seen as an information processing system; it represents a source for a systematized process that provides a structured framework for accumulating, categorizing and classifying different types of knowledge necessary for design.

According to Sanoff (1992), programming, as an analytical process, encourages decision-making through objective procedures rather than individual assumptions or personal preferences. Effective programming depends on what types of knowledge are needed and on selecting the appropriate tools of obtaining and documenting such knowledge. In this sense, programming is a process of investigating and developing information, and analyzing clients/users' needs and concerns. There are four distinct stages of programming that can be introduced in the studio. They are generic and apply to all programming activities:

- Investigating the existing situation, where students are involved in a process of developing an up-to-date profile,
- Defining needs and trends, where students are involved in a process of identifying current and future opportunities and constraints,
- Generating solutions, where students are involved in a process of determining alternative ways of meeting requirements, and
- Resolving needs and resources, where students are involved in a process of selecting and documenting the design solution that is most direct and feasible.

The programming process involves serial and holistic modes of thinking about the design problem. It involves serial thinking because each step leads to another, culminating in space specification. It also involves holistic thinking because the sequence of the steps requires simultaneous tasks, repetitive cycles and feedback.

Participatory Architecture: A Knowledge Tool in the Studio

Introducing the concept of participatory architecture in the architectural design studio seeks to empower students to better understand the physical and social environment, to appreciate it and to be able to make decisions about it. It attempts to demystify the process of design through its inclusion of non-designers. In this sense, it returns architecture to its former position of being an expression of society, and arising from within it.

User participation as a research tool in the studio goes beyond published literature and interviews to explore issues and needs comprehensively and specifically for each unique situation. It fosters sensitivity in the student to listen to the clients and users, and to be able to filter the relevant information necessary for designing. Collaboration is one of the important factors that participation relies on. In this regard, participation harnesses collaboration toward the making of a coherent architectural product. Participation is, hence, seen as a philosophy that should be internalized by students to be better prepared for professional practice.

There are several strategies for introducing the concept of participation in the architectural design studio:

- One strategy can be exemplified by allowing students within a studio group to play different roles. The students can act as clients, users, and designers. They can review each other to introduce a layer of evaluation different from and equally influential to self-evaluation. The design instructor could also play one of the roles needed to simulate a real life situation. Interdisciplinary design studios, that include students from different disciplines related to the design field, are beneficial since such studios replicate the professional environment, where a group of specialists will collaborate to create a coherent design solution.
- The best strategy for stimulating participation lies in offering students the opportunity to interact directly with real clients and real users. Community design development centers provide one of the few links between architectural education and society. Such centers provide invaluable experience to students and offer design services to the community.

SUMMARY

The intent of this paper has been to critically analyze the relationship between skill based and knowledge architectural pedagogies. Paradigmatic shifts, admission policies, knowledge content and delivery methods, and studio teaching practices have been identified as thematic issues that put this analysis into focus. The analysis conveys a continuous emphasis on the skills required for successful practice while the acquisition, assimilation, and the production of knowledge often take a back seat. A more effective integration of humane environments as a form of knowledge into the teaching practice of architecture is proposed by introducing a number of scenarios that involve real interaction with the everyday environment, integrate different fragments of the curriculum, and foster critical thinking and understanding the environment. The scenarios have attempted to incorporate the type of knowledge necessary for creating humane environments. Within these scenarios environmental evaluation, architectural programming, and participatory architecture have been introduced to delineate the balance and harmony of the skill-based and knowledge-based pedagogies that are crucially needed in the architectural education of the future.

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ACKNOWLEDGMENT

The author would like to acknowledge the support of King Fahd University of Petroleum and Minerals-KFUPM. He extends his thanks to his colleagues that-- through continuous online and face to face discussions-- contributed to the development of many ideas discussed in this paper.