COOPERATIVE LEARNING IN AN ARCHITECTURAL DESIGN STUDIO

Nilüfer AKINCITÜRK[*]
Yasemin ERBİL[**]
Çiğdem YÜCEL[*]

Abstract: The purpose of this study is to discover the efficiency of cooperative learning approach in architectural design education. The study was conducted with 23 architecture students from the first and third year students in February-March 2011, in Bursa, Turkey. Researchers adopted a qualitative research strategy since it enables a deeper understanding of the context. The result of this study indicated that cooperative learning method at various levels can be used as an effective learning method to increase motivation of students, sharing knowledge and increasing learning capacity. Furthermore, this study showed that cooperative learning method during the first year of architecture education simplifies understanding, comprehension, and interpreting project areas.

Keywords: architectural design studio, cooperative learning, qualitative research methods

Mimari Tasarım Stüdyosunda İşbirlikli Öğrenme Yaklaşımı

Özet: Bu çalışmanın amacı, işbirlikli öğrenme yaklaşımının mimari tasarım stüdyolarında etkili bir öğretim metodu olarak kullanılıp kullanılamayacağının araştırılmasıdır. Araştırma, Uludağ Üniversitesi Mimarlık Bölümü'nde 2010-2011 Eğitim Öğretim yılı Bahar Yarıyılında Mimari Tasarım I ve Mimari Tasarım V dersini alan iki farklı sınıftaki toplam 23 mimarlık öğrencisiyle Şubat – Mart 2011 tarihlerinde gerçekleştirilmiştir.Araştırmacılar, derinlemesine bir inceleme yapmak üzere kalitatif araştırma yöntemini benimsemişlerdir. Sonuç olarak, mimarlık eğitimi sürecinde çeşitli seviyelerde işbirlikli öğrenme yönteminin kullanılmasının öğrencilerin motivasyonlarının artması, bilgi paylaşımı ve öğrenme kapasitesinin artmasını sağlamada etkili bir öğrenme metodu olarak kullanılabileceği ve mimarlık eğitiminin ilk yılında işbirlikli öğrenme yönteminin öğrencilerin proje alanını tanıma, kavrama ve yorumlamalarını kolaylaştırdığını ortaya koymuştur.

Anahtar Kelimeler: mimari tasarım stüdyosu, işbirlikli öğrenme, kalitatif araştırma yöntemi

1. INTRODUCTION

From the late nineteenth century, various research had been published on the benefits of social and cooperative learning. John Dewey (1897) and Piaget (1928) illuminated social theories of learning. Gergen (1999), Bruffee (1994), Biggs (1999) and Ramsden (1992), have stated relevance and effectiveness of student-centred learning. Similarly, Vygotsky focused on the connections between people and the sociocultural context in which they act and interact in shared experiences. Vygotsky's theory promotes learning contexts in which students play an active role in learning (Vygotsky, 1978).

Group learning include collaborative learning, cooperative learning, peer learning, and group work (McKeachie, 2002; Timpson & Bendel-Simso, 1996). This pedagogy has been shown to be superior over individual learning (Gunderson and Moore, 2008). Collaborative

[*] Uludağ Üniversitesi, Mühendislik-Mimarlık Fakültesi, Mimarlık Bölümü, Görükle 16059, Bursa.
[**] Bursa Orhangazi Üniversitesi, Mimarlık-Tasarım Fakültesi, Mimarlık Bölümü, Bursa.
İletişim Yazarı: Y. Erbil (erbil.yasemin@gmail.com)

learning, cooperative learning, and group work are similar terms to describe "students working together in a group small enough that everyone can participate in a collective task that has been clearly assigned" (Cohen, 1994). Rau and Heyl (1990) assert, "Collaborative learning clearly establishes its superiority over individualistic and competitive modes of learning. Isolated students do not learn as much or as well as students who are embedded in a network of informal social relations". Similarly, Springer et al. (1999) say, "What students learn is greatly influenced by how they learn, and many students learn best through active, collaborative, small-group work inside and outside the classroom".

Cooperative learning is a teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. To make collaborative learning successful it is important to shift the student's role from a passive receiver of information into an active participant (Dominick *et al*., 1997; Umbach and Wawrzynski, 2005).

The effects of group work depend on how the group is organized, what the tasks are, who participates, and how the group is held accountable (Blumenfeld et al., 1996). One problem is failure to contribute by all members of the group or the "freerider" problem (Bartlett, 1995; Blumenfeld et al., 1996). This leads to those "free-riding" failure to learn since they are not participating while those that are doing most of the work can often feel exploited and either reduce their own efforts or work on their own. Other anti-social behavior can occur when forceful students dominate discussions, pressure others to accept their perspective, or force conclusions on the group. Others may ridicule and exclude group members or discount their contributions leaving those rejected members to feel humiliated or withdraw from the group completely (Blumenfeld et al., 1996).

2. LEARNING IN THE ARCHITECTURAL DESIGN STUDIO

Architectural education contains a multi-dimensional education process. The goal of architectural education is to ensure students understand buildings as a whole; obtain professional knowledge and skills on planning, design and production and to ensure students develop their critical thinking abilities to analyze knowledge learned. In architectural education, active learning takes place when students question theories of design, relate these theories to the task at hand, and engage in a creative process of discovery. The architecture studio creates a context where active learning occurs throughgroup or individual problem-based projects (Datta, 2007).

Architecture design studios are locations uniting knowledge and skills of students obtained throughout lessons with students' knowledge on perception and psychology which are central to architectural training (Erbil Y., 2008). Architecture design studios are locations of constructing/reconstructing/experiencing, which enable students to show their creativity. Koester defines the active learning environment of the studio as an experience that is loved by students with passion and which is intensive inspiring/creative (Koester, 2006). Therefore the studio environment should be an environment where transactions between disciplines and all possibilities are discussed and an empathy is created between the teacher and the learner. In this environment, the coordinator of the studio needs to develop a language that covers the architecture education. In this context, different architectural schools promote different types of studio cultures, which range from very informal to very formal models of learning.

An architectural design studio creates an environment for cooperative working and learning (Goldschmidt and Tatsa, 2005). Meiss, defends this relationship as "it shall not be a relation with two sides, in which one knows all and the other doesn't, the relation shall be a

partnership of an experienced and an inexperienced person who are looking to understand information together" (Meiss, 1995). Çağlar (2007), states that the studio environment shall be a teaching and learning environment for all. The shared idea in these views is that studios need to be locations of sharing. In this sense cooperative learning method, which aims to gather students together and let them learn from each other in small groups, can be used as a valid education method in architectural design studios.

3. CASE RESEARCH

This paper addresses the responses of architectural design studio 1 students for the questions that concern adaptation to architectural design and design studio environment. In an attempt to have the picture of architecture students' group learning dynamics, this paper also seeks to provide answer to the following question: Is cooperative learning approach efficient or not in an architectural design education?

This study examines cooperative learning issues of architectural education in a first and third year undergraduate architecture studio. The aim of this research is to discover whether there is a significant difference in contribution of cooperative working in architectural design studio 1 and architectural design studio students 5 at the project area analyses stage. The study was conducted with 23 architecture students from the first and third year students in February-March 2011, in Bursa, Turkey. Working groups from 1st and 3rd classes were established with a balanced distribution of students. The analyses stage was completed with a jury evaluation, in which both project studio coordinators have participated. After the evaluation of the jury, students were asked to evaluate the working process. Qualitative research method was used to evaluate the feedbacks received. This study presents the results of an experimental research and will provide a base for further research.

4. RESEARCH METHODOLOGY

Researchers adopted a qualitative research strategy since it enables a deeper understanding of the context. To increase validity and reliability, all methods and procedures related to each phase of the research were clearly identified and explained. Considering that the basic goal of the qualitative research method is not being generalization and that the laborous data collection processes limit the sample size, the researchers used purposeful sampling method. Purposive sample sizes are often determined on the basis of theoretical saturation. According to Glaser and Strauss (1967) *"theoretical saturation"* is the criterion used to judge when to stop collecting data when new data no longer bring additional insights to the research questions. Samples are chosen as and when they are needed rather than before the research. Only when no new patterns, or possible categories, emerging from the data could be found, a point labelled as "*theoretical saturation*" (Glaser and Strauss, 1967; Glaser, 1992) is reached and sampling is finalized. Data collection process was ended after a meeting with 23 architecture students. Data were collected through semi-structured interviews. Researchers conducted a survey composed of open-ended questions.

Researchers used qualitative content analysis to analyze data. Content analysis contains four phases which are coding data, defining themes, organizing/defining data according to codes and themes, interpreting findings (Yıldırım and Şimşek, 2004; Strauss, 1987). In the first phase of the content analyses, which is the coding phase, data collected are separated into meaningful parts (Strauss, 1987). Coding is defining meaningful data which can be composed of a few words, a sentence, a paragraph or a page by the researcher. Coding can be carried out according to defined concepts in the literature or it can be carried out using concepts that come out of the expressions of the persons interviewed. In the second phase

based on the codes previously identified data themes will be defined which can define data in general and collect codes under different categories. To do this first of all codes will be gathered together and their similarities and differences will be identified and then themes that will define codes that are interrelated will be defined. In the third phase, a system will be set up to define and interpret data collected at the coding phase. In the fourth phase of the content analyses which is interpreting finding, the views and interpretations of the researcher are important parts in qualitative research. For this reason, it is expected from the researcher to make conclusions giving meaning to data collected, creating cause and effect relationships, defining outcomes of the findings and describing the importance of these findings (Yıldırım and Şimşek, 2004). In this research the coding system was developed by the researchers.

5. RESULTS OF THE STUDY

Based on the qualitative data evaluations, there is a significant difference in the architectural design education under a cooperative learning approach when compared to the same lesson taught using a conventional learning approach. This study highlights that the cooperative learning approach is more efficient than the conventional approach. The results and their implications indicate that the cooperation is a beneficial strategy on improving individual performance in both first year-architecture students and third-year architecture students. This study showed the value of a collaborative learning method in streamlining understanding, gaining insight and evaluating project area for students. It is an effective learning method to increase the motivation of students, to share information and to increase learning capacity for students. As a result, collaborative learning where collaboration at various levels among students is established, instead of traditional teaching, is effective in increasing the interest and active participation of students in lessons. Some of the codes and themes of the case study are given Table 1 and Table 2.

Table 1. Codes of the case study

Code number	Case number	Codes
Code 1	Student 1	I've worked with two friends in Project 1. We had difficulties in coordinating our work because our course schedules were different.
Code 2	Student 2	I've worked with one person from Project 1. He tried to learn Photoshop while we are preparing an analyses map section together.
Code 3	Student 3	I believe it was the correct method of working. I believe I learned a lot. I benefited from their experience.
Code 4	Student 5	Project 1 and 5 working together was beneficial because of the highly experienced partners in Project 5, compared to us. We can learn from their experiences. I believe there are more negative sides to it compared to positive outcomes. They are much more advanced compared to us therefore we can only work efficiently to some extent. I believe we can be more efficient if we work in separate classes.
Code 5	Student 11	Project 1 and 5 working together was helpful for me. They are more experienced and have more information compared to us. They shared their knowledge with us. Therefore it was beneficial. But being in different classes it was not easy to create time and meet. But I was satisfied from the work.

Table 1 (continued). Codes of the case study

Code number	Case number	Codes
Code 6	Student 14	I've worked with students in my class and higher classes. I believe starting working like this was beneficial both for Project 1 and 5. As a student from Project 1, I learned more how to start a project and how to carry out analyses.
Code 7	Student 4	In my opinion working groups is really good especially mixed gorup with 1 and 5. Working together teaches how to take responsibilities and pay attention.
Code 8	Student 12	I thought it would be very beneficial to work with the members of Project 5. But due to their extensive knowledge on the subject and also the advanced software they use made it not possible to work together.
Code 9	Student 16	As a student from Project 5, integrating with a friend in Project 1 gave me the opportunity to transfer some of my knowledge and experiences to her. I've illustrated her some of the meanings of the architectural terms, which she did not hear before.
Code 10	Student 19	It was a good experience for me to transfer some of my knowledge and help them in carrying out analyses to our friends in the first class. I believe the contribution for both us and them will be positive if we continue these kind of activities in most of the projects.
Code 11	Student 8	We have gathered more information in a shorter period. We worked together and transferred the knowledge to each other.
Code 12	Student 7	We weren't able to actively participate because they had better computer skills.
Code 13	Student 8	The biggest advantage of group work for me was although my work area was limited to the Misi village I was getting more information on the region easier.
Code 14	Student 9	I can say that it was more beneficial for me to work together with students of Project 5. Because the students I've worked with were more experienced than us. I can see that the point of view they had was larger and different than ours.
Code 15	Student 6	Thanks to the group work I've understood that projects need to be prepared according to the needs of people. I am looking forward to benefit from the experiences of the students of higher classes even after this project ends.
Code 16	Student 7	The advantage of working together with Project 5 students was being aware of the starting point. They have shown us what to do and how, when starting analyses.
Code 17	Student 13	I've learned how to analyze the terrain. I've realized there is much to learn.
Code 18	Student 10	It was an advantage to work with students from higher classes, who had more information. I believe the information given by them when we were evaluating the areas we have visited was beneficial. But I believe it also was an obstacle for us to feel inside the project.

Table 1 (continued). Codes of the case study

Code number	Case number	Codes
Code 19	Student 13	Due to the difference in our knowledge they had to spare some time to teach us. As a result I believe that it was positive for us but negative for them.
Code 20	Student 18	The work we carried out with Project 5 group was fun and efficient. I especially learned a lot from my friend in Project 5 in terms of building analyses, techniques to be used in the building and materials to be chosen.
Code 21	Student 15	The analyses we have carried out in the Misi village in the scope of Project 1 and 5 were fun. We assisted our friends in the class. For us it was important to assist our friends in lower classes. In the past, when we were younger, we also have received assistance from students at higher classed, therefore we felt that this was what we needed to do now. We have carried out analyses in the times we could spare. I believe it was beneficial to do the analyses in collaboration with many people.
Code 22	Student 16	The contribution of working together with another student from Project 1 as a student of Project 5 was during communicating to people during surveys. We were more comfortable together when we have visited houses during surveys. I would not feel comfortable if I was alone. My partner also helped me finding building in the charts we had.
Code 23	Student 20	I became more optimistic for the future of architecture as I saw the will of my friend from Architectural Design 1 to learn and research.
Code 24	Student 22	I was beneficial to work with friends from the first class. We benefited from their free approach and their excitement.
Code 25	Student 21	Working with students from lower classes was beneficial for exchange of ideas and gaining experience. We had the opportunity to share our experience and learn from their impressions. The analysis work was efficient.

Table 2. **Themes of the case study**

Theme Number	Themes
Theme (1)	Differences in the course programmes make it difficult to find time and place for cooperative working. This makes it harder for students to become organized.
Theme (2)	First year architecture students were introduced to architecture profession softwares.
Theme (3)	First class students benefited from third class students' knowledge and experiences they have gathered throughout their education.
Theme (4)	Responsibilities that had to be taken in a cooperative work encouraged focusing on the project.
Theme (5)	Due to different knowledge levels between students there were problems in harmony within the group.

Table 2 (continued). Themes of the case study

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Theme (1)	Differences in the course programmes make it difficult to find time and place for cooperative working. This makes it harder for students to become organized.
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Theme (4)	Responsibilities that had to be taken in a cooperative work encouraged focusing on the project.
Theme (5)	Due to different knowledge levels between students there were problems in harmony within the group.
Theme (6)	Within the group third class students have taken the role of an instructor or guide, which increased the sense of responsibility.
Theme (7)	Cooperation enabled creating more work and information in a shorter time period.
Theme (8)	Due to limited knowledge of first class students they were under a risk of not being able to actively participate in works.
Theme (9)	During group work it was possible to reach more detailed information in general.
Theme (10)	Students being at different classes have presented different approaches, which in turn made it possible to evaluate the region with a larger perspective.
Theme (11)	First class students seeing a larger knowledge accumulation helped them to make a forecast for the future.
Theme (12)	Awareness of first class students increased.
Theme (13)	The risk of embracing the project, losing interest, and distraction of students not being able actively participate in the work.
Theme (14)	Lack of information of the first class students increased the learning curve.
Theme (15)	Increased social connections made the work more fun.
Theme (16)	Cooperative learning helped the sense of collaboration in education.
Theme (17)	Students felt stronger during the course of the work with the sense of being part of a group.
Theme (18)	Increased levels of excitement and their free approach to the subject increased the motivation of higher class students.
Theme (19)	Sharing ideas and knowledge in architecture education was supported.

6. CONCLUSIONS AND RECOMMENDATIONS

The result of this study indicated that cooperative learning method is a good learning strategy to increase architecture student learning and it can be used as an effective learning methods to increase motivation of students, sharing knowledge and increasing learning capacity. Furthermore this study showed that cooperative learning method during the first year of architecture education simplifies understanding, comprehension, and interpreting project areas. In addition, cooperative learning created at various levels of student groups compared to traditional education methods based on teaching, is effective on creating a

greater student interest and participation towards lessons. Results of the study shows that supporting cooperative learning activities will especially reduce difficulties of first year architecture students in adaptation to their profession and will engage them in efficient and meaningful learning. As a result, these types of activities in architectural education not only limited in architecture design studio, but also supported in various lessons in the curriculum will have positive results.

ACKNOWLEDGEMENTS

The researchers wish to thank the students who took part in this study and provided valuable feedback.

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Makale 14.02.2012 tarihinde alınmış, 16.03.2012 tarihinde düzeltilmiş, 30.03.2012 tarihinde kabul edilmiştir.