A TEACHING AND LEARNING ENVIRONMENT FOR INTEGRATING VIRTUAL LABORATORIES

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Abstract - *In the course of a program in architectural design education, the students learn architectural concepts, the literature, and design criteria in addition to information about human dimensions and physical settings. Architecture not simply represents a functional structure made by a designer; it also constitutes an influential and shaping force in human life. Design students must acquire not only the necessary technical knowledge but also learn about human behavior and its relation to the environment through much greater integration of environmental and behavioral sciences in architectural education. The desire to understand the nature of mutual influence of human behavior and environment has stimulated theoretical studies in the environmental psychology. Through the use of design methods in architectural education, various theoretical studies in environmental psychology have served as sources for the development of architecture. The integration of environmental psychology in architectural education will help educators in training fully conscious architects for the creation of livable man-made environment which is more suited to the rapid changes in the world.*
Key Words: Environmental Psychology; Architectural Design Education; Interdisciplinary; Integration,

INTRODUCTION

Architecture is not merely building a functional structure nor is it only a branch of art performed by designers. Indeed, it plays an influential orientating role in human life. The fact that the problems caused by design errors in the environment constructed by humans are irremediable and that the importance of humanistic architecture has been well understood has once more underlined the necessity of behavioral and social sciences, that discuss the human fact, in design education. Designers have seen that cooperation with psychologists and other social scientists helps answer many of the design questions and they have also seen how, for instance, design settings support and facilitate certain human activities. They have drawn attention to the need that architects should be taught human psychology and behavior in architectural education so that they will consider the environment as a significant field of architectural research and shape it accordingly.

Concerning the relationship between the environment and human behaviors, it is observed that, so far as the physical settings affect behaviors, the individuals affect and change the environment also.   Various theoretical studies in Environmental Psychology [1; 2; 3], used together with the design methods [4;5], have led to developments in architecture. The endeavor to understand the interaction among human behaviors and preferences and environment and culture [6] has brought about theoretical studies in human-social sciences and architecture. Architects and designers and behavioral-social scientists have begun to study the complicated human-environment relations and the physical settings systematically within the framework of a common objective. It has been found that it is necessary to include such work in architectural design education to educate better architects and designers.

ENVIRONMENTAL PSYCHOLOGY

Environmental psychology is a field of science that especially meets the demands of the world today in that it explores both the suitability of the familiar, everyday physical environment in which people live and work for social planning and architectural design, and the human behaviors in such environments. The risk of environmental sources vanishing day by day and the importance given to the human-environment interaction speed up the studies carried out in this field. It is considered that a crucial way to obtain knowledge about the nature of human behaviors is through the study of the demands of people from their environment and how they use it to meet their personal needs. Craik [7] defines environmental psychology as a perspective where study is done about "the physical setting of all behaviors" and further enlarges the borders of psychology beyond a stimulant-reaction study as to include the study of behaviors organized with the large scale environment and in larger intervals. Proshansky [8] defined environmental psychology as an attempt to constitute the empirical and theoretical links between the individual's behaviors, experience and the environment. Environmental psychology as a field of psychology focusing on the study of the relationship between physical environment and human behaviors- experience [9], while exploring the

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psychological effects of the buildings and the architectural environment, concerns itself also with the environments peculiar to themselves, such as crowding and privacy.

Scientific interest in the effects of ecological and "geographical" environment on man was put forth among psychologists years ago in the works of Koffka, Murray, Brunswick, Tolman and Chein. However, many "environment-oriented" psychologists drew their attention away from the molar physical environment either to Lewin's life space theory (Life space: Psychological condition perceived by individuals), or to the micro environmental "stimuli" theory of the perceptional and operant psychology [10]. Yet, the first systematic approach among psychologists towards the ecological environment and its effects on people was initiated by Roger Barker [11] and his colleagues before the end of 1960's and beginning of 1970's, when environmental psychology emerged. Daniel Berlyne joined Roger Barker in his theory of psychological ecology with his own theory of environmental aesthetics, J.J. Gibson with his theory of landscape perception, Kurt Lewin with his research of life space and action, B.F. Skinner with his theory of operant conditioning and E.B. Tolman with his theory of cognitive map. Also, besides psychology, writers such as Jane Jacobs and Lewis Mumford from city planning, Richard Neutra from architecture, Erving Goffman from sociology, Edward Hall from anthropology, Nikko Tinberg and Heini Hediger from ethnology have attracted attention to the need to study the relations between people and their environment [12]. The formulation of environmental psychology has been affected through the first developments and theoretical studies in ecological psychology. This effect, as a determinant of environmental psychology, the dynamic mutual interchange between man and his environment, has been reflected to the significance attributed to molar physical environment today. However, the intellectual sources of environmental and ecological psychology are quite different from each other. Environmental psychology attaches much importance to interpersonal operations and the subjective as well as objective effects of the environment on individuals and groups. Though environmental psychology is viewed as a field of psychology, it actually differs from other psychological research fields that explore the relationship between human behaviors and environment, in some substantial points. Stokols [10] explained these points as follows: Contrary to many sub-fields of psychology, environmental psychology brings an ecological perspective to the studies of environment and behaviors. Therefore, in environmental psychology, environment is interpreted within the multi-dimensional molar terms. This subfield focuses mostly on the interaction between the people and their socio-physical surroundings rather than on the links between different stimuli and behavioral reactions. Environmental psychology gives more weight to the use of scientific strategies in the solutions for socio-environmental problems than many other fields of psychology. In the

Lewinian tradition [13], this composition of "fundamental" and "tested" perspectives is given on the research conducted upon such subject matters as social impact assessment [14], perceived environmental quality [15], and urban stress [16]. Due to the macro-scale confusion and the need to approach socio-physical environment and analyses at different levels, most research in environmental psychology is, both in terms of its scope and conduct, interdisciplinary.

On account of the aforesaid points, research subjects and strategies classified under the title of "environmental psychology" as the parts of an interdisciplinary field on environment and behavior or "man-environment relations" can most probably be best expressed in this field. This field encompasses many different viewpoints about environment and behaviors such as human ecology, environmental and urban sociology, architecture, planning, natural resources management and behavioral geography. Though it has close links with these fields of study, it differs from them in that it gives relatively more importance to the basic psychological operations such as cognition, development, personality, learning etc. and to the individual and group (opposite of which is 'social') levels of analysis than they do [10]. Environmental psychology is an "Anglo-Saxon" term. In Europe, the term Architectural Psychology is more common. The terminological difference arises from the fact that the scope of the former is broader than the latter and that the former comprises also all the environmental arrangement and design work like the city design and planning, natural arrangement, industrial design and interior architecture [17]. The close connection between environmental psychology and architecture and the existence of an area shared by both has caused these two to work together. "Journal of Architectural Research" and "Design and Environment", in which the works and research of architects and designers appear, has been published since 1971 and 1969 respectively. Thus, weight has been attached to the need of practitioners in the shared fields of architecture and environmental psychology. North and South American (EDRA), European (IAPS), Japanese (MERA) and Australian/New Zealand (PAPER) organizations are devoted to the study of human behavior and the physical environment. Each manages a regular conference, publishes proceedings, either annually or bi-annually, and sponsors a newsletter.

ARCHITECTURE AND ENVIRONMENTAL DESIGN RESEARCH

The emergence of environmental psychology started in 1960's when the world went through political changes and technological developments following the II. World War. Two intellectual movements influenced it during this time. These are the Human Rights Movement that opposed colonialism, discrimination of people within nations, unjust distribution of forces and resources after II. World War and the Ecological/Environmental Movement whose goal was to

preserve the natural resources on earth and to prevent environmental pollution. Demands forcing solutions for the political and social problems affected architecture and psychology, the two professions closely linked to the development of environmental psychology, differently.

During the thirty years following II. World War, new construction technologies were developed as a result of the Modern Movement in architecture and many buildings and city areas were constructed. Unfortunately, it was seen that most of the buildings did not operate and meet the users' behavioral needs as good as conjectured and expected. The objectives, ideals and works of the Modern Movement are criticized by behavioral scientists, architectural critics, and architects, architectural educators by means of articles, studies and lectures [12]. This criticism includes many topics and is varied. One of the topics is about the observations on the necessity of the potential participation of behavioral sciences in the education and practice of environmental design professionals. It is stated that unless there exists a close professional relationship between the architects and users at times when values can be different, architecture can not succeed. It is stressed that both the Modern and Postmodern architectural ideology have neglected the cultural differences among people. Since 1960's, professionals of architecture and design have started to gradually accept the notion of the interaction of architecture and human behaviors. They have begun to view human needs and experiences rather than aesthetic satisfaction and symbolic meanings as the true values. Architect-designers have defined the physical environment and human actions related to each other in the designs and expressed their opinions.

With the re-evaluation of values in the developmental process of humanity and new inventions, humanistic architectural designs aimed at nature and a livable world has gained significance. Research has begun as to how design works should be considering the needs of people and their physical and socio-psychological health. Post-occupancy evaluations-POEs has been discussed [18;19;20] and designed by the architects and planners, which is the research conducted by designers and social scientists based on the accumulated experience of the present inhabitants of the housing developments are one type. Much useful information is gained through the evaluation of the users' lives in the surroundings of the building and advantages and disadvantages of the design can be understood with the help of inhabitants' opinions. These points can be paid attention to in future designs and errors can be avoided. Designs enabling users to lead more healthy lives in the housing environments can especially be created. In addition, design guidelines comprising the principles to be formulated through the application of post-occupancy evaluations (POE s) is another important development.

In another study, it is projected that happier and more satisfactory surroundings will be created by involving the users in the design process and informing them of and giving them a say over the environment in which they are to live [21]. However, not everybody agrees with the idea that participation of the users is important for their satisfaction. For example, B.F. Skinner [22; 23] puts forth that cultural designer can know, by making use of the behavioral science, how to plan and develop an environment that will make people happy and creative. He says that there is no need for the people to participate in the decision-making process of design and that the "expert" who has gone through education and instruction will design the environment in the way that will satisfy the people. On the other hand, participation of users is accepted and the discussion goes on only about the phase at which this participation is to take place and what sort of participation it is to be. At this point, three types of participation, checking, input-feedback and implementation are suggested. In case of lack of direct participation of users, it is suggested that social scientists study and evaluate users' feedback concerning the design and thus involve users in the process. Evaluation research is, ideally, a tool to increase the logicality of the policy making to be followed in the design.

ENVIRONMENTAL PSYCHOLOGY IN ARCHITECTURAL DESIGN THEORY AND EDUCATION

As one tries to define the relation between human activities and physical appearances in various architectural designs, one finds it useful to obtain information about human behaviors. While on one hand, buildings are designed in such a way as to contain machinery, equipment and other non-living objects; on the other hand, buildings are also designed for humans –dispensaries, psychiatric hospitals, prisons, schools, housing settlements. Besides these extreme ones, buildings containing both human and objects such as libraries, laboratories, large stores, offices and the like are also designed. As one goes from buildings that contain the fewest to the ones that contain the most people, the success of a building is assessed upwardly according to whether it meets the needs and activity preferences of the users. From this point of view, the contribution that behavioral sciences make is to study the interaction between buildings and their users in order that architects more clearly see the psychological effects of the building environment. In this way, designers' attitude towards architecture will be altered and their designs will accordingly be affected. However, help of social scientists at various levels is neither necessary nor desired by architects in finding solutions [24]. Many architects have started to write about architectural determinism (that human behaviors determine architecture) which has commenced to show up especially at shopping areas, neighborhood and housing development and in designs of buildings belonging to institutions. The insufficiency of the foreseeing power of the beliefs held by designers concerning the relation between the building environment and human behaviors in creating "a good

surrounding" has pointed out the need for a scientific-theoretical basis, also including behavioral sciences, to guide architectural activities instead of belief.

The present architectural theories, being mainly related to the architectural thought schools or a series of ideologies espoused by individual architects, constitute the knowledge basis of architectural design education. There are three main aspects in today's theories other than behavioral concerns. The fist one focuses on aesthetics as the continuation of the Modern Movement, the second one cherishes the expression of the ordinary and the third one view the future in line with the utopia. Theory is a mental scheme believed to explain a fact or a group of facts. It is a system of thoughts or situations [25]. This type points out to the positive theory and is composed of two parts: the substantive theory and the procedural theory. Substantive theory is concerned about the facts architects and other designers deal with in their profession and about the nature of the environment. It is divided into two theories that are related to each other: the natural environmental theory concerned about the physical, chemical and geographical structure of the environment, people and other organisms and the person-environment theory studying the relations of people with their environments and other people and rendering man biologically, psychologically, socially and culturally intelligible. The procedural theory is concerned about the nature of application in environmental design areas. Another theory is the normative theory which serves as an instruction to act. Design principles, standards and papers read at a conference are samples of this theory in architecture. The normative theory is also composed of substantive and procedural theories. It is about different designers' and design schools' opinions about the role of the designer and design of a good environment. One can count four basic theoretical approaches concerning the relationship between environment and behaviors [25]. These are: the free will approach: this approach, which claims that environment has no effect on human behaviors, is undefendable, taken into consideration the various limitations people have as biological beings. The possibilistic approach: this approach accepts that environment has somewhat more influence in shaping human behaviors and discusses the environmental possibilities that affect the behaviors. Behavioral analyses set forth the idea that man is not totally free in his actions and that he is conditioned externally by worldly, social and cultural environments, internally by motivation and talents. The probabilistic approach: this approach says that environment, in touch with the needs, capacities and perceptions of individuals, is full of supports. Latest studies on environmental design and behavioral relations are based on this approach. The deterministic approach: Supporters of this approach are of the opinion that people are actually controlled by genetics and environment even when they seemingly act according to their free will. Environmental determinism accepts that environment is the major determinant of human behaviors, as environment changes, the behavior also changes and there is a simple cause and effect relationship between environment and behaviors. Environmental determinism, physical determinism and architectural determinism are defined at different levels. This is because behavioral sciences take the term determinism in a very general sense. According to them, changes in the environmental arrangement cause subsequent changes in individuals' social behaviors and aesthetic values. Architectural determinism defends the view that the environment (the surroundings of the building) arranged with natural and architectural elements causes changes in man's social behavior.

The student, who, with the architectural design education, starts to learn the new cognitive processes and theories, encounters information and concepts that he/she has never learned or thought of before. It is one of the main principles of design education to bring up imaginative works along with the rationalization of architecture through study. One tries to develop the student's architectural literacy and talents inside the design studios where, contrary to other classrooms, debates, conversations, drawing and model-making take place [26]. In design education, the student is taught the dimensions of man, the actions of man, the structural aspect of physical settings and the necessary information about setting arrangement for man and society. It can be shown through the involvement of environmental-behavioral studies that physical settings are observable upon the personal and meaningful sides of the individuals. Environmental-behavioral studies should be included in the design from the very beginning of the architectural education, for man and society are the shared subject matters of both architecture and social sciences [26; 27; 28]. The traces of rapid social, cultural, economic and political changes together with the changes in time and technology are observable in architecture as well as in man-environment relations. The student must be taught these relations in design education. The student must be able to rationalize all that he/she has learned within the system of knowledge. In the light of the education provided this way, the student must be able to create new approaches for architecture by using his/her imagination.

CONCLUSION

Although architecture as a practice has not embraced the behavioral sciences to the extent hoped for, the education of architects typically includes some exposure to human behavior. The idea that design affects users and can make a difference in their lives is central to every major design profession. In many other countries outside of North America, however, there is better and more sustained collaboration between architecture and environmental psychology. This seems particularly true in economically developing countries and in smaller countries where the trivialities of professional turf wars are not as easily

tolerated. The direct link between environmental psychology and design has begun to develop in the form of design guidelines or programming documents, particularly for the design of specialized facilities. Various universities in America and Europe have opened courses on environmental psychology within the framework of architectural design education and established special laboratories for this purpose.

The design studio, where architectural project courses are given, is the basis of architectural education. The objectives and methods of education should be properly set in the studio work. Environmental-behavioral studies should be given the due importance. It is revealed in studio designs that the student needs more systematic knowledge on the interaction among man, culture and environment. As Salama [28] who relates environmental-behavioral studies to architectural pedagogy puts; the literature of social sciences is necessary in the educational process of architecture. The integration of environmental-behavioral studies into architectural design education may prevent the student from evaluating people for their actional sides only and allow him/her to assess man as a psychological and social being defined in the relationship between environment and culture. In this sense, in the studios, the student must be able to handle and test the problems during the design work in accordance with the theories. Architectural design in education must be deemed as an action-reaction activity and results must be deduced accordingly. Knowledge obtained in various disciplines should be used in the studio setting in an active and efficient way. Besides the world and man being studied and rationalized in an interdisciplinary dimension, the student's creativity and imagination should also be encouraged, which is one of the major principles of design education. One can make use of the findings of psychology and architectural pedagogy to improve the creativity and activate the imagination.

The sciences concerning man, society, nature and technology must be integrated, the interdisciplinary theory and practice must be combined and thus the student must be provided with favorable working conditions. Technological developments, contemporary fields of progress and many topics of research and approaches in the in-between cross sections of architecture must be handled in the architectural education. Thus, to preserve, design and improve a livable world, there will be a stronger possibility of getting more sensitive and equipped architects educated.

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