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The Effect of the Jigsaw Technique on Learning the Concepts of the Principles and Methods of Teaching

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Abstract: The purpose of this work is to study the effects of the jigsaw technique used in collaborative learning and that of classical learning method on the academic performance of the students, on the learning of the concepts in the Principles and Methods of Teaching course. The research has been performed on the second year students of the Ataturk University Primary School Teaching Division in the 'Principles and Methods of Teaching' course. A total of 80 students have participated in the research, in the form of an experimental group where the Jigsaw technique (n=40) and a control group (n=40) where the Classical Learning method has been applied. At the end of the evaluation there was a statistically meaningful difference in favor of the experimental group

Key words: The Jigsaw Technique · Learning principles · Methods of teaching

INTRODUCTION

A close look at the developed countries of the 21st century reveals that just as they do in the case of science and technology, they transfer their practices in the field of education to other societies. The changes experienced in the area of science and technology leads to changes in the area of teaching methods and techniques. These changes are from teacher centered (passive) teaching methods towards modern (active) teaching methods. Many researchers and educators have been stating that teaching methods are one of the problematic areas of education [1,2]. To make the students acquire critical and creative thinking is one of the purposes of the modern education practices. Children reach to cognition stage only when they discover themselves [3]. Collaborative learning is used to increase motivation and progress in classes. Just as it is being used in every arena of Education Science, it is also used effectively in the second year of primary school.

Collaborative learning is the learning process of those who do not know much while working with those who know well. Some of the people are more capable while others are smarter. It is when these people come together and help each other that collaborative learning takes place.

In collaborative learning process, students work for a common cause. They help each other learn. This process can be described as an educational approach, to increase self confidence, improve communication skills and increase active participation in the education process [2, 4-13]. They achieve this by forming small groups. But not every group work is a collaborative learning process. In collaborative learning, both the student and his/her friends should strive to learn at the highest level.

Collaborative learning is a concept that continues to attract the attention of teachers, school administrators and education scientists [14]. Furthermore, it is the most widely used approach in the theory, research and education practices [2, 15-17]. The role of learning in class with collaboration, team projects or working on the application abilities and supporting the teachers in the education process by giving the chance to the students to discuss the content can be strengthened. This process aims to develop students both socially and intellectually.

Collaborative learning has recently been at the focus of education research. It is observed that the Jigsaw technique used in collaborative learning effects increasing the academic success in addition to the social and intellectual abilities of the students, Various research have shown that especially at the primary, middle school and the university level, Jigsaw technique, is effective in the learning process of the theoretical courses, in the development of critical thinking process of the students, in their ability to express themselves and in their communication skills [17-20].

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There are many studies using the Jigsaw technique within the collaborative learning method. Mark *et al.* (1991) have studied the effects of collaborative learning method on the academic performance of students doing experiments in the chemistry lab [21]. This work was performed by forming a control and an experimental group. In the present work, the environments for success have been created for unsuccessful students by forming groups that have been selected from the main group in the form of a jigsaw. At the end of this work, we have decided that the experimental group that used the collaborative learning method has been more successful than the control group that used the traditional learning method. In the works of Doymuş *et al.* (2007), on the effects of traditional and collaborative learning on the academic performance of students in the general chemistry laboratory course, it has been determined that the collaborative learning is more successful than the traditional methods [2].

In this and similar works, by enabling the active participation of the students, the collaborative learning method creates an environment for them to gain high level academic and social skills. The purpose of this research; is to study the effects of the jigsaw method used in collaborative and traditional learning on the academic success and the learning of the concepts in the teaching principles and methods course. In this regard, answers were sought for the following questions:

- Will the academic success of the students in the collaborative learning groups in learning the concepts in the teaching principles and methods course be significantly different than the academic success of students in the traditional learning groups?
- In the teaching principles and methods course, will the student's capabilities in the collaborative learning groups in the area of program development and recognition and learning the related concepts be significantly higher than the other students?

MATERIALS AND METHODS

Sampling: Research was conducted with the participation of 80 second year students of the Ataturk University Kazım Karabekir Education Faculty taking the Teaching Principles and Methods course in the Classroom Teaching Education Branch in two separate sections. One of these different groups was identified as collaborative (experimental) group (n=40) using collaborative learning (jigsaw method) and the other as using the traditional learning method (control) group (n=40).

Data Collection Tools: Program Development Success Test (PGBT): The program development success test is composed of 30 multiple choice questions each with 5 choices intended for testing the learning of the concepts in the Teaching Principles and Methods course, All of the multiple choice questions cover program development topics. While each of these questions are prepared to measure the gains in the program development in education, question types in different forms to test the same gains have also been included. The PGBT test developed in this way has been applied to the students who took the course and the reliability coefficients (KR-21) have been found as 0.62. For the validity of the PGBT test developed for this purpose, views of other faculty members that teach the Teaching Principles and Methods course and the views of the relevant other faculty related to the Education Sciences were solicited. These faculty members have confirmed the validity of the test designed to measure the gains in the area of said topics.

In this research, PGBT test was applied as a pre-test, to decide whether there is a significant difference between the control groups that used collaborative learning methods and the groups that used traditional learning methods. According to the pre-test findings, the students that belong to the experimental groups that used jigsaw method were placed into homogenous groups. After applying the pre-test to experimental and control groups, topics were covered using jigsaw method for experimental group and traditional learning approach for control group. This application was conducted by corresponding group researcher, for seven weeks with three lecture hours per week

In this work, first, the jigsaw group that used the jigsaw method of collaborative learning approach was divided into two sections. From among students attending the first and second sections, four main groups were formed with five students each for a total of eight main groups as shown in Fig. 1:

The reason that four groups from each of the first and second sections were formed was because the numbers of topics chosen were four. Group forms were distributed to all of the groups in the class chosen as the jigsaw group. On the group forms, the name of the group, the number of members, the topics the group members are responsible for and the group leaders were written. Through the group leaders, the sub topics in the program

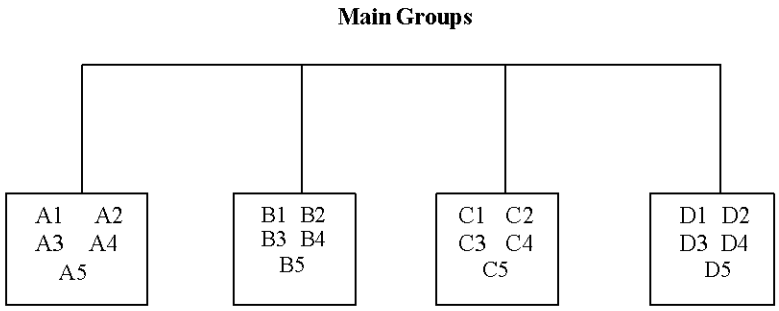

Fig. 1: The distribution of the first section of the class into main groups where Jigsaw technique was applied

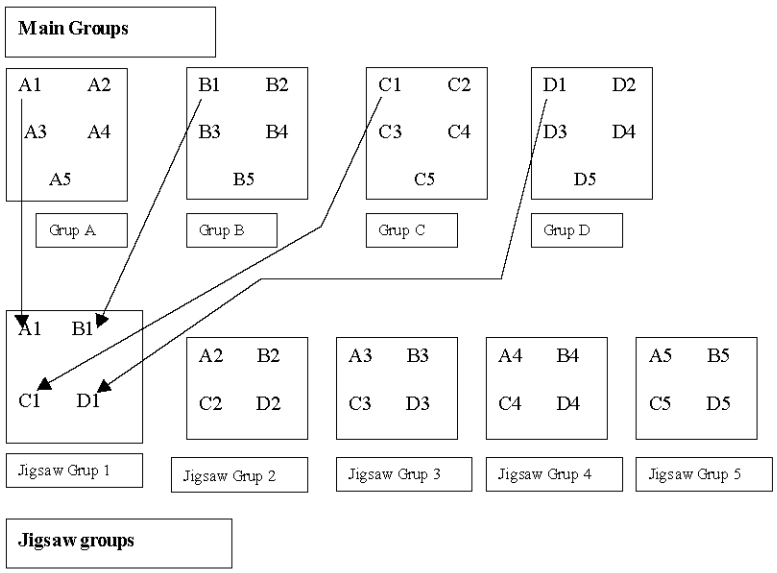

Fig. 2: Formation of the Jigsaw Groups from the main groups of the class where Jigsaw technique was applied

development topic of the Teaching Principles and Methods course were distributed to members of the group and personal responsibilities were given to each member. The students that received the team subtopics in their main group have been placed into jigsaw groups of four people as seen in Fig. 2.

When the jigsaw groups that received the same subtopics were given 1 week to research and discuss their topics in order to teach them to their peers upon their return. During the second week of the exercise, the students in the jigsaw group concluded their work and returned to their former main groups to teach their peers the topics. The students that have returned to their main groups made presentations to their group members and discussed the topics. After the completion of teaching the topics, they were asked to prepare for group presentations. In the remaining weeks of the exercise, groups have made possible to teach the topics in detail by making group presentations to the whole class by discussing in class and developing different viewpoints. After all groups have finished their presentations the exercise was considered completed and PGBT was applied as the last test.

In the control group where traditional teaching was applied, the researcher has continued to cover the course in the belief that with a good presentation the traditional approach can also be successful. In effect: an effective introduction, a plan to teach the course, examples to be given, questions to be asked, material to be used was prepared before entering the class.

As the course resource, the course material that was given prior to the student was followed. By writing topic titles and subtitles on the board and by inquiring what they would ask on these topics, their attention was solicited. During the course of the class, important points were asked to the students and the course was continued

depending on their answers. After the completion of each subtopic, it was asked of the class whether the topic was understood, followed with a short review and homework was given to students. The course was completed by telling the students to come to class prepared.

RESULTS AND DISCUSSION

In this section the findings and discussion of the findings have been presented. The findings of the independent group's t test reflecting the overall average points scored are given in Table 1 performed on the jigsaw and control groups before the application of the jigsaw and traditional learning techniques in order to determine the performance of students in the Principles of Teaching and Methods course

From data of the Table 1, it was observed that before the related sections were taught, the PGBT pre-test average scores of the control and jigsaw groups (X_{Jigsaw} =66,50; $X_{Control}$ =62,50) were close to each other. There was no significant statistical difference between the average scores of the groups.

These findings indicated that in the rules and methods of the education lecture, the academicals success of the groups were similar before jigsaw and traditional methods were applied. The reason for exhibiting the similar qualifications of students can be originated from being educated in the same education program and having the similar admission scores while being admitted to the program. After jigsaw and traditional learning programs were applied, the same test was applied to the research groups as the final test to compare the academicals success in the principles and methods of the education course of the students. The findings of the t test which was related to the average scores of the final test obtained from the PGTD are given in Table 2.

According to the last test findings in Table 2, the effects of the experimental group where jigsaw technique used in collaborative learning has been employed and the control group where traditional learning method has been employed, on the academic performance in the teaching principles and methods course have been compared and a statistically meaningful difference (p=0,001) between the academic performance of the groups was found. According to these findings, average success of the experimental group was found to be higher than that of the control group (X_{Jigsaw} =92, 25; $X_{Control}$ =75, 50). The reason for the experimental group to have a higher success than the control group in the principles of

Table 1: Independent groups t-test findings obtained from PGBT'nin pre-test

Test	Groups	N	X	Std. D	p
pre-test	Jigsaw	40	66.50	14.685	0.192
	control	40	62.50	12.403	

Maximum points: 150

Table 2: Independent groups t-test findings obtained from PGBT'nin post-test

Test	Groups	N	X	Std. D	p
Post-test	Jigsaw	40	92.25	14.320	0.001
	Control	40	75.50	15.098	

Table 3: Paired t test findings for PGBT scores in jigsaw and control groups

Groups	Pre-test points	Post-test points	t value	p
Jigsaw	66.50	92.25	7.393	p=0.000
Control	62.50	75.50	4.166	p=0.000

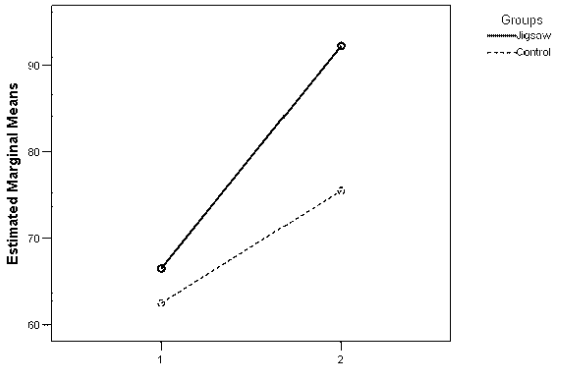

Fig. 3:

teaching methods course can be said to be due to the fact that the students, having lived through the learning processes themselves, have formed real learning experiences since they applied the jigsaw technique themselves, researching and discussing the topics indepth. The findings of this study is in agreement with other studies jigsaw technique used in collaborative learning was found to be effective [22-24].

The variation of PGBT scores for each group was also examined. According to the paired t test findings, the increase of 25.75 points occurred in the jigsaw group was found to be significant (p=0,000). In the control group, an increase of 13.00 points occurred and this was also found to be meaningful (p= 0,000). As is seen in Table 3 below, the change in the jigsaw groups appear to be more to control group.

As is demonstrated in Fig. 3, the gap between the jigsaw group and the control group is getting larger at the end of the study. The mean score difference on the post test becomes significant.

CONCLUSIONS

From the findings of this study performed to measure the effects of the Jigsaw technique used, in collaborative learning approach in the Teaching Principles and Methods course: it was found that this technique has more favorable findings on the academic performance of students than the traditional learning method. These findings are in agreement with previous studies expressing that collaborative learning is much more successful when compared with traditional learning [25-29].

As is stated in the findings section, relying on the academic success score of the control groups where the jigsaw technique used in the collaborative learning method has been applied than the control groups, it can be said that this technique has a positive influence on their learning the principles and methods of teaching course.

We claim the following due to the findings of the research performed in this work:

- Jigsaw technique should be used in all phases of education,
- The work of students using the jigsaw technique should be monitored carefully and the faculty should intervene only when necessary.
- Using 'Collaborative Learning' in one of the courses of the package programmers of the Education Faculties will give efficiency and ease of teaching to teacher candidates.

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