The Effect of Project Based Learning Approach in Social Sciences Class on the Student Success and Memorability*

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Abstract

Problem Statement*: One of the aims of Social Sciences is to raise efficient citizens to improve the democratic process. In a rapidly changing democratic society, we need critical and creative citizens capable of questioning the existing social values and producing new ones. An efficient democratic citizen must filter every incidence based on knowledge and reasoning. To realize the aims of the Social Sciences and to extend the class beyond being based on memorization, the implementation of the Project Based Learning Model, which encompasses many methods and strategies and enables the students to reach the necessary information on their own, use it efficiently, transfer the information to the related fields, conduct searches, use their skills of scientific process, present the information they have obtained upon appropriately bringing them together and express themselves, shall add a new dimension to the class.*

Purpose of Study*: The purpose of this study is to define the effect of Project Based Learning Approach on the success (access) of students and memorization in teaching the unit called "Population in Our Country" in the Social Sciences class of 7th Grade students in Elementary School.*

Methods*: This experimental study (Pretest-Posttest Design with a Control Group) was practiced upon 73 students – including an experimental (37) and a control group (36)- in an Elementary School in Bolu province. In order to determine whether the experimental and control groups were equivalent in terms of number, sex and presence of the students, the number and sex of the students and the averages of their pretest scores, "pass and school report marks" of 6th Grade students and "school report marks of social sciences" of the second term of 6th Grade students, their standard deviations, and the results of t test were analyzed. The achievement test prepared in accordance with the unit was given to the experimental and control groups prior to and following the practice as a posttest and 21 days after the finalization of the practice to test memorability and it was implemented with open-ended questions separately designed for the opinions of the students.*

Findings and Results*: Significant differences were found for the experimental group between the knowledge, comprehension, practice, total access average and memorability marks of the experimental group who took project based education and the knowledge, comprehension, practice, total access average and memorability marks of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class.*

Conclusions and Recommendations*: When we examined the opinions of the students regarding the project-based learning process, the majority of the experimental group students on whom project-based learning was practiced said that the Social Sciences Class became more enjoyable, got far from being monotonous and teacher-centered education and instead became research based and that the method enabled them to be more active during the lesson. They also stated that they more easily learned about the lesson and their knowledge became more memorable in that they searched about the subject themselves, classified the information they found and chose among them and explained about them to the other students. New studies might be conducted regarding the efficiency of "Project Based Learning" in different lessons, classes and schools with the aim of enlightening the present studies.*

Key Words: Social sciences, project based learning approach, traditional learning, access, memorability.

*This research paper is prepared basing on doctorate thesis

Introduction

Education has been defined as the process of bringing about terminal changes either through the life of the individual himself or intentionally (Ertürk, 1984). Equipping i.e. educating the humans with the terminal behaviors has been the most vital problem for ages. Nowadays, this problem has become more complicated and even more intense. The human being can be integrated with any kind of processes ranging from the most solid and plain relations to the most abstract and complicated ones. It is the human being who will govern the state, design, build and operate plants, gain products from them, start a family; build houses, schools and dams or solve the problems created by himself or others. Therefore, there is a need to equip the human beings with consistent behaviors, i.e., with problem-solving knowledge and skills, which is achieved only through education (Sönmez, 2001).

The education institutions fulfill their functions to raise the newly growing-up generations as good citizens by enabling the individuals to know about the culture, history, geography and institutions of their country and by earning them the behaviors required by the social roles, the possibilities provided by the society and the ways to utilize them. In our country, the majority of these skills and knowledge are provided in the Social Sciences classes of the elementary schools.

Social sciences might be defined as a field of study through which the students are provided with the fundamental knowledge, skills, attitudes and values related to social life based on the selected knowledge from the disciplines of the social sciences in the elementary schools with the aim of raising good and responsible citizens. Through social sciences, the cultural heritage is descended to the students, who are in turn raised as good citizens (Erden, Tarihsiz:9). When we say reality, any activity regulating the social life comes to mind. However, Sönmez (1999) defines Social Sciences as "the process of establishing a correlation with the social realities based on evidencing and the dynamic knowledge obtained from that". When we say social reality, any activity regulating the social life comes to mind. All phenomena and relations providing an easier, more comfortable and happier life for the individual through his own potentials, which he has to use in his daily life, might be included in this concept.
Barr, Barth and Shermis (1978) define Social Sciences as "the integration of social sciences with the aim of realizing the goals of the education of citizenship". The National Council for the Social Studies (NCSS) of the USA defines Social Sciences as "the integration of the studies in the fields of Social Sciences and human sciences with the aim of improving the efficiency of the citizens" (Martorella, 1998).

In the curriculum of 2005, the vision of the Social Sciences Learning Program was defined as "raising citizens of the Republic of Turkey to adopt the modern principles and reforms of Ataturk, to comprehend the Turkish history and culture, to be equipped with the fundamental democratic values and to be respectful for the human rights, sensitive for their environment, to interpret the knowledge according to their experiences and to create, use and regulate (with critical thinking, creativeness and through the right decisions) it again within the social and cultural context, to be developed in terms of social participation skills, to gain the methods which are employed during the production of knowledge by the social scientists, to be efficient and productive in the social life and to be aware of their rights and responsibilities" (Social Sciences Program, 2005).

One of the aims of the Social Sciences is to raise efficient citizens to improve the democratic process. The core of the democratic citizenship is formed by efficient decision-making based on knowledge and scientific reasoning. Another purpose is to enable socialization. Every society wants to earn their existing cultural values to the new generations for their continuity. The gaining process of the new generation of these values is called socialization. In a rapidly changing democratic society, critical and creative citizens capable of generating new values by questioning the existing social values are needed. An efficient democratic citizen must filter each evidence based on knowledge and reasoning. Moreover, he should teach about the scientific thinking methods of Social Sciences (Öztürk and Dilek, 2002).

Providing a teaching-learning environment which is student-centered and in which an active participation is provided, the students and their opinions are valued and the information is interpreted upon being integrated with the life itself might provide contributions for the students to develop positive attitudes towards the Social Sciences classes. The findings of the studies about the attitudes of the students and teachers towards the Social Sciences classes reveal that they do not much favor these classes (Hawkins, 1997; Chapin and Messick, 1992; Massialias, 1990; Goodlad, 1984; Öztürk and Otluoğlu, 2002; cited by: Öztürk and Dilek, 2002).

Hawkins has shown in his studies that the negative attitudes of the students towards this class are caused by the attitudes of their teacher and the methods employed by the teachers in the classes. Chapin and Messick (1992) attribute the reasons for the negative attitudes of teachers to the teaching method, i.e., this class is taught according to the facts and based on memorization without going beyond the extent of the course book or using many teaching methods or having any effective purpose (Dursun and Dilek, 2002).

In the changing era, the teachers should prefer learning methods which render the learning permanent for their students by being alienated from the traditional methods in the teaching-learning process. Within this scope, the present understanding needs to be questioned. At this point, we need to ask these questions; "Should the courses be full of encyclopedic information or prioritize the deep understanding of the subjects and events and critical thinking? Should the schools equip their students with the information necessary for their future or should the students learn to learn by accepting that the knowledge taught them in school is not life-long? (Özden, 1999)".

One can clearly understand that the answers to these questions won't be realized by the traditional teaching-learning methods, because the most important duty of the contemporary teachers is to raise creative, critical and multi-directional thinking individuals who can learn to learn, solve problems, are responsible for their own learning and capable of reaching healthy decisions (Saban, 2005). These questions and their answers enable the teacher to search for new understandings to realize effective learning, find and use different methods and techniques by constituting a starting point for the teacher to change the existing structure. When we look at the subject in this respect, "Project Based Learning Model" might be seen as a method treating the learning differently for the Social Sciences classes.

The Social Sciences Class and Project Based Learning

The schools, as we head for the 21st century, should rearrange their learning environments to conform with the contemporary conditions and expectations upon examining the needs of the students and the new age. For this purpose, learning environments in which the students:

- Can reach information from various sources,
- Can use knowledge for problem solving, decision making and planning,
- Can transfer their knowledge to the daily life
- Can use the technology as an access tool to the information must be provided with a multi-channel learning process including the use of technology and based on cooperation (Kurbanoğlu and Akkoyunlu, 2001; Öztürk, 2004).

The Project Based Learning Approach is an innovative approach to the teaching-learning process. In this approach, the general concepts, thoughts and principles of a discipline are focused. The basis for this approach has been constituted as the solution to the problems offered by the learners in close cooperation which might be encountered during the daily life (Buck Institute for Education, PBL: 2002).
It favors long-term learning activities, establishment of inter-disciplinary bonds and a learner centered learning integrating the studies with the real life subjects rather than a teacher centered learning environment which is formed by short practices and in which one class is unconnected to the other (County Superintendent of Schools, 2002).

Project Based Learning Approach focuses on the learning ability of students by establishing their own knowledge through their experiences. It realizes that by giving responsibility to the learners on defining problems, searching for solutions, managing searches, analyzing data, choosing information, integrating the chosen information and correlating the new information with the old ones (Diffily, 2002).

In Project Based Learning, there is an existing problem lacking in a pre-established solution, the students design the process to reach a solution and are responsible for accessing the information they have collected and managing the information; there is an ongoing evaluation, the end product is produced and evaluated for quality and the class is constructed to be tolerative of mistakes and changes (Buck Institute for Education, What is Project Based Learning PBL, 2001). The process steps of Project Based Learning Approach have been classified by Erdem and Akkoyunlu (2002) and Moursund, D. (1999) as follows:

1. Setting out the targets
2. Identification and definition of the work or subject to be handled
3. Forming the teams

4. Determining the properties of the result report and its method of presentation
5. Forming the work program
6. Determining the check points
7. Determining the evaluation criteria and efficiency level
8. Collecting information
9. Integrating and reporting of the information
10. Presenting the project

When we examine the process steps, we can see that the steps of collecting information come after the basic planning steps, which constitute the basic concepts of the contemporary human model under the scope of information literacy competencies.

We can arrange the properties of Project Based Learning Approach as follows:

1. It might enrich and develop the learning capabilities of the learners by allowing them to form their knowledge. It allows them to think about the importance of the information by allowing them to deeply search about the subject matter. It allows for the evaluation of the information of critical importance and makes the learner more active in the material forming process.
2. It is an interesting approach for the learners to be active, carry out in-depth studies and produce something.
3. It proposes many ways for the learners to participate in the learning process and show their level of knowledge.
4. It might be adapted to different intelligence types.
5. It may provide a change to the learners with their own learning methods like those who learn by reading or reviewing alone or with a group or by discussing.
6. At the same time, it shows different ways to the learners apart from those they distinctly do every day. It allows them to learn through application.
7. It provides meaningful information to the families of the learners about the changes in their performance (Demirhan, 2002).

Project Based Learning Approach might contribute to the development of the following skills and properties:

- Skills of studying with a group
- Life skills (carrying out a meeting, planning, budget administration etc)
- Cognitive process skills (decision-making, critical thinking, problem solving etc)
- Self-governance skills (setting out the purposes, organizing the duties)
- Attitudes (learning drive, desire for advance training steps)
- Inclinations (self-direction, sense of achievement)
- Beliefs (self-sufficiency etc) (Buck Institute for Education, PBL Overview, 2002).

The implementation of Project Based Learning Model, which encompasses many methods and strategies and enables the students to reach, use and transfer the information to the related fields, make searches, use their skills of scientific process, present the information they have collected upon appropriately integrating and to express themselves, shall add a new dimension to the class to realize the goals of the Social Sciences and alienate the class from being one based on memorization. This experimental search is of importance on grounds that it shows the effectiveness of the Project Based Learning Model on the Social Sciences classes of Elementary Schools in terms of student success. Project Based Learning Model shall add a new dimension to the teaching of Social Sciences by enabling the best realization of the goals of this class. It is expected that this search shall contribute to the Social Sciences Learning in this sense.

Method

Model of the Study

This study is experimental. This constitutes the model of the study called "Pretest-Posttest Design with a Control Group" (Balci, 1997; Kaptan, 1998). The study was conducted upon two groups. They groups were randomly named as the experimental and control groups. While the experimental group took the Social Sciences class using a training program prepared in accordance with the "project based learning approach" and course materials, the control group took traditional training.

The training was maintained by the searcher in the experimental group and by the lecturer in the control group. In the experimental group, the searcher and the lecturer of the Social Sciences stood as observers. In the study, the lecturers of both the experimental and control groups were balanced in terms of age, sex, seniority and level of education. In order to determine whether the experimental and control groups were equivalent in terms of number, sex and presence of the students, the number and sex of the students and the averages of their pretest scores, "pass and school report marks" of 6th Grade students and "school report marks of social sciences" of the second term of 6th Grade students, their standard deviations, and the results of t test were analyzed. The data about the groups obtained as a result of the analyses are given in the tables below.

Findings about the Distribution by Gender

The data about the distribution of the groups by gender who took project based and traditional education in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School are given in Table 1 below.

Table 1: ***The Distribution of Experimental and Control Groups by Gender***

GROUPS	**N**	**GIRL**		**BOY**	
	Number	**Number**	**%**	**Number**	**%**
EXPERIMENTAL	37	17	45.9	20	54.1
CONTROL	36	17	47.2	19	52.7
TOTAL	73	34	93.1	39	106.8

As is seen in Table 1, the number of students in the experimental group is 37 while the number of students in the control group is 36. Of the students in the experimental group, 17 of them are girls and 20 are boys while 17 of the students in the control group are girls and 19 are boys. No significant difference has been found at the level of 0.05 significance and the various degrees of freedom in accordance with the t test between the girl and boy distributions of the groups. In the light of this information, we can say that the distribution of the experimental and control groups by the number and gender of students is balanced.

Findings about the Pretest Scores of the Groups

The results of the "t" test about whether there is a significant difference between the averages of the pretest scores and standard deviations and the scores of the experimental group who took project based education and control group who took traditional education in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School are given in Table 2 below.

Table 2 ***The Pretest Scores of the Groups***

GROUPS	Number of Qs	N	PRETEST		
			X	S	t
EXPERIMENTAL	30	**37**	8.45	3.45	0.67*
CONTROL	30	36	7.91	3.41	

"t" value at the level of 0.05 is 2.00 according to (*)71 degree of freedom (t<2.00).

As is seen in Table 11, the average of total pretest scores of the experimental group is 8.45 while the average of the control group is 7.91. It has been checked through the "t" test whether there is any significant difference between the averages of the pretest scores of the groups, and the observed "t" value of 0.67 **has not been found to be significant** at the level of freedom of 71 and significance of 0.05. It can be said that both groups are equal in terms of their pretest scores.

Findings Regarding the Averages of Pass and School Report Marks of 6th Grade students

The results of the "t" test about whether there is a significant difference between the averages of pass and school report marks and standard deviations and the scores of the experimental group who took project based education and control group who took traditional education in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School in the 6th grade are given in Table 3 below.

Table 3 ***The Averages of Pass and School Reports of the Groups in the 6th Grade***

GROUPS	6. Grade, Pass School Report			
	N	X	S	t
EXPERIMENTAL	37	3.82	0.72	0.14
CONTROL	36	4.08	0.70	

As is seen in Table 3, the average of pass and school report of the experimental group in the 6th Grade is 3.82 while the average for the control group is 4.08. It has been checked through the "t" test whether there is any significant difference between the averages of the pass and school reports of the groups, and the observed "t" value of 0.14 **has not been found to be significant** at the level of freedom of 71 and significance of 0.05. It can be said that both groups are equal in terms of the average of pass and school reports in the 6th grade.

The Averages of the School Report Marks of the Groups in the Year End for the Social Sciences Class of the 6th Grade Students

The results of the "t" test about whether there is a significant difference between the averages of school report marks in the year end and standard deviations and the scores of the experimental group who took project based education and control group who took traditional education in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School in the 6th grade are given in Table 4 below.

Table 4: ***The Averages of Marks of the Groups for the Social Sciences Class of the 6th Grade Students in the Year End***

GROUPS	6th Grade, School Report Mark of the Social Sciences Class			
	N	X	Ss	t
EXPERIMENTAL	37	2.94	1.06	0.04
CONTROL	36	3.50	1.13	

As is seen in Table 4, the average of school report marks for the Social Sciences class of the experimental group in the year end of the 6th Grade is 2.94 while the average for the control group is 3.50. It has been checked through the "t" test whether there is any significant difference between the averages of the pass and school reports of the groups and the observed "t" value of 0.04 **has not been found to be significant** at the level of freedom of 71 and significance of 0.05. It can be said that both groups are equal in terms of the average of school report marks for the Social Sciences class of the groups in the year end of the 6th grade.

Development of Data Collection Tools

Achievement Test

In the study, the searcher developed a test comprising of multiple-choice questions taking into consideration the targets and behaviors about the unit called "Population in Our Country" in the Social Sciences class of 7th Grade students in Elementary School with the aim of determining the effect of project based learning model on the student success. He offered five choices for each question, one of which was the correct answer while the other four wrong choices were constituted to be distracters. Content validity was ensured by forming a table of specifications regarding the unit called "Population in Our Country".

Learned opinions were consulted and the relevant corrections were made. In the end, the test comprising of 33 questions was formed. The questions in the test were practiced upon 100 of the 8th grade students and 100 of the 6th grade students, i.e., on 200 students in total. The data acquired according to the results of the achievement test, which was the first of the pre-practice tests, were implemented item analysis and thus, the difficulty and distinctiveness indexes of each article were calculated. The three questions whose index of distinctiveness was below 20 were removed.

The arithmetic average of the test was found to be 0.55. The achievement test on which the indexes of difficulty and distinctiveness were calculated was practiced upon 200 students in total, 100 of whom were 6th grade students and the remaining 100 were from the 8th grade. The reliability coefficient of "Cronbach's Alpha" of the test was calculated as 0.83.

Lecturing Method, Implementation of the Study

The daily lesson plans have been prepared in accordance with the principles of project based learning approach to earn the students the targets and behaviors of the unit. These processes have been followed with this purpose:
The behaviors at the level of the concepts to be introduced in each unit, the explanation and implementations of the principles about the concepts have been identified. These behaviors have been exactly taken from the 2005 Social Sciences program for the Elementary Schools of the Ministry of National Education. Those in the school administration and the lecturers of Social Sciences have been informed about Project Based Learning approach via a PowerPoint presentation. The questions of the teachers have been answered.

The students of the experimental group have also been informed about the subject. The students have been provided with a workshop display. With this display, the students have been informed about the steps of project based learning approach. They have also been informed about how and with what steps they will search about the subject or problem they choose; the issues they must pay attention in their own displays and evaluation. The level of interest of the students has been taken into consideration during the forming of the groups and the groups have been designed so that the students can study in their desired fields. Utmost attention has been paid to the heterogeneous structure of the groups. The members of the group have been informed about their duties and about what is expected of them. The working plan has been prepared.

Data Collection Tools

The data to test the hypothesis of the study have been collected as follows:

1. The targets and behaviors of the unit called "Population in Our Country" of the Social Sciences Class have been chosen from the Elementary Schools program of the Ministry of National Education. Expert opinions have been consulted by forming three questions to assess each behavior. After the concept validity has been defined by the experts, 9 information, 13 comprehension and 11 practice questions have been prepared in the draft pretest comprising of 33 questions in total.
2. The prepared pretest has been practiced upon the 8th grade students who have taken and passed this class and the 6th grade students who have never taken the class.
3. Indexes of difficulty and distinctiveness of each article have been calculated based on the results. A test comprising of 30 questions have been prepared upon removing the questions whose distinctiveness was below 0.20.
4. The test has been practiced upon 200 students in total, 100 of whom were 6th grade students and the remaining 100 were from the 8th grade. The reliability coefficient of "Cronbach's Alpha" of the test has been calculated as 0.83.
5. This test has been practiced upon the 7th grade students as a pretest prior to the experimental study practices.
6. There are 5 classes for 7th grade students and their school report marks in the 6th grade, and their averages of Social Sciences scores in the 6th grade and their pretest averages have been taken as a basis in the selection of experimental and control groups among them.
7. The pass marks for the 6th grade and the school report marks of the Social Sciences of the experimental and control groups have been analyzed upon obtaining them from the data sources of the school.
8. The sex, number and age of the students in the experimental and control groups and the age, seniority, sex and level of education of the lecturers have been obtained from the data sources of the school.
9. The level of presence of the students in the experimental and control groups have been calculated based on their scores from the pretest.
10. Two 7th grade classes have been defined between which there is no significant difference in terms of the "t" test results of their averages of pass marks in the 6th grade, school reports and pretest. Of the two classes between which there is no significant difference based on the results of the "t" test, class 7-D has been defined as the experimental group and class 7-C has been defined as the control group.

11. The prepared achievement test has been given to the experimental and control groups prior to the practice and as a posttest following the practice. Moreover, the achievement test has been practiced again 21 days after the practice.
12. The memorability scores of the students in the experimental and control groups have been calculated based on the test practiced 21 days after the last test.

Findings

"Are there any significant differences between the averages of access to information of the group who took project based education and the averages of access to information of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class for the 7th Grade students in the Elementary Schools in favor of the experimental group?" To test this sub-problem, the (access) averages and standard deviations of the score differences between the pretest and posttest of the experimental and control groups have been calculated and "t" test has been practiced to test whether the difference in their level of information access is statistically meaningful. The data about the level of information access of the group who took project based education and the group who took traditional education and the results of the "t" test in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School are given in Table 5 below.

Table 5: ***The Level of Information Access of the Groups and the Results of the t-Test***

	NUMBER OF Qs	N	PRETEST X	PRETEST Ss	POSTTEST X	POSTTEST Ss	ACCESS X	ACCESS Ss	t
EXPERIMENTAL	8	37	3.00	1.39	4.35	1.67	1.35	1.25	3.45 *
CONTROL	8	36	3.00	1.26	3.22	1.55	0.22	1.53	

"t" value at the level of 0.05 is 2.00 according to (*)71 degree of freedom (t>2.00).

As is seen in Table 5, the average of the level of information of the experimental group in the pretest is 3.00 while its average of posttest is 4.35. The average of the level of information of the control group in the pretest is 3.00 while its average of posttest is 3.22. The average of the level of information access of the experimental group is 1.35 while the number is 0.22 for the control group. It has been checked through the "t" test whether there is any significant difference between the averages of the level of information access of the groups, and the observed "t" value of 3.45 **has been found to be significant** at the level of freedom of 71 and significance of 0.05. Based on this information, it can be said that project based learning is more efficient in earning the behaviors of the level of knowledge compared to the traditional education.

"Are there any significant differences between the averages of the level of comprehension access of the group who took project based education and the averages of the level of comprehension access of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class for the 7th Grade students in the Elementary Schools in favor of the experimental group?"

To test this sub-problem, the (access) averages and standard deviations of the score differences between the pretest and posttest of the experimental and control groups have been calculated, and "t" test has been practiced to test whether the difference in their level of comprehension access is statistically meaningful. The data about the level of comprehension access of the group who took project based education and the group who took traditional education and the results of the "t" test in the unit called "Population in Our Country" of the Social Sciences class for the 7th grade students of Elementary School are given in Table 6 below.

Table 6: ***The Level of Comprehension Access of the Groups and the Results of the t-Test***

	NUMBER OF Qs	N	PRETEST X	PRETEST Ss	POSTTEST X	POSTTEST Ss	ACCESS X	ACCESS Ss	t
EXPERIMENTAL	12	37	3.29	1.57	5.56	1.62	2.27	1.42	6.5
CONTROL	12	36	2.88	1.44	3.19	1.60	0.25	1.42	

As is seen in Table 6, the average of the level of comprehension of the experimental group in the pretest is 3.29 while its average of posttest is 5.56. The average of the level of comprehension of the control group in the pretest is 2.88 while its average of posttest is 3.19.

The average of the level of comprehension access of the experimental group is 2.27 while the number is 0.25 for the control group. It has been checked through the "t" test whether there is any significant difference between the averages of the level of comprehension access of the groups, and the observed "t" value of 6.05 **has been found to be significant** at the level of freedom of 71 and significance of 0.05. Based on this information, it can be said that project based learning is more efficient in earning the behaviors about the level of comprehension compared to the traditional education. The findings obtained in this study show that there is a significant difference between the level of comprehension access of the experimental and control groups.

"Are there any significant differences between the averages of the level of practice access of the group who took project based education and the averages of the level of practice access of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class for the 7th Grade students in the Elementary Schools in favor of the experimental group?"

To test this sub-problem, the (access) averages and standard deviations of the score differences between the pretest and posttest of the experimental and control groups have been calculated and "t" test has been practiced to test whether the difference in their level of practice access is statistically meaningful. The data about the level of practice access of the groups and the results of the "t" test are given in Table 7 below.

Table 7*The Level of Practice Access of the Groups and the Results of the t-Test*

	NUMBER OF Qs	N	PRETEST		POSTTEST		ACCESS		
			X	Ss	X	S s	X	Ss	t
EXPERIMENTAL	8	37	2.13	1.15	5.13	1.37	3.00	1.24	10.35
CONTROL	8	36	2.22	1.33	2.30	0.98	0.08	1.15	

As is seen in Table 7, the average of the level of practice of the experimental group in the pretest is 2.13 while its average of posttest is 5.13. The average of the level of practice of the control group in the pretest is 2.22 while its average of posttest is 2.30.

The average of the level of practice access of the experimental group is 3.00 while the number is 0.08 for the control group. It has been checked through the "t" test whether there is any significant difference between the averages of the level of practice access of the groups, and the observed "t" value of 10.35 **has been found to be significant** at the level of freedom of 71 and significance of 0.05. Based on this information, it can be said that project based learning is more efficient in earning the behaviors of the level of comprehension compared to the traditional education.

"Are there any significant differences between the averages of the level of total access of the group who took project based education and the averages of the level of total access of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class for the 7th Grade students in the Elementary Schools in favor of the experimental group?"

To test this hypothesis, the (access) averages and standard deviations of the score differences between the pretest and posttest of the experimental and control groups have been calculated and "t" test has been practiced to test whether the difference in their level of total access is statistically meaningful. The data about the level of total access of the groups and the results of the "t" test are given in Table 8 below.

Table 8 : ***The Level of Total Access of the Groups and the Results of the t-Test***

	NUMBER OF Qs		PRETEST		POSTTEST		ACCESS		
		N	X	Ss	X	Ss	X	Ss	t
EXPERIMENTAL	30	37	8.45	3.45	15.02	4.09	6.56	2.92	9.21
CONTROL	30	36	8.11	3.20	8.72	3.05	0.61	2.58	

As is seen in Table 8, the average of the level of practice of the experimental group in the pretest is 8.45 while its average of posttest is 15.02. The average of the level of practice of the control group in the pretest is 8.11 while its average of posttest is 8.72.

The average of the level of practice access of the experimental group is 6.56 while the number is 0.61 for the control group. It has been checked through the "t" test whether there is any significant difference between the averages of the level of practice access of the groups, and the observed "t" value of 9.21 **has been found to be significant** at the level of freedom of 71 and significance of 0.05. Based on this information, it can be said that project based learning is more efficient in earning the behaviors of the level of total access compared to the traditional education.

"Are there any significant differences between the averages of total memorability of the group who took project based education and the averages of total memorability of the group who took traditional education in the unit called the "Population in Our Country" of Social Sciences Class for the 7th Grade students in the Elementary Schools in favor of the experimental group?"

To test this hypothesis, the averages of total memorability and standard deviations of the group who took project based education and of the group who took traditional education have been calculated, and "t" test has been practiced to test whether there is any difference between them. The data about the level of total memorability of the groups and the results of the "t" test are given in Table 9 below.

Table 9: ***The Level of Total Memorability Scores of the Groups***

	NUMBER OF Qs	N	POSTTEST	MEMORABILITY		
			X	X	S	t
EXPERIMENTAL	30	37	15.02	17.32	4.35	
CONTROL	30	36	8.72	8.22	3.10	5.33

As is seen in Table 9, the average of total memorability scores of the experimental group in the unit is 17.32 while that of the control group is 8.22. It has been checked through the "t" test whether there is any significant difference between the averages of total memorability scores of the groups and the observed "t" value of 5.33 **has been found to be significant** at the level of freedom of 71 and significance of 0.05. Based on this information, it can be said that project based learning is more efficient in ensuring the permanence of the behaviors at the levels of information, comprehension and practice in the experimental group compared to the traditional learning.

Conclusion and Recommendations

The fact that there is a significant difference between the experimental and control groups in terms of level of information in favor of the experimental groups and the information about the level of information access might be interpreted as follows: The level of information includes behaviors of the individual to recognize some properties about any object and phenomenon upon seeing them, to answer any questions or to repeat them (Sönmez, 2001: 47). Remembering and recognizing form the basis of our behaviors. We can't show any learned behavior about the subjects we do not recognize or remember (Sönmez, 1993: 25).

The students have been informed about the subject "Population in Our Country" prior to choosing their project subjects and asked to make researches about the subject. Concept maps, fill and studying sheets about the subject have been given to them and completed in the class. The concepts have been explained and the students have been encouraged to give examples. Each student giving the correct answer during the explanation of the concepts has been awarded with a reinforcer. All students have been encouraged to participate in the lesson. Moreover, the students have once more explained the concepts about their subject and given examples during presentation. The researcher have asked questions about the incoherent concepts or issues to the members of the group and required that more examples be given during and at the end of the presentations. Duplex communication has been ensured during the practice.

To provide an active participation of students; feedback, correction and reinforcer have been utilized in searching, preparing presentation for students and in presentation processes. All these activities made in the course of practices of project based learning model are the factors effecting access.

As all subjects in "Population in Our Country" unit are related to each other in all presentations to enable them to remember and to be familiar with information in experimental group; revision in these subjects, providing an interaction and active participation of students, students' finding information themselves by searching, telling other students about the subjects which they have researched and the use of attractive instruments for students, and the use of all activities together can enable students to know and remember information. The fact that there is a significant difference and memorability in respect of access in level of comprehension between experimental group and control group can be interpreted as follows: in level of comprehension, students internalize, take over and grasp the meaning of information acquired in level of information. Transfer of information is required. In transferred type learning, memorizing alone, remembering and recognition knowledge do not exist. Addition to and beyond these, converting to a new wording, plotting, the explanation of a new graphic in a oral or written way, the explanation of why, how, what, for what a phenomena occurs with his own sentences by giving reasons, giving new examples and the prediction of past and future of data exist. (Sönmez, 2002:60)

The strategies of discovery method, brainstorming, research strategy, controlled discussion, group discussion technique, cooperative learning strategy have been employed. According to strategy of discovery method, questions "why, how" have been asked to students. While groups are preparing project subjects, students have been asked following questions in stages of research and presentation: for example; a discussion platform has been created with questions such as "explain us 'what are the consequences of population increase?'", "what happens if rate of population increase does not decrease in Turkey?". By sometimes giving clues to students during discussion, students have been enabled to find answers by themselves. Participation of all students to discussion has been provided during presentation. By sometimes interfering with presentation, teacher has asked all students to answer "How would you solve this question if you were in their place?" and "why?" before explaining the subject and teacher has made students to conceive information. Students and teacher have explained how to interpret population pyramids and graphics in course of explaining subjects. Group conducting census has made graphics according to census date. Students have acquired information about the population graphics, the interpretation of population pyramids, expressing their properties during practices and presentation. They have made predictions about future. Explanation of information and phenomena which they have researched and found with their own sentences by giving reasons "how and why they happen", the explanation with new examples and the answer of questions with "why" which were asked to groups after presentation with their own sentences can effect access in level of comprehension.

The fact that there is a significant difference in level of practice between experimental group and control group in favor of experimental group and there are data related to level of practice access can be interpreted as follows: level of practice includes the behavior of use of method, principles in new situations. In level of practice, student is asked to solve this new problem based on acquired behaviors in step of information and comprehension. Problem is required to be new in terms of quality and quantity. (Sönmez, 2001:65). While students have acquired practice behaviors in this research, they have been made to do practice according to research-investigation method strategy and explanation method. Students have been taught how to convert data obtained into graphics and to interpret them and then they have been asked to convert the results of census which group members have made as practices into graphics and to interpret them. Each group has made researches for the problems determined for themselves and represented to them. In this research, brainstorming has been employed during research stage and in the stage of presentation and after this process. Subject has been discussed in stage of group preparation and has been decided. Advantages and disadvantages of decision have been established. The interaction and activeness of students have been provided. The interaction and activeness of the students, their reliance on their own thinking process, their endeavors of solving a new problem by making research, their development of solution alternatives can be said do effect access in level of practice.

The fact that there is a significant difference in favor of experimental group between experimental group and control group in terms of total access level and there are data related to total access (success) can be interpreted as follows: in the Social Sciences class in which Project Based Learning Model is used, the students' reliance on their thinking process, their selection and their use of necessary and important concepts for problems they have encountered, their searching solution ways and reaching to correct solution, using necessary and important information for themselves and elimination of others, learning by experiencing and as a result, their active participation in learning process, creating a product at the end of this process make their learning more efficient and memorable.

Determination of appropriate learning method conforming to the individual interest and capabilities of students is considered to be important. In this context, the approach of Project Based Learning Model can be said to be effective in success of students in Social Science class. Related researches support this opinion. (Meyer,1999; Çoşkun,2004; Haliloğlu and Asan, 2004; Özdener and Özçoban, 2004; Yılmaz, 2006). Carrying out five activities in experimental group (listening, visual, discussion, explanation method, teaching to another), the use of different methods, the technique and tactics, the use of different instruments, students' presence in multi dimensional learning-teaching environment can affect the reasonable nature of total access. In the interviews with students, they have stated that they like the lecturing method, making researches, participating in class actively and that classes are not boring and they are not bored. It can be said that affective field can also affect learning positively. (Bloom, 1979; Senemoğlu, 1987; Sönmez, 2000). Related studies support this opinion.

The expected work in favor of experimental groups in terms of memorability score between experimental group and control group supports this opinion. It can be interpreted that students do not lose the acquired behaviors in total level, namely, no information loss exists. in the Social Sciences class in which Project Based Learning Model is used, students' selection and their use of necessary and important concepts for problems they have encountered, their use of information, searching solution ways and reaching to correct solution, their using necessary and important information for themselves and elimination of others, learning by experiencing and as a result, their active participation in learning process, creating a product at the end of this process can make their learning memorable. (Balkı, 2003; Coşkun, 2004) related studies support this opinion.

Results

1- The access average in level of information in "Population in Our Country" unit of Social Science class of experimental group to which Project Based teaching was applied has been found significant difference in favor of experimental group among the access average in level of information of the group taught by traditional learning.
2- The access average in level of comprehension in "Population in Our Country" unit of Social Science class of experimental group carried out Project Based teaching has been found significant difference in favor of experimental group among the access average in level of comprehension of the group taught by traditional learning.
3- The access average in level of practice in "Population in Our Country" unit of Social Science class of experimental group to which Project Based teaching was applied has been found significant difference in favor of experimental group among the access average in level of practice of the group taught by traditional learning.
4- The access average in total level in "Population in Our Country" unit of Social Science class of experimental group to which Project Based teaching was applied has been found significant difference in favor of experimental group among the access average in total level of the group taught by traditional learning.
5- The memorability average in total level in "Population in Our Country" unit of Social Science class of experimental group to which Project Based teaching was applied has been found significant difference in favor of experimental group among the memorability average in total level of the group taught by traditional learning.

Recommendations

1- Teachers should be informed about the approach of Project Based Learning properties, its steps and evaluation and they should be included in in-service training activities as regards this approach.
2- There are many student- centered approaches which constructivist approach emphasizes and are the subjects of many studies. Teachers should be taught about the approaches such as cooperation learning closely related to Project Based Learning Approach, learning based on researches, brainstorming, problem solution method, multiple-intelligence and they also should be informed about the properties of these approaches. In- service and pre-service seminars about new approaches whose efficiency have been proved by different studies, should be arranged and made to enable Social Science teachers to acquire information and practice sufficiency.

3- Information about scientific research steps, problem solution steps, project based learning approach's steps and the information about what should be done should be given to students in Elementary schools, corrections should be done by giving necessary feedback and making them go through practices.
4- New researches can be carried out about the efficiency of "Project Based Learning" in different courses, classes and schools with the aim of enlightening present studies.
5- While teaching a lesson with Project Based Learning model, new studies can be carried out to provide continuous attention of student, to provide active participation in group studies and to determine to what extent they can find and use information and produce new ones from those.

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