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How the Enthusiasm and Pre-Knowledge of First Year Architectural Students Effects Their Educational Performance

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ABSTRACT

This study, which has been carried out by means of a survey of 450 students of 10 departments of architecture in Turkey, has been formed to reveal, from the students' point of view, in adapting to the new language of architectural discourse. The survey consisted of interpretative questions related to the factors that affected their choice of studying architecture, the level of the students' interest in architecture. The performance of enthusiastic students in the design studio was higher than the others. However, the study also concluded that enthusiastic students were not seen as an advantage for learning architectural representation techniques, which were more easily comprehended by all students, regardless of previous knowledge.

Key words: first year architectural education, basic design, technical drawing, student proposals.

1. INTRODUCTION

It is well known that architecture students have adaptation difficulties at the beginning of their professional education. Most of the research on this topic has focused on the reason of such difficulties. Akin states that the design instruction paradigm suffers from the following weaknesses: motivational difficulties, insufficient explanation of the design process and inefficiencies in learning [1].

In terms of motivational difficulties for Turkish students, the Turkish university entrance system is a major contributor. In Turkey, students are accepted to universities according to the results of a national exam heavy in mathematics and science comprehension, and places are won in both state and private universities based on a student's score. As a result, students' desire for various courses of study, in other words their "enthusiasm" is largely determined according to their success in this exam, as opposed to whether or not they would like to study that topic. In such circumstances, enthusiasm to study architecture (or any other topic) is not necessarily a pre-requisite to do so, and as a result many students end up in architecture programs with little or no "enthusiasm" for the discipline. Starting with enthusiasm may helps to overcome difficulties. It takes part in also as a need. There are five levels of human need in Maslow's hierarchy: (1) Physiological (lower-level) (2) Safety (lower-level) (3) Love and belongings (higher needs) (4) Esteem (higher need) (5) Self-Actualization (higher need) [2]. The need for "love and belonging" and the chance to "self-actualization" might be addressed to the right career choice.

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Motivation is associated with enthusiasm and also motivation to learn is paramount to student success. People work longer, harder and with more vigor and intensity when they are motivated than when they are not [2].

A second reason of the difficulties of the students in first-year is insufficient explanation of the design process. In some architecture and design schools, the pedagogy of basic-level design education is meant to equip students with one approach according to a certain style, philosophy, or paradigm [3].

The third reason -inefficiencies in learning- depends on a variety of factors, but insufficient cultural and technical background and insufficient support from secondary education are the main factors. According to Cross, having a cultural background and a "designer" way of thinking are very important in succeeding in architecture school [4]. The inadequate guidance from a student's high school and their insufficient cultural and technical background are seen to have a negative effect. Empirical studies indicate that the learning styles of designers are systematically different from those of other professional groups [5], and this has obvious relevance to designers' ways of viewing the world and responding to different environments. While students of other professional fields encounter quite a lot of guidance and support from their secondary education, the multi-disciplinary and holistic nature of architecture leads to a level of cognitive challenge that is unlikely to have been experienced during secondary education [6]. For those students who have not had the chance to develop a background required by architecture and design departments, attending a design studio is like entering into new world. As the students progress, they develop ways of countering these difficulties, which places a demand on schools of architecture to instill new ways of thinking and doing in their students from an early stage [7].

All the negative factors emphasized above inevitably effect first-year architectural students during their education. In this study, the effect(s) of their "pre-knowledge" (cultural and technical background on the field) and its opposite their "enthusiasm" (motivation to the field) on a first-year architectural student's performance in representation techniques and design studio was researched.

With the purpose of evaluating how the previous knowledge (cultural and technical background) about architecture, interest and enthusiasm of the students to study architecture and effected their performance in architectural education, a survey has been carried out among 450 students from 10 departments of architecture in Turkey.

The questions in the survey were asked to determining the difficulties that the students face with in the first year of architectural education. The 2nd year students were selected as subjects to assess their experiences and academic achievement at the beginning of architectural education.

The survey consisted of three parts:

- The level of the students' interest for architecture
- The factors that affected their choice to study architecture
- The subjects with which students had difficulty

The data of the study may indicate how architectural educators can help students overcome their difficulties in their first year of architectural education.

2. EXPERIMENTAL

In order to determine the level of the students' interest in architecture, the factors that affected their choice of studying architecture, and the subjects with which students have difficulties, a survey was carried out among architecture department students at 10 universities in Turkey: Gazi University (51 students), Çukurova University (60), Erciyes University (39), Mersin University (22), Kocaeli University (28), Selçuk University (48), Mimar Sinan University (57), İzmir Institute of Technology (54), Yıldız Technical University (47) and İstanbul Technical University (43). So that the students objectively evaluated both themselves and the method carried out in their universities, they were asked to respond anonymously and not give their identification information.

2.1.The Level of Students' Interest for Architecture

The first part of the survey consisted of questions relating to their interest in architecture. The students' previous knowledge about architectural education and design, and the compatibility of this knowledge with what that they have learned during their education process are the topics that were explored. As a result of the survey, 28.6% of the survey participants stated that "they had no idea about what architecture or architectural education was" before studying it.

In the few Turkish universities that accept architecture students via a skills test (rather than the national university entrance exam), the interest of the students about architecture was evaluated with reference to their knowledge of famous figures in architectural history and well-known buildings. In order to evaluate such an interest, the students were asked the question "Did you know any famous architect or building before you entered your department of architecture?" While 53.7% replied "yes," 46.2% replied "no" to this question. Mimar Sinan, Frank Lloyd Wright, Mies van der Rohe, Zaha Hadid, Frank Gehry and Santiago Calatrava were all equally observed to be the most known architects among respondents.

The question "Did you know architectural representational techniques before you entered your department of architecture?" was answered affirmatively by only 4.4% of respondents. On the other hand, 16.4% answered "I knew a little" while 78.8% replied that "they did not have any knowledge about architectural representational techniques." As a result of these answers, it can be said that the technical

language of architectural practice is a little known subject among architecture students prior to studying architecture.

2.2. Reasons for Studying Architecture

The participants of the survey were requested to answer "*whether or not they* enthusiastically *wanted to study architecture.*" Among the 450 participants, 32.7% said that "they enthusiasticly chose architecture". In order to clarify the reasons that made students choose to study architecture, they were requested to mark one or more of the choices below. As seen in Figure 1, there seems to be two main factors effective in choosing to study architecture: "being enthusiastic" and "being influenced and/or obligated." The reason of choices and the ratio of students that marked each choice are given below:

Being enthusiastic
"I always knew that I was talented at drawing" (29.1% of respondents)
"Being an architect had always been my dream" (22.9%)
These group members are highly motivated to study and even they are ready to self-actualization by architectural education. Their choices are thought as so intentionally.

Being influenced and obligated
"My score on the national exam was sufficient for architecture" (38.7%)
"I was influenced by the architect(s)in my family or close to me" (26.2%)
"The 'Introduction to Professions Booklet' impressed me" (16.2%)
"I received guidance from a vocational counselor" (9.3%)
"My friends studied architecture and I was influenced by them" (3.6%)
These group members are influenced by different factors; moreover they have chosen studying architecture because of an obligation.

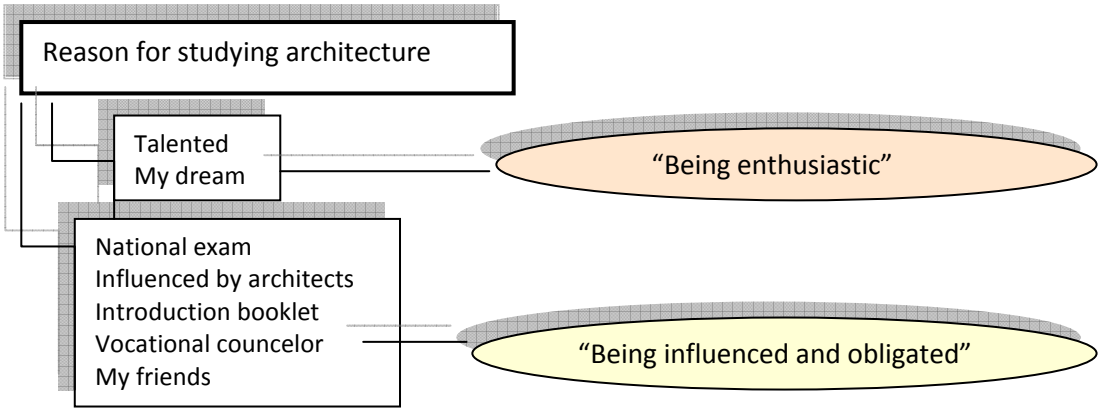


Figure 3. The two main factors for studying architecture

2.3. The Subjects with which Students Had Difficulties during Their First Year

The basic objectives of first year architectural education programs are to enable students to organize knowledge from different systems, to become creative, and to form and develop an architectural language and culture. Therefore, basic design studio, architectural design, and architectural representation techniques are a large part of first-year of architectural education. For this early period of architectural education, a further and more detailed study has been made to reveal the problems that students face.

Representational Difficulties: Students were asked to express their opinion about the following representation techniques topics and their replies were analyzed on a Likert scale by Mean Values and Standard Deviation.

Table 1. Evaluation of the difficulty of representation techniques

"....." was difficult for me.	**M[a]**	**SD**
(A-1) Perceiving the depth of objects and reflecting that in a 2-dimensional drawing	3.20	1.23
(A-2) Changing scales and working with measurements	3.71	1.06
(A-3) Making a model of a design	3.12	1.26
(A-4) Drawing plan/section and elevation of a 3-dimensional model of an object	3.32	1.18
(A-5) Perceiving the structural system of 3-dimensional objects and expressing this in technical drawing	2.92	1.11
(A-6) Drawing the section of an object from its plan and elevation	3.30	1.21
(A-7) Drawing the perspective of an object from its plan, elevation and section	2.94	1.31
(A-8) Drawing the section of an object from its perspective and dimensions	2.92	1.17

Notes: M: Mean Values, SD: Standard Deviation
a: Means of the variables listed between 1-5 (numbers closest to 5 are positive responses).

Architectural representation topics A-5 and A-8 seem to be the most difficult subjects for the students to understand, whereas the most easily understood topic seems to be A-2.

Design Difficulties: Students were asked to express their opinion about the following design topics and their replies were analyzed on a Likert scale by Mean Values and Standard Deviation.

Table 2. Design difficulties

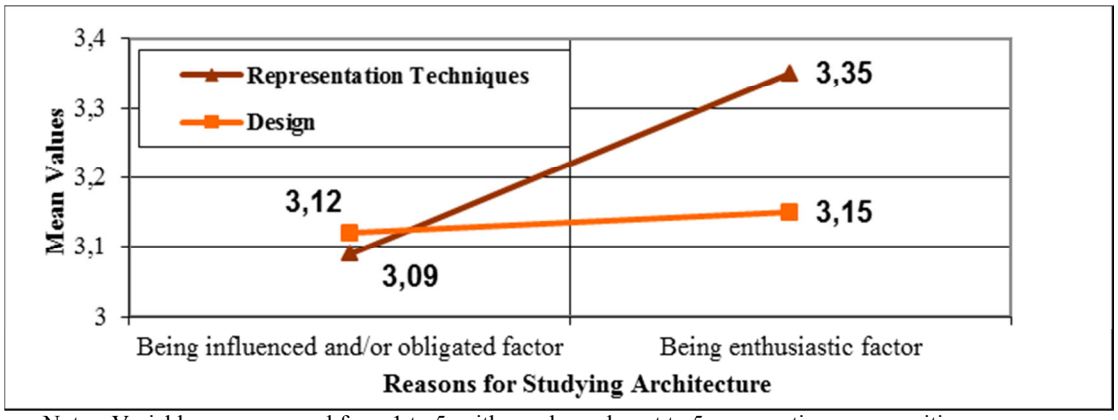
"....." was difficult for me.	**M[a]**	**SD**
(B-1) Designing using an abstract concept	2.73	1,18
(B-2) While designing a project, to know the needs of its users and to meet them accordingly	3.43	1,07
(B-3) Reflecting on many different issues during designing	2.95	1,16
(B-4) Learning about site measurements and fitting my design there	3.42	1.05

Notes: M: Mean Values, SD: Standard Deviation
a: Means of the variables listed between 1-5 (numbers closest to 5 are positive responses).

Design topic B-1 seems to be the most difficult subject to understand for the students, whereas the most easily understood question seems to be B-2.

2.4. Difficulties During Education in Terms of Choice of Studying Architecture

According to Zeisel, the complex activity called designing interconnects three constituent activities: imaging, presenting and testing [8]. Since "testing" must be done on a final design studio product, this study is concerned with only the "imaging" and "presenting" aspects of design, as seen in basic design studio and representational techniques. Figure 4, below, presents the relationship between representation techniques, design difficulties and the previously discussed reason for choosing to study architecture. Although the performance of the enthusiastic students on design issues was slightly higher than the students who study architecture having been influenced and/or felt obligated. Handling with representation techniques was significantly easier for them.



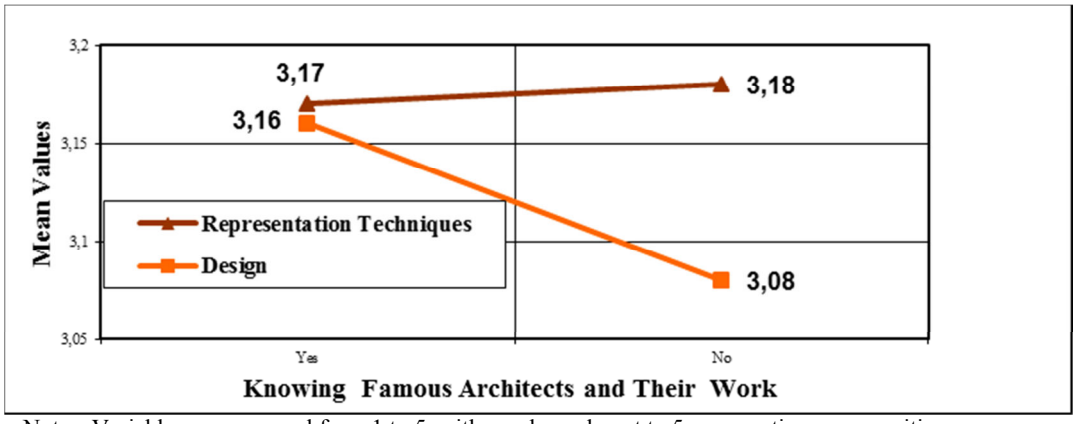
Notes: Variable means ranged from 1 to 5, with numbers closest to 5 representing more positive responses.

Figure 4. The effect of being influenced and/or obligated and enthusiastic factor upon representation techniques and design performance

It is possible to say that enthusiastic students, due to their enthusiasm, could have performed technical representation techniques issues easily, but this enthusiasm seems to be not effective on their performance in design issues as much. Therefore, as a factor, how much being acquainted to architectural culture could effect design skill was then examined.

There seems to be no significant difference between students who knew famous architects before studying

architecture and their performance in representation techniques, but in terms of design issues, it can be clearly seen that the performance of students who knew famous architects was higher than the others.



Notes: Variable means ranged from 1 to 5, with numbers closest to 5 representing more positive responses.

Figure 5. The effects of knowing famous architects and/or buildings before studying architecture upon representation techniques and design performance

Those students who had previous knowledge of architects and/or their buildings seem to have had a familiarity with the fundamentals of visual perception and the principles of order that inform two- and three-dimensional design, thereby giving them an advantage over other students. Chan has stated that a package of knowledge about a design unit, called a schema, which contains design constraints and rules for application, is stored in a knowledge base as a part of a designer's long-term memory. By repeating the design process (taking a goal, activating a design unit, retrieving a set of associated schema, applying a rule to search for a solution and then testing the solution), the design problem gradually moves towards the final goal [9]. The result of this study result has confirmed Chan's opinion about design-related knowledge having been stored in the designer's long-term memory and thereby providing an advantage for such students during the design process.

3. RESULTS AND DISCUSSION

In Turkey, it can be asserted that the major criterion for choosing to study architecture is the national university exam, from which they win places at universities, both public and private.

Students' close family members and their attraction to famous architects are other factors that follow their exam results. Conversely, it can also be asserted that career consultation services and vocational introductory booklets are not very effective in persuading students to study architecture. This reveals the fact that the current presentation of the architectural profession is not adequate for students to gain prior knowledge about the study of architecture.

Despite the majority of students claiming an interest in architectural culture, it has been seen that the actual amount of students who had acquaintance with an architect and/or their work was much less. Students' interest in the vocation of architecture, being correctly informed about the profession and having the necessary basic knowledge are some important factors that seems to increase the performance of students during their first year of education.

It has been observed that students' knowledge and interest of architecture was actually not so deep. For example, the amount of students who did not know architectural representation techniques was 79%. Only 18% of the students expressed that what they knew about architecture matched their experiences while studying in the first year.

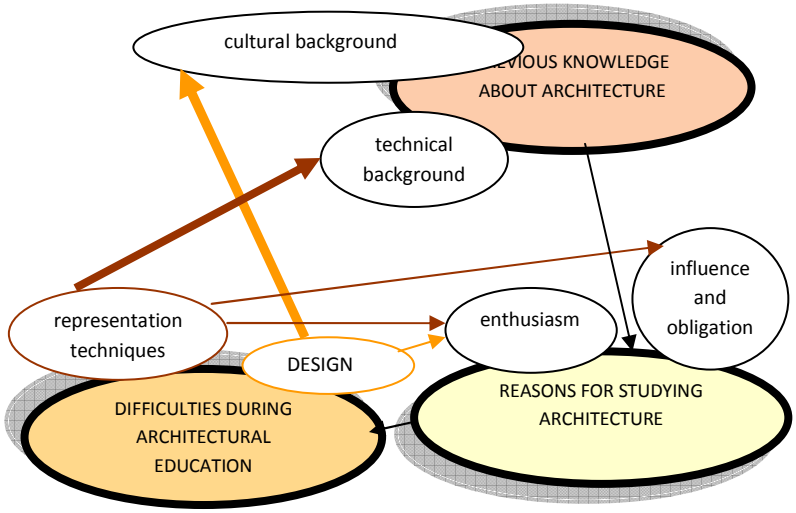


Figure 6. The factors effecting students' difficulties in the first year of architectural education

In the final evaluation of this study, it has been observed that the performance of students in representation techniques is higher than in design issues. The method and results teaching of representational techniques are easily adaptable to those students coming directly from high school, where algorithmic thinking is the prominent pedagogical method. In addition, the rules of architectural representation techniques share common characteristics with the various fields of engineering, which some students may have preferred to study but could not gain enough points on the national exam. However, architectural design – the topic most difficult for first-year students – is the topic that sets architectural education apart from those fields.

According to the results of this study, those students who defined themselves as enthusiastic were slightly better in design than those students who chose to study architecture because of being influenced or feeling obligated. Surprisingly, enthusiastic students were even better at representation technique issues than they were at design. According to this result, it can be interpreted that even enthusiastic students do not have enough previous knowledge and experience to handle design issues.

Without a doubt, sufficient design skill depends on a student's creativity and their ability to experiment. To improve such creativity, both knowledge and the creative cognitive operation called application (the adaptive use of existing knowledge) are necessary. Oxman has stated that a naive approach to the knowledge issue might claim that the more knowledge the student gains the more design skill they will acquire. Competence in design appears not to be measured by the quantity of knowledge gained, but by knowing where to find it, which specific kind of knowledge to apply in a particular situation, and how to use it when needed. [10] Cross has pointed out that design has its own things to know, ways of knowing them, and ways of finding out about them. This suggests that there is more in knowing how to design than just knowing more about designs [10,11].

It is clear that while students said they had knowledge about architecture, they did not have the same knowledge needed to complete Cross's previously-mentioned definition of design (knowing where to find, which specific kind, and how to use knowledge). Such a deficiency can be a lesson to architectural educators as Cross and others have concluded that a students' design abilities can be enhanced through educational programs [12]. Students need experiences to encourage them to fully explore all of the steps of the design process, and educators should learn from students' experiences and determine what elements of the design process are the weakest [13].

According to the survey of this study, it can be asserted that the beginning of architectural education is much easier for students who are relatively close to architecture culture. Although the design performance of enthusiastic students seems to be slightly higher than other students, the performance of students who were familiar with famous architects and their work was distinctively higher than those students without familiarity. This result confirms that architectural education is a teachable professional field more than it is based on individual talent. It also exposed the importance of pre-university education.

The revision of pre-university education to support academic architects would decrease students' difficulties with respect to their knowledge and interest areas. To be creative in multi-input problems and to get used to multi-dimensional, flexible thinking, students require supportive activities. Such support could be organized as extra- or intra-curricular activities to introduce students to architecture and/or design culture. To provide such activities before university education would prevent some of the problems before they occur. To specify what the problems are from the student's point of view is an important supportive source to enhance the productivity of these studies. As identified

by McCoy, "It may be time to consider a new structural model for higher education in design - a pre-design undergraduate curriculum." [14].

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