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# An analytic study on the traditional studio environments and the use of the constructivist studio in the architectural design education

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## Abstract

The architect should be equipped with knowledge of many branches of study and varied kinds of learning. This knowledge is mainly constructed by means of practice and theory (Vitruvius, 1914). Architectural education is considered to be a complex process. Its creative demands must be supported by an understanding of art, science, psychology, mathematics, engineering and etc. The design studio has long been the major component of architectural education. Traditionally it has involved a relatively small group of students under the direction of a studio master, and an instructor. This paper analyzes the characteristics of traditional studio environments, compares it with the constructivist studio in general and recommends a transformation in the design studio.

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*Keywords:* Architectural design education; studio environment; traditional design Studio; constructivism.

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## 1. Introduction:

Learning can be considered as a process that involves the whole experiences of an individual influenced by different factors such as his distinctiveness, educational environment, social environment, skills, abilities, and etc. Although learning is mainly a student-centered, the attitudes of instructors, the curriculum goals and the conditions of the learning environment are also very effective in the process. Thus learning can be defined as the outcome of an individual who is constantly active and interactive with her/his environment. Learning is contextual; it takes place in a social context. Gagne suggests that different internal and external conditions are necessary for each type of learning (Kearsley, 1994). Hence the educational environment has an enormous effect in learning.

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### *1.1. Architectural education*

Onat defines architectural education as a system of efforts that should be implemented individually in order to obtain necessary behavioral development compelled by architectural profession. This behavioral change should be achieved through individual's own experiences; otherwise it could not be permanent. For this reason, practice is extremely important in architectural education (Onat, 1985, p.29).

According to Teymur (2001) there are two purposes of architectural education. The first purpose is the education /training of future architects and the second one is helping to bring up "good, educated, citizens". In the light of these definitions, the theory and the practice of architectural education can be built on a set of parameters that have been derived as much from an intelligent common sense as from the philosophy of education.

### *1.2. Architectural design education*

The architectural curriculum, as distinct from the majority of other disciplines in the university system, is organized with a special, privileged, "core" subject; design. Design is an iterative, decision-making process that produces plans by which resources are converted into products or systems that meet human needs and requirements or solve problems.

Design process can also be defined as a process which involves all activities which can be performed by a designer from the beginning until locating the final solution (Kurt, 1994). This procedure is full of repeated actions which lie between a problem definition and the solution of this problem. It is the research and decision making process that defines the problem to be solved by design. Rittel (1973) asserts that design can be thought of as problem setting -locating, identifying and formulating the problem, its underlying causes, structure and operative dynamics- in such a way that an approach to solving the problem emerges. Architectural programming is a dominating part of this process. Programming is generally viewed as an information processing system setting out design directions that will accommodate the needs of users, the client, the designer or the developer (Sanoff, 1999).

This information contains some basic quantitative data, which includes also constraints or requirements in terms of the production process. Such constraints and requirements guide the design process and shape the manufacturing environments like form features, proximities, adjacencies, dimensions, performance related issues as thermal acoustical or lighting expectations, and etc. (Pham, 1991). Correspondingly the nature of architectural design requires management of multiple levels of information in different stages of the design process. The information created at one phase along the process of design becomes input and constraint to the later stages.

Although the design process consists of regular experimentation, it can be said that architectural curriculum generally has few real variations in different countries (Teymur, 1985). They are variously informed by pedagogic traditions (e.g. Beaux Arts, Bauhaus, etc.), requirements of the profession or the registration boards or the recommendations of the accrediting bodies and, at studio floor, by ever-changing architectural 'doctrines', 'movements', 'languages', 'écoles', 'fashions', graphic innovations and, more recently, the computer.

Kunz & Rittel, (1970) addresses design problems by using argumentation structures to facilitate a discussion amongst the stakeholders about design issues, which allows the problem to be explored and framed. Design issues can entail such varied items as questions, concerns and even discussions about procedural aspects of the design which need to be resolved before progressing. According to Lawson (1980) design problems often define a very wide area and the number of possible solutions is infinite. Unlike the problems of natural sciences, the goal of design is not clearly set and it changes according to the environment it is situated. A designer might ask how, what, and why while setting up the problem and gathering necessary information but they are not the questions that a designer would ask to solve a design problem. As a result, the ultimate design solution is vague and very difficult to achieve. Rittel (1984) expounded on the nature of ill-defined design and planning problems which he termed "wicked" (i.e., messy, circular, aggressive) to contrast against the relatively "tame" problems of mathematics, chess,

or puzzle solving. Problem means there is a contradiction between existing condition and desired one. In order to solve the design problem this opposition should be taken away (Kurt 1994).

Architectural curricula, like many professional education curricula (Dinham&Stritter, 1986) are composed of three general categories of academic work: The first category includes basic courses of liberal arts, second one consists of professional courses dealing with important aspects of professional practice such as building structures, materials and construction or environmental control systems, and the third group is full of “apprenticeship” experiences which occur in the architectural studio. The students undertake a design project under the supervision of a master designer or professor in the design studio. This design studio which is traditional in every school of architecture, has a great importance in architectural education.

### *1.3. Design studio in architectural education*

Design studio is the core of architectural education. The architectural curriculum has been based on the design studio model which focuses on “learning by doing”. The architectural design studio offers a prime example of a collaborative, multi-sensory, learner-centered, constructivist, experiential problem-based teaching environment. Usually, it is a pleasant studio space, from ten to as many as twelve students for per professor; arrange their own drawing tables, papers, books, pictures, drawings and models. In this space, students spend much of their working lives, at times talking together, but mostly engaged in private, parallel pursuits of the common design task (Schön, 1983). "It is a process - a way of thinking during which the many elements, possibilities, and constraints of architectural knowledge are integrated. At its best the design studio sequence provides the connective tissue that brings together, progressively, the many elements of architecture education" (Boyer & Mitgang, 1996; 85-86).

Architecture studio teaching can involve a number of varied activities. Before the project begins, the professor(s) may establish the goals, expectations, general procedure, and assessment criteria he (they) will employ for the project. This aspect of instructional planning is called “the design of a project assignment”. During the semester, professors meet students either individually or in groups for design related discussions and clarifications. Then at the end of the project, traditionally, a final review or jury is executed. The “desk critic” is very important experience in the studio education. It is a brief event occurring repeatedly through class hours. Typically, the critic moves through the studio in a random or sometimes an “informal” appointment basis, meeting with students at desks or at panel discussing their attitude, their thinking, their work, their progress and their problems with the project assignment. Each studio professor is responsible for ten or twelve students and must have 30 minute negotiation -may be two different periods- in a week. Danahy believes that the level of a student skill is possibly the most profound variable in a design studio. Design process is a result of intelligence. This process refers the physical world to using semi transparency or filtering one's vision to symbolically create the illusion or feeling of containment (Danahy, 1992).

#### *1.3.1. Similarities and dissimilarities: “traditional studio” / “constructivist studio”*

General explanations about the system of the traditional architectural studio reveal that it is based on an ancient model of apprenticeship, with a constructionist assumption of learning through doing. However, in some cases the traditional design studio in a school of architecture consists of a teacher telling students what to do and student doing what they are told: In the studio education, the professor initiates a design problem, the student responds with an attempted solution, and the teacher evaluates this during a desk critic or jury and offers more suggestions to develop the design project. This sequence is behavioral rather than constructivist. This judgement suggests that the traditional studio has some properties which needs to be incorporated into the constructivist studio. Hence, teaching/learning actions which are performed in “traditional studio” in architectural education should be analyzed and compared to the “constructivist studio” in detail.

Studio teaching/learning actions in architectural education have been examined by many, but most usefully by Donald Schön (1987). Based on a constructivist view of human perception and thought-processes, Schön (1987) describes design as a reflective conversation within the design situation. According to this view, problems are

actively set or "framed" by designers, who take action (make "moves") by using a spatial-action language (sketching and drawing). This action or move improves the (perceived) current situation by revealing new qualities and relations unimagined before, which guides the designer for further moves to refine the situation.

Schön's concept of "Reflection in action" refers to how, in the course of acting, we improvise, changing our behavior to address unexpected new conditions. This improvisation is not a random exercise, but an intelligent, measured response that may even appear to an outsider as "the smooth performance of an ongoing task" (Schön 1987, p. 29). The design process is a prime example of "reflection in action." At each step, the designer evaluates the consequences of the decision in terms of (1) the initially expressed problem criteria, (2) conformity to or violation of implications of previous decisions, and (3) new opportunities or constraints arising from the decision.

## 2. Classification of the Design Studio Practice

There are different types of design studio applications which can be implemented by the supervisor of the design studio. These applications are categorized into five groups according to the critic style and/or given possibilities to the student to be creative and productive.

**Crit Type 1:** There are eight or twelve students in each group. Students are obliged to take crit from studio supervisor for their design work which studied outside of the studio environment. They sit around a big desk as seen in Figure 2.1. Frequently the professor manages the discussion so the participation of the students is limited; the communication is under the control of the supervisor.

**Strength:** All of the students can listen to their friend's critics, and have an opportunity and possibility to participate in the discussions. Preliminary Jury and Final Jury system is implemented.

**Weakness:** The practice is supervisor-centered. Teaching occurs rather than learning. Lack of multi-media applications.

**Crit Type 2:** There are eight or twelve students in each group. Students are obliged to take crit from the studio supervisor for their design work studied inside and outside of the studio environment. They are supposed to study their own desks. The studio supervisor gives desk critics, answers questions individually. No discussion takes place in the studio. (See Fig.2.2)

**Strength:** All of the students can work in design studio during the studio hours. Preliminary Jury and Final Jury system is implemented.

**Weakness:** There is not enough collaboration and participation in the studio practice. Lack of multi-media applications.

**Crit Type 3:** The studio work has to be done by a group of students under the supervision of a group of professors. Each professor gives advice to a different student at his/her desk. Thus each student can have different point of view by taking crits from different professors. (See Fig: 2.3.) Generally, there can't be any class discussion. Each student has to construct his/her own solution to the specific design problem according to the given advice and recommendations.

**Strength:** Each student can get crit from different supervisors. Preliminary Jury and Final Jury system is implemented.

**Weakness:** There is not enough collaboration and participation in the studio practice. Lack of multi-media applications.

**Crit Type 4:** There is a "frequent jury" system in the studio teaching. A group of professors who are responsible for different student groups come

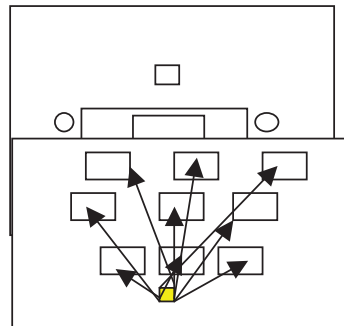


Figure 2.2. Crit Type 2

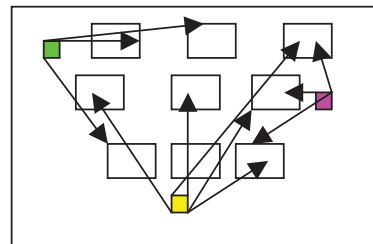
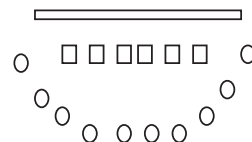
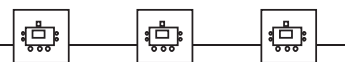


Figure 2.3. Crit Type 3



together regularly in the juries. Common jury discussions will be held as seen in Figure 2.4.

**Strength:** Even though it is limited, there are opportunities and possibilities of discussions and participation in the studio environment throughout the juries.

**Weakness:** The practice is supervisor-centered. During desk critics, students are supposed to study individually. Lack of multi-media applications.

**Crit Type 5:** A “constant jury” system is applied in the studio teaching

a) **Concentrated Studio:** 2-3 professors manage the studio operations. The students are at the same academic level and responsible for the same project assignment.

**Crit Type 6:** A “constant jury” system is applied in the studio teaching

a) **Spread Studio:** 2-3 professors manage the studio operations. The students are at different academic level and responsible for different project assignment.

**Strength:** (Both Crit Type 5 and Crit Type 6) It encourages collaboration, participation and discussion concerning the subjects and assignments.

**Weakness:** (Both Crit Type 5 and 6) The multi-media application is limited.

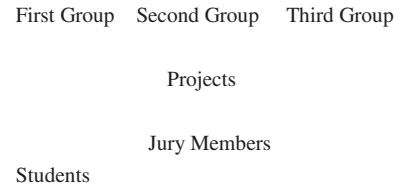
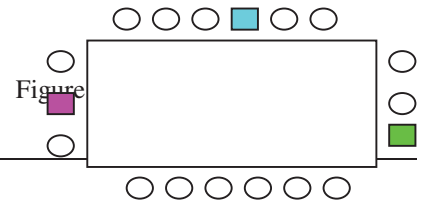


Figure 2.4. Crit Type 4



## 2.1. The Evaluation of the Crit Types of the Design Studio Practice

Architectural design studio environment should have collaborative practice and flexible solutions, and ensure explorations, participation and discussions. According to these criteria;

- There occurs full discussions in crit type one and crit type 5, limited discussions crit type four, and no discussions in the remaining groups. Thus, discussions and inter-activity should be strengthened in these categories.

- Generally in every crit type, the design process is an educator-centered one. Conversely, the design process should be changed into a student-centered process.

- In every crit type there is limited participation and collaboration between students. There is not enough group study to motivate students to be creative and socially satisfied.

- In all the studios there is a communication problem. Especially, educator-centered activities inhibit students' creativity and prevent them from doing practice freely.

- Assessment systems which focus on the "end product" make the process unimportant.

- There is not enough technical device and multi-media use in all types.

In this context the properties of the traditional design studio can be defined as follows:

- Studio is the core of the architectural design education.

- In most architectural schools, studio schedule is arranged as two or three times a week each being at least four hour blocks.

- The proportion of an educator to students is relatively low; it varies from 1/10 to 1/12.

- The learning environment is a "problem based" one and requires exploration.

- All learning and teaching models are unified in the studio education.

### Teaching Method in Studio

- The whole information system is applied to =====> a specific problem

- Learning process is based on =====> doing practice.

- Students are prepared to problem-solving and role-playing circumstances. Design problem is given without one specific solution, but there are always limitations – technical, functional, rational or presentational (drawings, simulations, model, and etc.)

### Studio Procedure:

- The process is full of entertainment, joy and uncertainties.

- Explorations are realized in a sequence.

- It is not certain that there will be complete success.

- The reasoning system is not linear and there are not prescriptions.

- Two dimensional and three dimensional explorations, articulations and reflections are required.

- The process can not be easily understood by the students at first time. But it requires a self start.

- Project assignments are given.

- Basic skills / tools are used to present the design idea.

- Content goals are set up.

- Studio critics (official Juries and non-official desk crits) are important.

- Specific readings are required (theory, history, typology study, hand working study etc.)

### Objectives

- The multimedia application is limited (digital or analog).

- The use of electronic media including computer in learning process is intended.

- The studio is focused on end product rather than design process.

- The assumptions resulted from the student skills and tools brought to design studio

- There are hidden parameters which encourage role-playing activities (question-answer, brainstorming, interpretation)

### Structure

- One or two project assignments are given in each academic semester.

- Students try to hide their work in order to prevent other students use their design ideas.

- Design is not a collective work, but individual.

Assessment of the result: Grading:

- Post-production assessment is done. Two and three dimensional presentations are evaluated, conceptual intentions have secondary importance.

Predictions

- Dedicated, self-motivated students who are committed to the pursuit of excellence will be more successful.

Results

- "sink or swim" situation
- 80 percent of the work load is done within 10 percent of the total time.

### **3. Conclusion and Recommendations: The transformation of the Traditional Design Studio to the Constructivist Design Studio.**

Constructivism is a learning theory that emerged in the early 1990's, rejects the objectivist view of reality and the idea that simply "communicating content to students will result in learning" (Jonassen, 1994, 1995), Constructivist teaching strategies carry with them labels such as "collaborative" or "cooperative" learning, "learning communities," "problem-based," "discovery," and "hands-on" learning, all of which can be used to describe the design studio. If the traditional design studio environment is transformed to the constructivist studio, the existing problems of the design studio can be reduced. Hence, it is recommended that the traditional design studio should be replaced by the constructivist studio (Kurt, 2002). The general properties of constructivist studio are as follows.

Objectives

- The studio focuses on the design process not the end product.
- New skills and tools are developed for learning procedure considering the course content.
- Multimedia applications are widely used. Computer technology helps the learning activity.
- Role-playing is encouraged. Virtual reality and simulations are used.

Structure

- Design studio is structured as a "spread studio". The students who are gathered in the studio may come from different academic years. Project assignments are varied and may change according the skills of the different student groups.

- Four or five major project subjects may be offered in any academic semester. Students can freely choose one major project assignment. Furthermore, they are also responsible for solving the sketch problems, minor assignments, exercises, case studies and etc. throughout the process.

- Students can share their design ideas.
- Collaboration is very important in design process. Open discussion sessions are implemented.
- Desk crits and/or screen crits are done. Students and educators, who are from different geographical location can participate in the design process.

Assessment of the result: Grading:

- The design process is evaluated.
- Students are supported to perform reflections on action.
- Developed product is recognized as the representative of the process.
- In evaluating students' success, the steps taken from the beginning of the process until the end is very important.

Predictions

- Studio environment is designed according to students' needs in order to achieve their academic aims.
- Electronic studio components are used.
- The possibilities of networks are widely used.

Possible Results in Constructivist Studio

- Both educators and students will work and produce much more compared to the traditional studio.
- Computer, software, information technology, multimedia applications and World Wide Web will be integrated into the architectural design process, as expected.



Consequently, constructively structured design studio, can solve the minor/major problems that exist in the traditional studio environments, and can create more appropriate, more collaborative and shared design processes.

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