Environmental Knowledge and Paradigm Shifts: Sustainability and Architectural Pedagogy
In Africa and the Middle East

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Paradigm Change: Shifting Attitudes about the Environment

There has been a trend in the past decade to introduce a new paradigm of thinking about the manner in which architects, urban designers, and planners approach the design of built environments. This new paradigm places emphasis on the concept of sustainability, a concept that should become the focus and goal of architectural education worldwide. Accordingly, the question that this paper addresses is: have we, architectural educators, reached to reconfigure our curricula in a manner that is based on sustainability?

Sustainability, within the scope of this paper, is envisioned as a state in which all humans, now and in the future, can live at a decent level of well being within the limits of what nature can provide our species and withstand from it in continuity and at no undue harm to other forms of life. Thus, it is a concept that would entail an economic/environmental component on the one hand, and a socio/cultural component on the other. In this respect, an attempt is made to define some emerging trends in architectural education that may contribute to a more sustainable future.

In recent years, we have witnessed major changes and developments, and have reached the time of the loss of the stable state. Explaining this statement might go beyond the scope of this paper. However, three paradigm shifts or shifting attitudes about the environment can be identified (Salama, 1999). The following is a brief discussion of these shifts. They are presented in a sequential manner, where one paradigm shift leads to another.

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 (1977) affirms this view when he argues that there are no parts at all, that 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.

Corresponding to the preceding views, one can argue that different assumptions of value can
provide insights into the understanding of new paradigms. In the old paradigm, the value of housing, for example, 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. According to Capra et al. (1992), the acceptance of the concept of sustainable development means the harmonization of the concepts of economy and ecology, which increasingly share the same meaning, i.e., the intelligent running of households with the available human and natural resources.

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 man 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 this respect, one can assert that sustainable development relies on a change in culture, supported by an adapted economic system and fed by appropriately used technology. The same technology that has been employed to conquer and subdue nature needs to be employed for the benefit 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 interdisciplinary practice 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. It provides designers and planners a criterion of social and ecological rationality that is different from market logic. It is rooted in the real need to fit human settlements within 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 make 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.

The preceding paradigm shifts mean that the way we think about our environments has changed, that interdisciplinary thinking is now taking place, that economy and ecology should be integrated, and that eco-development in the very near future will definitely replace techno-development. These shifts frame the need to investigate how these concepts are introduced to our students, our budding professionals.

The argument here is based on the belief that if real sustainable development is a target, then
architectural education could open a new avenue toward its achievement. Concomitantly, the paper reviews the literature on sustainability, identifies attitudes for understanding its underlying domains, and investigates the status of related architectural courses in a number of African and Middle Eastern architectural schools. The paper introduces a new architectural program in one of the new Egyptian private universities, namely Misk International University (MIU), a program that attempts to develop students’ attitudes in a manner more responsive to sustainable development demands.

Sustainability and Sustainable Development

The linguistic definition of sustainability is to endure without giving way or yielding (Webster Dictionary, 1991). When looking at recent debates on sustainability one can observe that, implicit within these debates, is a criticism of the values, attitudes, and tools by which most of the built environment has been produced over the years, which have led to social alienation and environmental depletion. Several definitions of sustainability correspond with this criticism; where some definitions focus on environmental criteria, others integrate socio-cultural aspects into environmental concerns.

On the one hand, the statements made by Lyle (1985) and Davies (1994) exemplify the definitions that focus on environmental criteria. Lyle reports that the objective of sustainability is to provide intentionally designed and managed ecosystems that represent a symbiosis of urban and natural processes. Davies places emphasis on the same criteria. He argues that the aim is to avoid the shortcomings in our culture in terms of the way we presently build and live, and re-introduce building as a process which is concerned with the impact it has on the people and the environment involved.

On the other hand, the integration of environmental and socio-cultural aspects can be envisaged within the declarations made by the international community. In the Rio declaration, sustainability is seen as staying within the capacity of the natural environment while improving the quality of life and offering our children opportunities at least as good as those available to us. The declaration of the World Congress of Architects, 1993, confirms this view when it mentions that we are socially, culturally, and economically interdependent. Sustainability in the context of this interdependence requires partnership, equity, and balance among all parties.

The preceding discussion suggests that the main idea behind sustainability is to create an effective system of resource distribution and utilization with a long-term perspective in mind. A sustainable society in this domain is one that can persist over generations, one that is far-sighted enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support.

Sustainable development is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (ECE, 1996). As this is a very general statement, it is necessary to elaborate the definition further, based on the literature that has grown over the last decade (Lyle, 1993; Stern et al., 1992; Rees, 1990). The concept of sustainable development, with emphasis on environmental sensitivity, has presented a great challenge to both developed and developing countries. It has an essentially relative and normative character, which makes it difficult to put into practice. In this kind of development, socio-economic objectives are balanced with the constraints that nature sets. Thus, it is based on the principles of self-reliance, fulfillment of basic needs, and an emphasis on the quality of life. Based on the above definition, one can conceive two objectives to be achieved by implementing the sustainable development concept. These are: a) achieving explicit ecological and socio-economic
objectives and b) imposing ecological limits on material consumption while fostering qualitative development at the community and individual levels. The implications of these objectives in ecological, social, and economic terms for design, planning, and management of human settlements are to be envisioned as appropriate technology and ecologically based designs, low energy consumption, selective and efficient use of resources, and ecological principles to guide land-use planning, participatory design and planning, waste and urban recycling.

In sum, sustainability involves two domains that should not be ignored or oversimplified: economic/environmental on one hand, and socio/cultural on the other. The question that should be raised at this point is: are architectural programs structured in a manner that is based on the above objectives of sustainability and sustainable development? The following section is devoted to this question.

**Sustainability and Architectural Pedagogy in Africa and the Middle East**

The objective of architectural education could be thought of as educating architects capable of creating meaningful environments. This is evident, since the primary concern of architects is to create three-dimensional structures of space and form to accommodate related human activities. Thus, architectural education should be regarded as the manifestation of the ability to conceptualize, coordinate, and execute the idea of building rooted in the tradition of humanism (Salama, 1995). Architectural education prepares budding professionals for professional practice, research, education, industry, and government agencies as these relate to the design of the built environment. The needs of people, the context for building, the dialectical relationship between the built environment and the natural environment, and the impact of natural forces must all be addressed in architectural education. In essence, these should be regarded as major factors influencing the creation of built environments and the development of attitudes of future architects and planning professionals (Salama, 1998).

In order to investigate the status of architectural courses that introduce the components of sustainability, eight schools/departments of architecture have been identified to examine their undergraduate programs leading to the first professional degree in architecture (Bachelor degree). There have been no specific criteria for selecting the schools. Thus, the investigation is not intended to provide a comprehensive generalization on the status of architectural education in Africa and the Middle East. However, the intention is to have a closer look at the issues addressed within the sample surveyed.

The survey of the undergraduate programs of the eight schools involves the search for subjects that go beyond the traditional courses in skill development, basic design courses, building construction courses, civil engineering courses, history and theory courses, and architectural and urban design studios. The objective is to identify courses that reflect the interest of the school in issues pertaining to the two domains underlying sustainability. Concomitantly, the methodology employs the following procedures:

- Classifying the non-traditional subjects/courses in terms of the two domains underlying sustainability: economic/environmental and socio/cultural.
- Analyzing the weight of courses underlying each domain in terms of number of courses. (The assumption is that the total number of courses underlying a domain reflects the number of contact hours or credit hours).
- Employing a content analysis procedure in order to draw generic conclusions about the status of each domain in each school and then the whole sample. This involves analysis
of course descriptions as written in the prospectuses of each school.

- Linking the results with the overall argument.

Another empirical approach has been employed through the examination of the philosophy statements written in the prospectuses of the schools surveyed. A major problem with this approach is due to the limited description of the objectives of each school and what is actually taught and the general lack of confidence in the accuracy of these statements. However, it provides insights into the understanding of the major concerns of a school, the interest of its faculty members, and the overall attitude about sustainability. The schools/departments are: Cairo University and Al Azhar University (Egypt), Addis Ababa University (Ethiopia), University of Nigeria and Ahmadu Bello University (Nigeria), University of Damascus (Syria), and Middle East Technical University and Gazi University (Turkey).

Discussion of Major Findings

Based on the survey of the eight African and Middle Eastern schools of architecture, there were several striking findings. These can be framed as follows:

The philosophy and objective statements outlined in the introduction of the prospectus of each school/department place emphasis on the importance of relating design artifacts to the physical environment and available human and natural resources. However, this is not reflected in most of the programs, course contents, and even electives and courses leading to minor or specialization studies.

The words sustainability, sustainable development, green design, ecological design, sustainable design practices did not appear at all in any of the course titles or course descriptions of any school.

The weight of the two domains underlying sustainability and sustainable development varies in each school. However, it is striking to notice that in Addis Ababa University and University of Damascus, the socio-cultural domain is not considered at all. It is also interesting to notice that the total number of courses that pertain to the economic/environmental domain is 36 courses, while the number of courses that pertain to socio-cultural domain is only 21 courses.

The number of courses that pertain to the economic/environmental domain is high, compared to the socio-cultural domain. However, it presents a very low percentage (less than 8%) compared to the overall program in each school. In addition, content analysis reveals that the content of these courses rarely refers to the environmental context within the region. It usually refers only to the advanced technology of the Western world.

The content analysis avows that the program of the University of Nigeria emphasizes the importance of environmental issues, and this is evident in the number of courses and their descriptions. Middle East Technical University and University of Damascus address issues related to the environment and climate and their relation to architecture. Other schools introduce the technical and technological aspects without significant reference to environmental concerns and protection of natural resources.

The content analysis reveals that the socio-cultural domain is highly considered in Ahmadu Bello University through the courses offered: indigenous architecture, man-environment relations, rural geography, and rural sociology. Also, the University of Nigeria addresses this domain through the courses offered on traditional architecture in Nigeria, and the sociology of housing. Middle East Technical University places emphasis on courses that pertain to restoration and conservation as processes of building/urban recycling and adaptive re-use of the built heritage. It should be noted
that in Cairo University and Al-Azhar University, although the number of courses underlying the socio-cultural domain is average compared to the whole sample, a considerable emphasis is placed on environment-behavior studies and the way in which people interact with the built environment.

The preceding findings correspond with the literature, where Franz (1998) argues that the understanding of sustainability is confined to its physical dimensions, exemplified by aspects such as greening, wilderness preservation, energy efficiency, and recycling. Very few professionals regard sustainability from a broader social equity perspective. In his survey, Franz confirms that many architects admit that they are poorly informed about issues that pertain to deep sustainability and environmental concerns.

The literature review (Pirage, 1994 and Hallin, 1995) and the survey of the eight African and Middle Eastern schools are corroboration that the professional community of architects and urban designers does not realize the essence of sustainable practice and development to the extent that is either technologically possible or socially warranted. In this respect, the findings assert that the academic community must become more involved in teaching and research about sustainability and sustainable development.

Reconfiguring Architectural Education: A Case from Egypt. Misr International University Undergraduate Program of Architecture

The Undergraduate Architectural Program of Misr International University (MIU) was developed in June/July 1996 by a committee led by the author. The structure of the program is constituted with the aim of providing students with a broad base of knowledge and understanding of inter-relationships of humans and their environments. It offers a base for developing the fundamental design methodology and technique required to respond to those needs of society that demand some form of design product. This statement is clearly reflected in many aspects of the program, since it offers courses that address current and future realities and challenges including sustainability and sustainable development.

The statements of the program’s educational philosophy, goals, and objectives mirror an interest in the economic/environmental and socio-cultural domains underlying sustainability and sustainable development:

“The program investigates social, technological, and historical paradigms relevant to the making of architecture and urbanism. Course work focuses on the synthesis of culture, history, environmental conditions, and social aspirations.”

In these statements, sustainability is a major concern:

“The program offers an excellent opportunity for exploring issues of sustainability and urban renewal and rehabilitation, placing emphasis on basic human needs and assuring relevance with local, regional, and global contexts.”

The design of the program is based on grouping the courses underlying nine major categories, each of which reflects a unique area of specialization required for graduation. The weight of each varies according to the number of courses and their credit or contact hours. Most of the categories include one or more courses that are devoted to the notion of sustainability with its underlying domains.

When analyzing the non-traditional subjects/courses of the MIU undergraduate program using the same methodology that has been employed in the analysis of African and Middle Eastern
schools, one finds that a considerable emphasis is placed on achieving the principles of sustainability. The economic/environmental and socio/cultural domains are balanced. The interesting feature of the program is that the content of specific courses is devoted to bridging the gap and linking the two domains (Fig. 1).

**Figure (1):**
MIU courses that cover economic/environmental and socio/cultural domains, an attempt to achieve balance and integration.

The content analysis confirms that some courses are still taught within the scope of the advanced technology of the Western culture. However, it is noteworthy to assert that there are course contents (Appropriate Building Technology/Energy Conservation and Architecture) that develop new visions and take into account the local and regional dimensions of the environment. The socio/cultural domain appears to be of interest, where there are courses that deal with issues of human, social, and cultural nature (Human Factors in Design/Socio-behavioral Studies in Architecture), delineating cultural and behavioral responses to the environment. Yet, only a small group has graduated, so the impact of the program on the attitudes and capabilities of future graduates remains to be seen.

**Conclusion: Architectural Pedagogy for Sustainable Future**

Essentially, this paper has argued that there should be a new manner in which we approach the design of built environments. This, in turn, necessitates revision of architectural programs, curricula, and their implementation. A literature review has been employed in order to define the attitudes for understanding sustainability and sustainable development and their underlying domains, economic/environmental and socio/cultural. A survey of undergraduate architectural
programs leading to first professional degrees in architecture in eight African and Middle Eastern schools has been conducted. Its results confirm that the concepts of sustainability and sustainable development are in their birth phase within architectural education processes. This is evident, since most of the courses in the economic/environmental domain are taught based on the principles and practices of the developed world, and rarely refer to the environmental context within the region. Architectural courses within the socio/cultural domain are not of concern in some schools, in terms of the number of courses, and their academic content.

Despite the fact that the survey exhibits several shortcomings in the sample surveyed, a number of positive attitudes have been observed, where the content analysis of courses attests that the program of the University of Nigeria emphasizes strongly the importance of environmental issues, while Middle East Technical University and the University of Damascus address issues related to the environment and climate and their relation to architecture. It also shows that the socio/cultural domain is considered important at Ahmadu Bello University and the University of Nigeria. Middle East Technical University places emphasis on courses that pertain to restoration and conservation as processes of building/urban recycling and adaptive re-use of the built heritage. In Cairo University and Al-Azhar University, special attention is given to environmental behavior studies and the way in which people interact with the built environment. Based on the survey and the literature, I would assert that the process of architectural education in the developing world has been slow to respond to the demands placed on the profession by the international community.

The analysis of the MIU undergraduate program confirms that economic/environmental and socio/cultural domains are treated equally, and are balanced within the overall program. They are integrated through a set of courses that aim at incorporating the knowledge of one domain into the other. Based on this analysis, I would argue that this program attempts to reconfigure and restructure the educational process in a manner that is based on sustainability.

Architectural education should be more responsive to sustainability and sustainable development fields. The academic community should be involved in providing opportunities for future architects and urban designers to develop more socially and culturally responsible, and environmentally responsive architecture. It is recommended that architectural educators should strive to balance the way in which students view relationships with the physical and social worlds. Architecture students should be made aware of alternative viewpoints including the view of the material world as something to be respected rather than to be conquered and controlled.

References


Prospectuses, Catalogs, Scientific Bulletins, and Undergraduate Handbooks of the Schools/Departments of Architecture of: *Cairo University, Cairo, Egypt; Al-Azhar University, Cairo, Egypt; University of Nigeria, Enugu, Nigeria; Ahmadu Bello University, Zaria, Nigeria; Addis Ababa University, Ethiopia; University of Damascus, Damascus Syria; Middle East Technical University, Ankara, Turkey; Gazi University, Maltepe, Ankara, Turkey*