

**THE EFFECT OF TEACHING THE BASIC CONCEPTS ON
THE FIRST YEAR ARCHITECTURAL EDUCATION:
ANALYSIS OF AN EXERCISE IN BUILDING SCIENCE
COURSE**

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Abstract

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Knowledge is the phenomenon of reproduction of the relations in the changing environment at the intellectual level. It appears during the action of human brain, and acquire by learning, research or observation. Presentation of knowledge to the person who learns for a specific purpose, for a specific case accelerates the process of learning action. It should be researched how a learning system that is motivating, allows active participation, use of initiative and keeps the interest of the learners alive should be for an efficient learning process.

The profession of architecture contributes to the social, cultural and economic development of the societies. The knowledge conveyed while educating a student of architecture is combined with design ability and integrating skills and plays an active role in the formation of built environment. The basis of architectural education is formed by learning the concepts that constitute the ground of this education. The subjects of how the knowledge belonging to architecture concepts will be conveyed and what the learning types can be are frequently discussed within the framework of architectural education.

Knowledge groups belonging to the basic concepts that should be conveyed in architectural education come into prominence as building, construction and design. In building design, the place of cultural environment, physical environment and technological environment factors and considering the design of the buildings in accordance with these factors constitute the building knowledge group.

The knowledge belonging to the architectural concepts may be conveyed by question, hypothesis, analogy, simulation, explanation etc. For example, informing by analogy and simulation is a method which is used frequently. Thus, informing is realized by making use of visual references. Within this context, an exercise was conducted in 2007-2008 fall semester in YTU Department of Architecture Building Science 1 course in order to test the effectiveness of

learning systems that may increase the motivation and accelerate the process of being informed.

Building Science 1 is a compulsory course in 1st year 1st semester. “Dwelling” where an individual spends most of his/her life constitutes the sample area of this course, and the transfer of knowledge related to how a dwelling should be arranged in accordance with its function constitutes the main fiction of the course. Teaching forms applied in this course can be sorted as research, seminar and exercise.

An exercise has been made in order to examine the effects of the foreknowledge or being taught of the concepts constituting the components of a whole on the process of being informed. 25 students participated in this study, and a plan drawing of a bedroom at the size of 4 x 3 m. and the plan schemes of the basic equipment made of carton that should be included in this room were distributed to the students. A period of 10 minutes was given in the first stage, and the students were asked to consider this room as their own bedroom and to arrange accordingly. No information was given to the students before the exercise. Before to 2nd stage, some basic information was given to the students related to the bedroom arrangement and passing they were asked to re-arrange the same room.

The aims of the study can be listed as follows:

- To discover whether the process of being informed has been realized or not by examining the approach before giving any information and the approach after giving some basic information,
- To understand the knowledge level of Architecture 1st year students related to their own personal spaces they always use, and to determine the studies to be conducted in the course accordingly.

Introduction

Learning is one of the most important individual activities that occurs in a particular period of human life, as in formal educational organizations or informal educational organizations.

Learning style is factors set which defines how an individual perceive, communicate with and react to the environment (•im•ek, 2001). Variables of learning preferences are classified as follows:

- a) Perceptual preferences/choices and difficulties
- b) Motivational differences
- c) Psychological factors
- d) Information processing practices: How does individual process information? The way that is preferred by individuals to perceive and process the information differs from one person to other person. While some person has the ability to learn math models and theories easily, rest learns easily schemata and graphical expressions.

Variables of learning preferences form learning styles. It is possible to find four major models on learning styles in the literature. These are The Myers-Briggs Type Indicator (MBTI), Hertmann Brain Dominance Instrument (HBDI), Felder-Silverman Learning Style Model and Experiential Learning Theory (ELT) (Felder, 1996). Kolb's (1984) ELT is widely accepted and generalized models and it has frequently been studied on researches of design disciplines related with learning styles and preferences. Recent studies made by Demirba•, Demirkan (2003), Kvan, Yunyan (2005), Demirba•, Demirkan (2007), Demirkan, Demirba• (2008-article in press) can be given as examples.

ELT suggests that learning is a circular process. This cycle begins with experience, continues with reflection and finishes an action that reflection becomes a concrete experience. In the Experiential Learning Theory (ELT), there are four phases, namely Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). Learning methods in the stages of the cycle differ from each other. In Concrete Experience (CE) phase learners prefer to learn by experiencing and in Reflective Observation (RO) learners have the tendency to learn by reflecting. In Abstract Conceptualization (AC) learn by thinking through the analysis of ideas is the preferred learning style and in Active Experimentation (AE) learn by doing through active experimentation is chosen by learners (Kolb, 1984; A•kar, Akkoyunlu, 1993).

The major phases that occur in the learning cycle of an architectural student are stated as Concrete Experience (CE) and Abstract Conceptualization (AC). In Concrete Experience (CE), learning from feelings and specific experiences has been seen. Instructor has an assistant and a guide position in this phase. Features such as learning by thinking, analysis, systematical planning, and deduction are important in Abstract Conceptualization (AC) phase. Instructor is the person who transfers the knowledge to the students in AC phase.

This paper is focused on “how can architectural students who are in the first year of their education combine concrete experiences with new knowledge gathered in the courses?” To achieve this goal an exercise is set.

Definition of the problem; the scope and aim of the study

Building Science 1 is a compulsory course in Yildiz Technical University Faculty of Architecture Department of Architecture. The course consists of 3 hours study, 1 for theoretical knowledge and 2 hours for practice. The course is continuing in forthcoming semesters as Building Science 2-3 and 4 with the scope of various themes in building science. The main theme of Building Science 1 is “House” and human dimensions, man-environment relations, user requirements, architectural planning process and architectural concepts are additional subjects.

House is handled with the sub subjects of house and culture such as life in house, activities, activity areas, activity types, postures, furniture, furniture-activity relations and the close environment of house. In this context, to determine the proper furniture's according to the fundamental and partial functions and organize these in a space forms the main aim of the course. This aim is realized through theoretical and practical studies. However, the process of being informed is not working in one way that is a flow only from instructor to students. To achieve interactivity in the course, the students are asked to prepare researches and express them whether written-verbal or visual format and share their knowledge with entire class. So, it could be possible to observe how the students interpret new knowledge that they gathered from theoretical and practical information in the course with the foreknowledge already

learned by experiences about the most known function of their lives; “house life”. The teaching style is formulated on induction approach; firstly the house is divided and studied partially and at the last stage the parts come together and form whole house. The parts are determined according to the fundamental functions; (Table 1.)

- living spaces/common spaces (living room, dining room, family room, study room etc.)
- service spaces (kitchen, garage, lavatory, storage, cloakroom etc.)
- private spaces (master bedroom, kids rooms, bathroom, etc.).

The teaching style of Building Science 1 is being formed after searching the program of similar architectural schools and courses and also the master-apprentice relations. In the process of revision of the program of the course a question is appeared; “could different teaching methods be effective on learning styles of the students?” and if so, “how should the revision be and what could the share of the ratio of the theoretical and practical knowledge be?”

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The aim of this study is to test how the process of being informed is working. How do the previous knowledge (concrete experience) and newly acquired knowledge combine to form operational knowledge that could orient the practical study? And also, the interpretation of previous knowledge and new knowledge will lead a path to active learning of “House” that students already had experienced and will improve the knowledge on the subject.

Table 1. The fundamental and partial functions of the house used in the exercises (Kıran, Polatoglu Baytin, 2006).

FUNDAMENTAL FUNCTION	FUNDAMENTAL FUNCTION	FUNDAMENTAL FUNCTION
1.LIVING FUNCTION	2.PRIVATE FUNCTION	3.SERVICE FUNCTION
<ul style="list-style-type: none"> • Open to outside • Common usage 	<ul style="list-style-type: none"> • Close to outside • Private usage 	<ul style="list-style-type: none"> • Service areas
PARTIAL FUNCTIONS	PARTIAL FUNCTIONS	PARTIAL FUNCTIONS
<ul style="list-style-type: none"> • sitting • eating • terrace and balconies 	<ul style="list-style-type: none"> • master bedroom • children's bedroom • bathroom 	<ul style="list-style-type: none"> • kitchen • lavatory • entrance, cellar, garage, storage servant's room, laundry etc.
SINGULAR FUNCTIONS	ACTIONS	EQUIPMENTS
<ul style="list-style-type: none"> • sitting sitting, chat/talk, listening music, watching TV, playing, reading, coach, coffee table, book shelves etc. • eating eating, buffet/sideboard, eating table, chair, terrace, balcony, sitting, breakfast, sunbathing. 	<ul style="list-style-type: none"> • master bedroom bed, bedside table, dressing table, mirror, chiffonier, wardrobe etc., dressing-taking off, working, sitting, sleeping. • children's bedroom sleeping, playing, working, sitting, bed, bedside table, wardrobe, dressing-taking off. • bathroom heating, storing, doing laundry/do the washing, washing, bathtub, closet, shower, washing machine 	<ul style="list-style-type: none"> • entrance entering-going out, shoe cupboard, umbrella stand, phone etc. • toilet excretion, closet, washing hands, sink • kitchen storage, cellar, preparing, washing, cooking, workbench, cupboard, oven, kitchen sink, fridge

Method of the study

25 first year students were chosen randomly as subject group from 2007-2008 fall term in YTU Department of Architecture Building Science 1 course. They were 19 female, 6 male students who attended the 1st. lesson of Building Science Course. The students were asked to consider the given room as their own bedroom and to arrange accordingly.

Why bedroom was chosen?

Bedroom, where an individual express himself/herself in a free manner, is the most private space in a house. Although the bedroom mostly shared with a relative in Turkish family constitution, it is still a place that an individual could stay oneself. Since bedroom is one of the most important spaces in the houses of every culture, it

was chosen for the subject of the study. How the students organize their bedrooms were also examined in scope of the study. Eventually the study is not only emphasized the relation between foreknowledge and acquired knowledge but also forms a preliminary framework for future studies on the preferences and arrangements of Turkish youth in their bedrooms. In the study, a plan drawing of a bedroom at the optimum size of 3.00 x 4.00 m. were given the students with basic furniture/equipments as bed, bedside table, wardrobe, desk and work chair (Figure 1.).

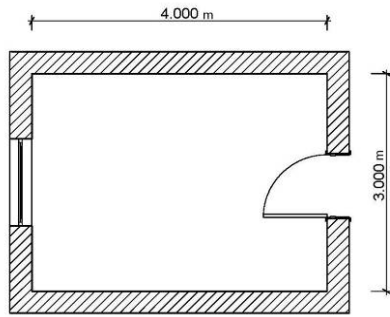


Figure 1. The given bedroom plan as architectural stimulant

The Drawings of Bedroom and Basic Furniture

In Turkish education system, there aren't any steps that orient students to consciously profession selection. All candidates have to be successful at the University Entrance Exam to enter universities of Turkey. As a consequence, only a few students could make proper selection and it is almost impossible to know the educational background of students. It seemed very risky to give the students an architectural drawing from the first day of their official architectural education. However, the students are familiar to plan drawing, top view of an object from pre-university period's lessons such as geography, painting. For this reason, it was decided to give the plan of the bedroom and the top view of furniture's. The students also informed about the scale of all drawings that is 1/50. The plan drawing was arranged on an A4 paper and the furniture's cut down form beige cartoon to create a figure-ground relation (Figure 2.).

Exercise

25 first year (freshman) students who were in the first lesson of Building Science 1 course participated in the study. The study consisted of three parts which took 30 minutes in total.

1st.Phase:

A period of 10 minutes was given in the first phase, and the students were asked to consider the given room as their own bedroom and to arrange this room with the given furniture (5 pieces). No information was given to the students before the exercise.

Information Process:

The students were informed about general rules of arranging a bedroom; size, access, spatial organizations etc. The time period of the information process was also 10 minutes.

2nd. Phase:

In the second phase, the students were asked to re-arrange the same room with same furniture within 10 minutes.

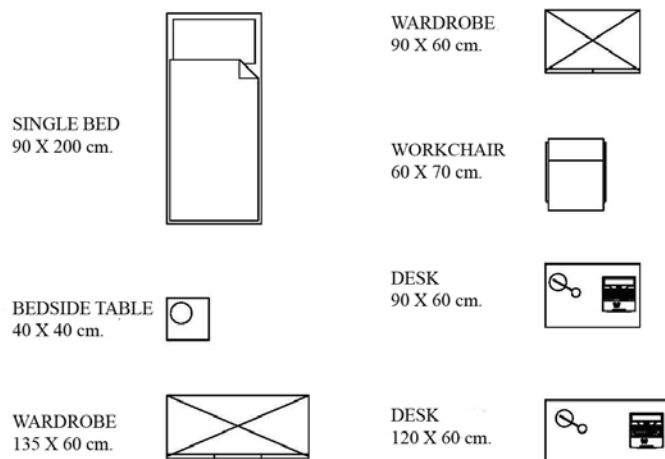


Figure 2. The given furniture

Data analysis

The results of the study were evaluated from the answers (arrangements) of 25 students who participated the exercise. The analyses of arrangements were evaluated in 3 criteria; spatial organization, visual relations, accessibility (Table 2).

A score for each criterion were given to each subjects at the end of the evaluation process. Suitable-unsuitable, present-absent and yes-

no phrases were used for the evaluation of each criterion. Positive solutions scored (1), while negative solutions scored (0). Table 3 indicates the total scores of all subjects (students) for each criterion in 1st. phase and 2nd. phase.

Table 2. The criteria of analysis of bedroom organization

1.Spatial Organization	2.Visaul Relations	3.Accessibility
Location of the bed	Vision from door to bed	Access to bed from door
Location of the wardrobe	Vision from door to wardrobe	Access to wardrobe from door
Location of desk	Vision from door to desk	Access to desk from door
Location of work chair	Vision from door to work chair	Access to work chair from door
Location of bedside table	Vision from door to bedside table	Access to bedside table from door
	Vision from window to bed	Access to desk from bed
	Vision from window to wardrobe	Access to wardrobe from bed
	Vision from window to desk	Access to desk from wardrobe
	Vision from window to work chair	Access to bedside table from bed
	Vision from window to bedside table	

Table 3. The total scores of subjects (students) for each phase

SUBJECT NO	CRITERIA OF ANALYSIS	1. PHASE	2. PHASE	SUBJECT NO	CRITERIA OF ANALYSIS	1. PHASE	2. PHASE
1	Spatial Organization	3	3	13	Spatial Organization	1	1
	Visual Relations	8	6		Visual Relations	6	6
	Accessibility	5	5		Accessibility	8	9
	Total Scores	16	14		Total Scores	15	16
2	Spatial Organization	4	3	14	Spatial Organization	1	3
	Visual Relations	7	6		Visual Relations	2	7
	Accessibility	6	4		Accessibility	5	6
	Total Scores	17	13		Total Scores	8	16
3	Spatial Organization	1	5	15	Spatial Organization	0	5
	Visual Relations	5	8		Visual Relations	1	9
	Accessibility	6	7		Accessibility	7	7
	Total Scores	12	20		Total Scores	8	21

SUBJECT NO	CRITERIA OF ANALYSIS	1. PHASE	2. PHASE	SUBJECT NO	CRITERIA OF ANALYSIS	1. PHASE	2. PHASE
4	Spatial Organization	1	2	16	Spatial Organization	3	2
	Visual Relations	5	7		Visual Relations	10	6
	Accessibility	4	5		Accessibility	7	7
	Total Scores	10	14		Total Scores	20	15
5	Spatial Organization	2	3	17	Spatial Organization	2	4
	Visual Relations	6	6		Visual Relations	6	7
	Accessibility	4	5		Accessibility	5	8
	Total Scores	12	14		Total Scores	13	19
6	Spatial Organization			18	Spatial Organization	2	5
	Visual Relations	5	3		Visual Relations	7	10
	Accessibility	5	5		Accessibility	7	8
	Total Scores	12	10		Total Scores	16	23
7	Spatial Organization	3	4	19	Spatial Organization	3	5
	Visual Relations	5	9		Visual Relations	7	10
	Accessibility	5	6		Accessibility	7	9
	Total Scores	13	19		Total Scores	17	24
8	Spatial Organization	1	3	20	Spatial Organization	1	3
	Visual Relations	5	9		Visual Relations	4	8
	Accessibility	6	7		Accessibility	7	7
	Total Scores	12	19		Total Scores	12	18
9	Spatial Organization	1	2	21	Spatial Organization	1	3
	Visual Relations	5	3		Visual Relations	7	9
	Accessibility	6	8		Accessibility	8	6
	Total Scores	12	13		Total Scores	16	18
10	Spatial Organization	4	3	22	Spatial Organization	2	3
	Visual Relations	2	6		Visual Relations	5	7
	Accessibility	5	7		Accessibility	8	7
	Total Scores	11	16		Total Scores	15	17
11	Spatial Organization	0	2	23	Spatial Organization	1	3
	Visual Relations	3	7		Visual Relations	5	8
	Accessibility	6	7		Accessibility	7	8
	Total Scores	9	16		Total Scores	13	19
12	Spatial Organization	0	5	24	Spatial Organization	0	5
	Visual Relations	3	10		Visual Relations	6	9
	Accessibility	7	7		Accessibility	7	9
	Total Scores	10	22		Total Scores	13	23
				25	Spatial Organization	4	4
					Visual Relations	9	9
					Accessibility	6	6
					Total Scores	19	19

Discussion

Findings on research hypothesis

1. The relation between the foreknowledge and acquired knowledge

- In the 1st. phase the scores are differentiated among 8-20 and the scores of 2nd. phase are among 10-24.
- There is a largely positive relation between first phase and second phase. 18 of subjects are seen progress for each 3 criterion that means positive relations (Figure 3). There is no progress in the organization of 4 subjects for each 3 criterion that defines negative relations. 3 of subjects have neutral relations; there is no either progress or decline in their arrangements (Figure 4).

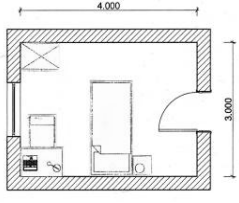
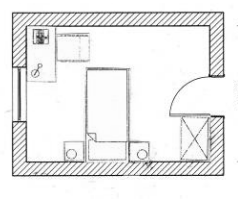
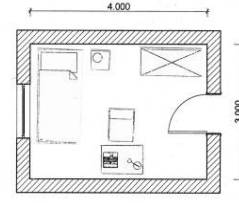
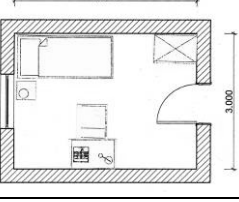
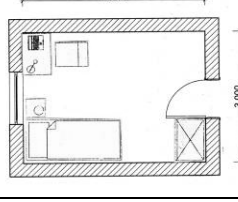
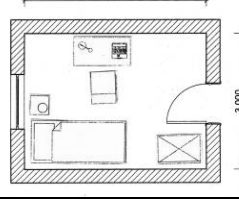
Subject 3	Subject 7	Subject 12
		
1 st . phase		
Subject 3	Subject 7	Subject 12
		
2 nd . phase		

Figure 3. Subject 3, 7 and 12 are the examples of positive relations found in arrangements.

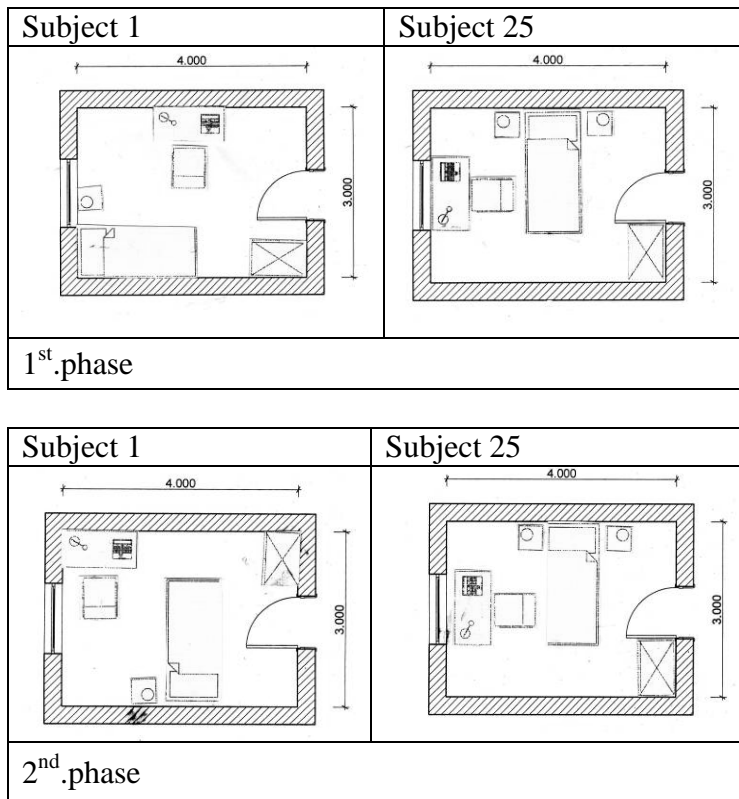


Figure 4. Subject 1 is the example of negative relations and Subject 25 is the example of neutral relations found in arrangements.

2. Information process is realized

- After information process, it is observed that in all groups the scores of the arrangements improved. Spatial organizations increased 5 points, visual relations increased 7 points and accessibility increased 1 point.

As a consequence it could be said that informative process especially was effective on spatial organization and visual relations. There isn't any distinctive effect on accessibility, the reason lays under the importance of this concept in house beside other features.

Conclusion

The findings of the study showed that the process of being informed has been realized gradually. It is also concluded that new knowledge is acquired after information process. The higher rate of the positive relations can give as evidence to support this conclusion.

Although there is no significant evidence about the learning styles of subjects in this empirical study, it is assumed that learning styles of them differ from each other. It is also possible to say that subjects who have positive relations should be better learner and they are also good to associate different learning styles.

The acquired framework of this research could be adapted the studies to be conducted in Building Science 1 course accordingly. The previous knowledge (concrete experience) and newly acquired knowledge of subjects about house design could be combined to form new operational knowledge. This knowledge should use to reach a learning system that is motivating, allows active participation, use of initiative and keeps the interest of the learners alive in Building Science 1 course. For the next step of this research, to design a completely new room should be asked the students as an example to see how they use their new operational knowledge.

For further studies, the process of being informed might be analyzed for the specific parts of architectural education such as building, construction and design. Beside, how the learning styles of architectural students affect the information process is another important point might be searched.

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