THE EFFECT OF CONSTRUCTIVIST LEARNING PRINCIPLES BASED LEARNING MATERIALS TO STUDENTS' ATTITUDES, SUCCESS AND RETENTION IN SOCIAL STUDIES*

Hıdır Karaduman and Dr. Mehmet Gültekin
Anadolu University Faculty of Education
hidirk@anadolu.edu.tr - mgulteki@anadolu.edu.tr

ABSTRACT
The present study aims to investigate whether the learning materials that based on constructivist learning principles have an effect on fifth grade Social Studies students' attitudes, their academic success and their retention. The study was conducted at Şehit Ali Gaffar Okkan Elementary School, Eskişehir. The participants of the study were 5th grade students in Şehit Ali Gaffar Okkan Elementary School. The data was collected in fall term in 2004-2005 academic year. Participants were divided into two groups: the control group (5-B) and the experimental group (5-C). In the present study, the following data collection instruments were used: a questionnaire for demographic information, pre- and post-tests and open-ended essay-type tests that were used to measure learners' academic success and retention level, lesson plans, various teaching materials for classroom activities, and a questionnaire to gather the learners' perspectives. Social Studies Attitude Scale, developed by Deveci and Güven (2002), was used to determine students' attitudes. The data obtained were analyzed using the SPSS program. The means and standard deviations were calculated for each group. The data were subjected to t-tests for inter- and between- group comparisons. The significance level was taken as .05. Findings of research indicate that constructivist learning principles based learning materials increase students' academic success and retention in Social Studies but don't increase attitudes. Additionally students think that constructivist learning principles based learning materials reflect constructivist learning principles.

Key words: Social Studies, Constructivist Theory, Teaching Material

INTRODUCTION

The education process is ensured by formal and informal education and elementary education is the most fundamental step of the formal education in a country. Elementary education, which prepares the 6 to14 year-old children to the life and to following education through enabling them to gain basic knowledge and skills, is the milestone of the education system. In this period, basic knowledge, skills and values are given to the pupils in order to make them live harmoniously with other individuals in the society and enable them to adopt the life conditions (Fidan and Erden 1998). The elementary education is the fundamental educational step that the child meets the regular education facts for the first time. It is also a period, in which the students experience their most critic terms, namely growing period, and it is the basement of their forthcoming educational lives. It is commonly believed that the way of training an individual in a god manner needs a high quality education (Gürkan and Gökce; 1999).

In elementary education, enabling students to gain the necessary behaviors is mainly supplied by education programs that are designed and practiced beforehand. In elementary education programs there are various courses, which called central lessons, and expression courses as well as skill courses. Social Science course is one of those central lessons in the elementary school education. A common definition of the social science course which is accepted by all the people in the field is difficult to describe (Öztürk and Otluoglu; 2003). However, social science course can be defined as a lesson which gives the learners some the basic cultural elements through findings of various studies and some cumulative knowledge that obtained through interdisciplinary studies. Furthermore, it can be defined as a course which combines the necessary knowledge with reference to global understanding of a young learner (Sözer, 1998). As it is figured in the Chart 1 below, the social science course is also functions as an umbrella which interconnects other disciplines in the elementary education.

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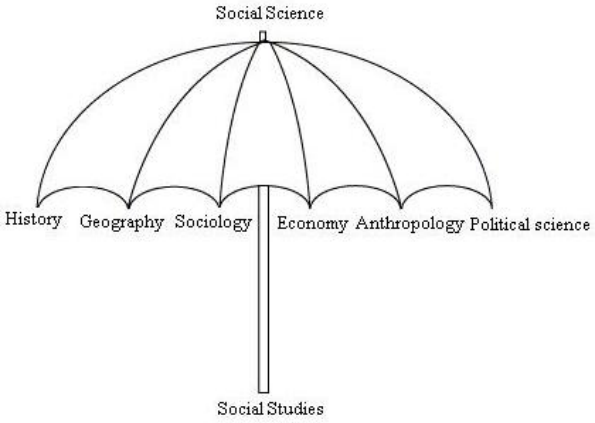

Chart 1. Social Studies Umbrella

The social science course ensures students to become well socialized and excellent citizens through enabling them to gain important social skills. Societies bring up their people, who are robust for their own social structures, through social science courses (Deveci, 2003). Therefore, the social science education has a significant and diagnostic role in practical education which based on modern science, human rights, freedom, democracy, secularity and cultural heritage of national and international sources (TED; 1987). Regarding the fact, students should be educated on various attitudes, personal characteristics, values of the societies and model behaviors through social science courses to encourage them participating to the society effectively (Kaltsounis; 1987)

The main objective of the educational institutions is to help bringing up the individuals as effective and productive citizens, and enable the young learners live happily by realizing their own capacities. In fact, this basic function explains what the objective of social science course is and why it takes place in the elementary education programs. Additionally, another fundamental goal of the social science course is to educate effective and responsible citizens through developing their knowledge acquisition sources and decision making abilities in the global world (NCSS; 1994).

In a global sense, social science courses are regarded as preparatory phase for the citizenship in democracy (Barr, Barth and Shermis;1978). Therefore, the duties of teachers in social science courses of the twentieth century become more complicated and new goals for the social science courses in elementary education are emerged depending on this fact. One of those new goals of the social science courses in elementary schools is to guide the learners to develop a broad understanding for the political and economical developments as well as developing general world knowledge about the environment they live. Another key goal of social science course is to develop critical and intellectual thinking abilities of the students which enable them to fully participate to the society effectively. Furthermore, the social science courses aim at guiding the students to associate their classroom experiences with those of real world experiences through the perspectives and mind activities that they gained in the classroom (Grant ve Vansledrigt, 1996).

The traditional notion of social science teaching, which intends to make individuals to gain a social identity, depends on a teacher centered instruction, which grounds the belief that the best teaching occurs in a quite teaching environment, where the teacher desk symbolizes the wisdom and the authority. Such a teaching notion abstracts the teacher from the classroom, uses the course book as the only teaching material and requires the learners to study on their own. Therefore, teaching of abstract things takes more places in the social science teaching procedures. Accordingly, narration and question-answer approaches play a figurative role in this traditional notion. As a result, the learning becomes through memorization (Yanpar 2001:466). As Teague (2000) states, “actually, the facts and the terms of social science is taught through traditional teacher centered teaching activities which emphasize memorization. However, when the objectives of social science courses, characteristics of the subjects and basic principles of social science teaching taken into consideration, it can be easily observed that the traditional teaching approaches are inadequate and needs to be enlarged (Alkan and Kurt, 1998: 94).

Though the limitations of the traditional teaching, nowadays some skills such as updating, practicing, criticizing, and analyzing the knowledge gain importance. The constructivist theory which plays an important role in the field of education recently, arouses the interests of the experts in the field of social science teaching in terms of designing a curriculum which enables the students to learn through practicing, problem solving and decision

making activities. Reformation of the components of social science curriculum in a way that enables learners to transfer their previous knowledge into intellectual skills such as problem-solving and decision making (Fontana, 1996:5), might provide a teaching environment which forces the limits of the traditional teaching notion and causes reformulation of definition of the effective missions of social science courses.

Regarding the fact, the constructivist theory that take for granted that the whole learning take place in the minds of the learners as a result of constructions (Yaşar, 1998:73), seems one of the proper teaching approaches which provides a meaningful and strong teaching and learning process in social science courses.

Especially, some of the goals of the social science course go with the constructivist learning principles which emphasize emotional and physical involvement effectively. Sunal and Haas (2002) summarized them as follows:

- Understanding the terms (such as alteration and continuity)
- Understanding the generalizations (the variations in a society and their associations)
- To develop high level thinking skills (to develop social science related skills such as classification of different political events, critical thinking, decision making, and problem solving)
- To develop attitudes and views in relation with the social world (for example; not to judge something without detailed and adequate evidence)

Therefore, the social science teachers should encourage their students to employ their high level thinking skills, to cooperate with other students, to construct their own knowledge about the social science terms, and to establish associations between the subjects that they have learned in their courses and their personal experiences (Rice and Wilson, 1999:32). It is because; meaningful social science learning includes an effective construction process. As it is presented in chart 2 below, in a meaningful social science course, the students construct their own knowledge, skills and attitudes with regard to their former experiences (Sunal and Haas, 2002: 23).

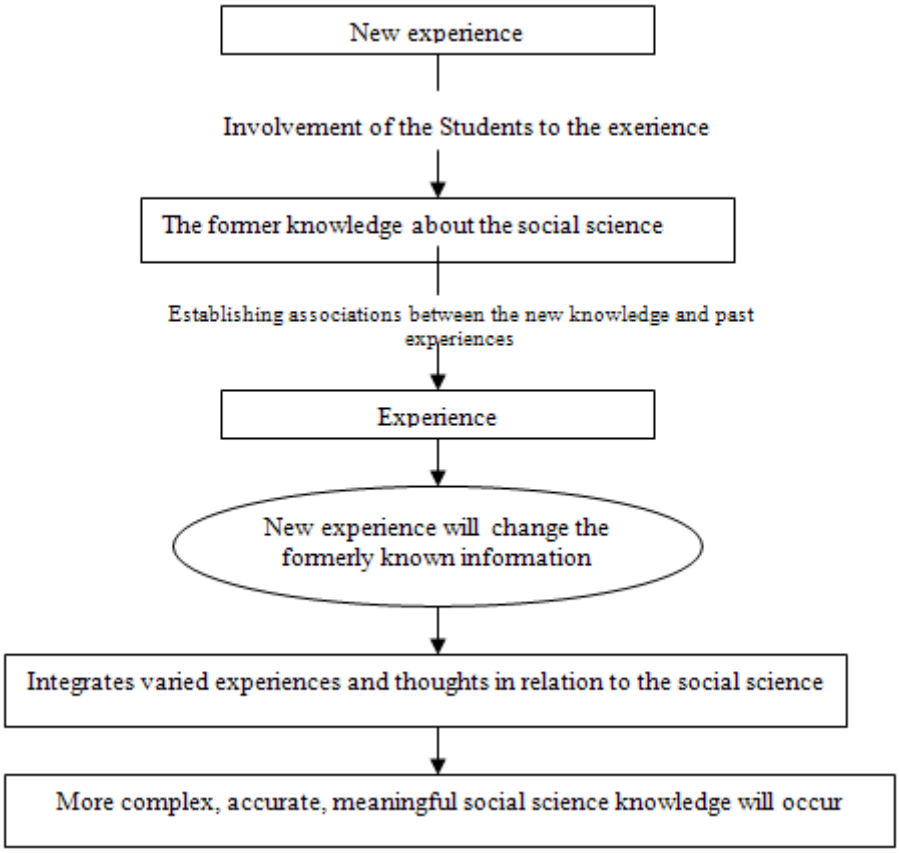

Chart 2. The constructivist learning process in social science course
Source: Adapted from Sunal and Haas (2002; 24)

According to Sunal and Haas (2002; 7) the classroom environment for meaningful learning in social science courses can be obtained through joining the principles of constructivist learning with the roles of instructors and

learners. Since, the main assumption of the constructivism supposes that the students' learning occurs when the new knowledge is presented in relation to the former knowledge within an effective teaching environment, where the new knowledge is practiced through experiences.

In such an environment, the learner brings his/her social life experiences to the classroom, gathers evidence, establishes associations between his/her experiences, able to see his/her newly gained knowledge, skills and experiences from another perspective and able to join his/her experiences with his/her life. Additionally, the learners in such an environment feel confident and enrich their learning with adequate materials and experiences.

Especially the constructivist learning environment, where constructing the meaning is the basis for learners (Tezci and Gürol, 2001), should be designed as an environment where the learners are able to interact with their environment and convey their rich learning into their learning environment. Therefore, teachers in the constructivist learning environment should support their teaching with some interactive teaching materials (Demirel, 2001; 134). The teaching materials, which might enable constructing the meaning, are also strength the teaching-learning process and ease the learners understanding as well (NCSS, 1994b).

The aim of constructivist learning is not to predetermine what the learners will do, but provide opportunities that shape the learners own learning through rich teaching materials which make the knowledge meaningful and useful (Erdem and Demirel, 2002; 81). While stating their opinions, the learners use various sources such as where they might gather the data about the problem (interviews, field trips, etc.) and where they might show the gathered data (cartoons, graphics, photographs, exhibition, telescope, drama, play, scenario, etc.) (Cunningham, 1992). Every source where the information is gained provides new opinions about the problems. Therefore, earlier than using the teaching materials, it is crucial to design them with regard to the principles of constructivist learning.

Application of materials that based on constructivist principles to Social Science courses will provide contributions to the meaningful learning of the learners as well as to the arrangement of effective teaching-learning process. Here, the question "what should be the proper teaching material that based on constructivist principles? comes to mind. When the literature in the field of constructivism is reviewed, it is found that the fundamental principles of constructivism and the way of adapting them into teaching materials are defined clearly. Regarding the definitions in the literature (Aydın, 2002; Brooks and Brooks, 1993; Özden, 2003; Tezci and Gürol, 2001; Yaşar and Gültekin, 2002; Olsen, 1999; Deryakulu, 2000; Şen, 2002; Marlowe and Page, 1998), the material that is proper to constructivist teaching principles should have the following qualities;

The teaching materials that based on constructivist principles should;

- enable learners to explore new knowledge through setting connections with their previous knowledge,
- enable learners to figure out their opinions before they achieve the new information,
- should feed the curiosity of the learners through learning cycle model (discovery, definition and application)
- should cover some key terms such as "define", "classify", "guess", "construct" that guide students' progress in the learning process.
- should support multiple opinions and courage students to declare their opinions
- should provide associations with real life experiences through examples
- should support learner autonomy
- should support an interactive relation with other students as well as teacher
- should guide the learners for search the sources such as encyclopedias and web pages through open ended and curiosity awakening questions
- should cover the answers of questions such as "how to learn" and "what to learn"
- should guide students to the primary sources
- should involve learning strategies such as problem based learning, case studies, project based learning and collaborative learning.

It can be claimed that in order to establish a meaningful and permanent learning in the Social Science courses, the learning environments should be enriched through teaching materials that encourage and guide the learners to think critically, to solve problems, to study collaboratively and that enable the learners to establish their own learning strategies. Seeking to reflect the innovations and developments in the world to the curriculums of national education in Turkiye, Ministry of National Education framed the Social Science curriculum of 2005-2006 within the framework of above considerations. Therefore, forthcoming scientific studies should inquiry the effectiveness of the teaching materials of social science courses that based on constructivist principles and utilization of those developed materials by the social science teachers.

Regarding the fact, the presents study is conducted to examine the role of teaching materials, which are based on the principles of constructivist learning, on the learners' attitudes toward courses, on learner achievement and on retention levels of the students. The present study might be considered as a significant study in its field, because;

- it depicts that constructivist learning principles are applicable to the teaching materials,
- it figures out whether the utilization of materials that based on constructivist learning principles have any contribution to the effectiveness of Social science courses or not, and
- it provides contributions to the new Social science curriculum that developed by the Ministry of National Education with regard to the constructivist learning principles.

PURPOSE OF THE STUDY

The main goal of the present study is to figure out the effectiveness of teaching materials, which were based on the principles of constructivist learning, with regard to the learners' attitudes toward the social science courses, learner achievement and retention levels of the learners. Concerning the above aim, following research questions are posed;

1. Is there any significant difference between the learner attitudes of the learners in the experimental group, which used teaching materials that designed regarding the principles of constructivist learning, and control group, which used traditional teaching materials in their social science courses?
2. Is there any significant difference between the academic achievements of the learners in the experimental group, which used teaching materials that designed regarding the principles of constructivist learning, and control group, which used traditional teaching materials in their social science courses?
3. Is there any significant difference between the retention levels of the learners in the experimental group, which used teaching materials that designed regarding the principles of constructivist learning, and control group, which used traditional teaching materials in their social science courses?
4. What are the viewpoints of the learners in the experimental group on the utilization of the teaching materials that designed with regard to the constructivist learning principles?

METHOD

The Research Model

The present study is designed as a control-grouped (Karasar 1998) experimental research model with pre-test and post-test in order to examine the role of teaching materials, which were based on the principles of constructivist learning, on the learners' attitudes toward courses, learner achievement and their retention levels. Two groups were objectively identified as experimental and control groups, and the learners in both groups were examined through pre and post tests. Additionally, a questionnaire, which inquires the perspectives of the learners on the use of teaching materials that are based on constructivist learning principles, is used in order figure out the learner preferences.

Participants

The participants of the study were 5th grade students in Şehit Ali Gaffar Okkan Elementary School in Eskişehir. The data was collected in fall term of 2004-2005 academic year. Participants were divided into two groups: the control group (5-B) and the experimental group (5-C). The definition of the groups as experimental and control was based on evenhanded principles and they were labeled through drawing of lots. There are 36 students in each of the groups. The reasons behind selecting the Şehit Ali Gaffar Okkan Elementary School as the scope of the research are the willingness of the teachers and school administration to participate and collaborate to this study, their interest and readiness to contribute scientific studies, and the school's technological equipments with its prosperous library.

Equalization

Since the present research is an experimental study the participants in both groups, namely the members of experiment and control groups, were attempted to equalize in terms of some features. Regarding the equalization process, the achievement test scores, learner's attitude scores towards Social science course and participants' demographic data were used in order to form equal groups. The achievement test is used as pre-test which examines the success of the participants, and its results show that the participants in both groups received similar scores. That is, there is not any significant difference between the experiment and control groups in terms of their success prior to the study.

The participants in each group were paired regarding the information that they provide through demographic information questionnaire. If a participant does not have any partner with similar demographic information s/he

is eliminated and dropped from the groups. Accordingly, 20 students out of 36 in each group were selected as pairs, and on account of the equalization process total 40 students form the participants of the study. The demographic backgrounds of the equalized participants are summarized in table 1 below.

Table 1. Demographic backgrounds of the participants

Features	Experiment Group		Control Group	
	N	Frequency	N	Frequency
Gender	8	40.0	8	40.0
Female Male	12	60.0	12	60.0
Average income of parents per month				
200 billion and less	2	10.0		
201-400 billion	2	10.0	2	10.0
401-600 billion	3	15.0	3	15.0
601-800 billion	5	25.0	6	30.0
801 billion -1 milliard	5	25.0	5	25.0
1 milliard and over	3	15.0	4	20.0
Educational background outside the school				
Learners who get private courses	3	15.0	3	15.0
Learners who do not get private courses	17	85.0	17	85.0
Report card grades				
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	2	10.0	2	10.0
5	18	90.0	18	90.0

As it is depicted in table 1, the participants in both groups are equal in terms of their gender, their educational backgrounds outside the school, and report card grades of 4th grade. They also show similarities in terms of average monthly income of their parents. Therefore, it can be claimed that the participants in both groups are equal in terms of their demographic backgrounds.

Although it is attempted to equalize the participants in terms of their attitudes, it is observed that there are not enough pairs in terms of their attitudes though they are equal in other aspects of the equalization. Therefore, the participants' pre-test scores of attitudes towards social science course, which depict no significant difference among the participants, will be regarded as equalization standard for their attitudes. If there would be any significant difference in pre-test attitude scores of the participants, then, the data would be statistically analyzed through covariance analysis at the end of the experiment.

Data and data gathering process

In terms of the theoretical background of the study, a variety of literature either in Turkish or in other contexts are reviewed. Furthermore, in order to answer the research questions of the present study several data gathering instruments are utilized. For instance, a questionnaire form is developed by the researcher in order to gather the demographic information about the participants. The participants' responds to the questionnaire are used to equalize the groups and to form pairs. Additionally, an achievement test, which is developed by the researcher, is employed to examine the academic successes of the participants at the beginning of the experiment; the same test is reused to examine retention levels of the participants at the end of the experiment. Furthermore, several lesson plans and teaching materials are designed by the researcher so as to follow the social science courses in connection with the principles of constructivist learning principles and in connection with the teaching materials that planned accordingly. Another questionnaire which inquires the opinions of the participants about the teaching materials that used in the courses is developed by the researcher. Consequently, "the social science course attitude scale" which was developed by Deveci and Güven (2002) is utilized in order to figure out the participants attitudes towards social science courses.

Demographic information questionnaire
This questionnaire form, which is designed for equalization and pairing process of the participants, consists of 6 questions. The questionnaire is reformed and developed through the contributions and opinions of the experts in the field.

Achievement tests which are employed to assess the success and retention levels of the participants
Two interrelated but different assessment instruments are employed to examine the achievement and retention levels of the students. Both of the assessment tools grounded their question from the unit named "How did we achieve the Republic". The first tool consists of a four-itemed 40 multiple choice questions and the second tool consists of 8 open ended essay questions.

In order to establish content validity of the multiple choice achievement test, a special attention is paid on the questions as to cover and exemplify the content of the unit (Tekin, 2000). The questions and their items are also evaluated by 10 assessment experts and 5 social science teachers in terms of their content validity. The final version of the multiple choice achievement test is formed with reference to the evaluations of the experts.

Prior to administrating the achievement test to the control and experimental groups it is administered to a sample group, which has similar characteristics with the participants of the study in order to judge the reliability of the achievement test. The test divided into two sections and the reliability score of the test is calculated through using Spearman- Brown's formula as cited in Tekin's (2000) study. The result of the reliability estimation depicts that the reliability co-efficiency score of the multiple choice achievement test that based on the unit "How did we achieve the Republic" is .88, and this score affirms the reliability of the achievement test.

Since the evaluation process with reference to constructivist learning principles is not solely based on a timed tests and assumed as the reflection of the learning of the learners, additional achievement measurement tool is utilized in the present research. In terms of evaluation procedures, the constructivist learning principles challenge the traditional evaluation procedures and employ authentic evaluation techniques. Therefore, in addition to the multiple choice achievement test, the researcher developed a 10 questioned essay type achievement test with regard to the constructivist learning principles. This 10 questioned achievement test is reviewed by the constructivist learning professionals and 2 questions are eliminated through their recommendations. The grading of this essay type achievement test is handled by two independent raters and the mean scores of raters are assumed as the achievement grades of the participants. As the final step of the achievement evaluation procedure, the participants' grades in multiple choice and essay type exams cumulated and then their average is obtained as the achievement scores of the participants.

The questionnaire which inquires the perceptions of the participants about the constructivist learning principles based teaching materials that used in the Social science courses
A tree-point likert type questionnaire is developed by the researcher in order to obtain the perceptions of the participants about the teaching material, which was designed concerning constructivist learning principles, for social science courses. The items in the questionnaire are developed as to reflect the perceptions of the participants about the teaching material which was intended to involve the constructivist learning elements.

The teaching material which was designed concerning constructivist learning principles
The first step in the constructivist learning principles based teaching material design is to define the general and behavioral objectives of the subject that is "How did we achieve the Republic" which is a unit in the syllabus of 5^{th} grade Social science courses. Subsequently, lesson plans are prepared with reference to the general and behavioral objectives of the unit. Finally, a teaching material, which is involving the constructivist learning elements, is developed.

In terms of selecting the unit two important criteria, which are ease in explanation and ease in making the unit meaningful to the learners, are regarded as main concerns. Accordingly, one of the units in the syllabus of 5^{th} grades, namely "How did we achieve the Republic" which is generally based on historical facts and information, was selected as the course subject for the study.

The literature in Turkish contexts and other contexts is reviewed in order to design teaching material which is proper for the principles of constructivist learning principles. Accordingly, a "check list for the constructivist learning principles based teaching materials" is developed. Finally, the course content is prepared as worksheets regarding the check list and objectives of the unit "How did we achieve the Republic".

While preparing the worksheets, a special attention was paid to their appropriateness to the constructivist learning principles, their aptness to the objectives of the unit, their relevance to the levels of the students and their being interactive. Therefore, the teaching material is designed as colorful and conspicuous and it is ornamented with various photographs, maps and caricatures. Furthermore, some gap filling activities are added to the worksheets in order to make students write down some notes on them. Potential sources that the learners might refer are listed on the worksheets, and some blanks are provided for students to add their own sources beneath the given source list. Students were also guided through some signs on the worksheets for the activities that they should accomplish. The worksheets compiled as small booklets and ten different experts are requested to review the worksheets for their relevance to the principles of constructivist learning. Afterwards, the worksheets were reorganized with reference to the reviews of the experts. Subsequently, the same experts were requested again to assess the relevance of the teaching material by using the "the constructivist learning principles based teaching materials check list". Only 8 out of ten experts have returned their final review. The ratings of the experts for the relevance of the teaching material by using the "the constructivist learning principles based teaching materials check list" is summarized in table 2 below.

Table. 2. The views of experts on the teaching material that designed with regard to constructivist learning principles

Check list for constructivist based teaching material		sufficient	acceptable	insufficient	$\bar{x}$
1. It enables the learners to discover the new information through associating former knowledge.	*f* %	7 87.5	1 12.5	- -	2.87
2. It helps to confirm the learners' opinions on the subject prior to get information about it.	*f* %	7 87.5	1 12.5	- -	2.87
3. It enables students to use the learning cycle model (discovery, definition and application) which feed the natural curiosity of the learners.	*f* %	8 100.0	- -	- -	3.00
4. It covers some key terms such as "compare", "define", "classify", "guess", "construct" that guide students' progress in the learning process.	*f* %	8 100.0	- -	- -	3.00
5. It covers case studies and problems that enable the students to look from different dimensions.	*f* %	8 100.0	- -	- -	3.00
6. It supports multiple opinions and courage students to declare their opinions	*f* %	8 100.0	- -	- -	3.00
7. It provides associations with real life experiences through examples	*f* %	7 87.5	- -	1 12.5	2.75
8. It supports learner autonomy	*f* %	8 100.0	- -	- -	3.00
9. It supports an interactive relation with other students as well as teacher	*f* %	8 100.0	- -	- -	3.00
10. It guides the learners for search the sources such as encyclopedias and web pages through open ended and curiosity awakening questions	*f* %	8 100.0	- -	- -	3.00
11. It covers the answers of questions such as "how to learn" and "what to learn"	*f* %	7 87.5	1 12.5	- -	2.87
12. It directs students to the primary sources	*f* %	8 100.0	- -	- -	3.00

13. It involves learning strategies such as problem based learning, case studies, project based learning and collaborative learning.	*f* %	6 75.0	1 12.5	1 12.5	2.62
Mean					2.92

The mean score of the views of experts on the teaching material that designed with regard to constructivist learning principles is 2.92 over 3. Regarding this mean score, it can be claimed that the experts, who were asked for their evaluations of the teaching materials, believe that the teaching materials that designed with reference to constructivist learning principles are well-matched with the defined constructivist learning principles.

Experimental Process

After preparing data collection instruments and obtaining permission from the relevant authority the test and control groups were determined through unbiased selection. In the test group lessons were performed by the researcher. The researcher had attended various conferences and had taken various courses on constructivism during postgraduate studies. Therefore it is assumed that the researcher is knowledgeable on constructivism.

After determining test and control groups, students in both groups were told that a research to determine the effect of teaching material designed in accordance to constructivist learning principles on students' attitudes towards the course, success and retention levels in Social Studies course was planned and that they were selected as subjects of this study. Later, both groups were given achievement test developed by the researcher for course unit titled "How did we achieve the Republic" and the attitude test developed by Deveci and Güven (2002) as pretest.

After explaining the characteristics of the research to students and teacher in detail a six hour teaching practice per week which was lasting six weeks was initiated. This teaching practice took place between 1 November 2004 and 10 December 2004.

Teaching practice using material prepared in accordance with constructivist learning principles was performed in the following manner:

The material developed by the researcher was distributed to the students prior to the practice in the form of a booklet and the students were asked to review the booklet. Resources to be used by the students during the practice period were brought into the classroom or left at the school library. Some of the lessons were undertaken at the school library or the computer laboratory. Instruction for the test group was undertaken in accordance to the previously prepared instruction set. Accordingly the researcher undertook the lessons in line with the activities indicated in the previously distributed material after stating the objectives and topics of the lessons.

Activities aimed at discovering what the students' know and want to know were given priority in the material and these were shared with the class. Later other activities that mentioned in the material and which were relevant to the topic were undertaken. These activities were carried out in the groups that were previously established. After each group completed their work, a class discussion on the group work was undertaken and relationships with the current period were established. In this manner students' were given the opportunity to voice their own views. Exercises varied according to topics. Some of the students were asked to classify, guess, determine differences and similarities, compare or analyze while at other instances students were asked to examine cartoons, photographs or documents in the distributed materials and indicate their opinions in the blanks provided in the material. Students were also asked to provide solutions to problem cases and case samples provided in the material by the researcher. During a portion of the unit students were directed to perform project work. Projects developed by groups were composed of drama, newspaper, contest, power-point presentation and poster. In performing their project exercise students utilized various resources and technologies. Also poems and drawings created by students were included in projects. Projects prepared by students were evaluated by students and presented in the classroom bulletin board.

Students in the test group participated in the learning process in an effective manner, played effective roles in group exercises and other activities. Whenever confronted with a problem the students attempted to solve the problem through cooperation and when unable to overcome the problem sought the help of the researcher.

Whether the implementation of teaching material prepared in accord with constructivist principles was conforming to the guidelines was observed by another researcher. Evaluation of observation form reports indicated that the implementation was in conformance to the set criteria. In the control group a traditional teacher

oriented teaching method consisting of reading relevant topics from a Social Studies textbook, class presentation of the topic and listening to instructors explanations on the topic was employed.

Social Studies course instruction for the test group was performed through teaching material prepared according to constructivist learning principles while instruction for the control group was performed through traditional teaching. After completion of activities for the unit in six weeks an achievement test for the unit titled "How did we achieve the Republic" and a Social Studies course attitude test was applied as a retest. Twenty days after this retesting the success test was performed again to measure the students' retention levels.

Data Analysis and Interpretation

The data collected through instruments used in the study were controlled and data obtained from this control was entered into a computer. After pretest and retest scores of the test and control groups were determined the score averages of the groups and standard deviations of score distributions were calculated. The t-test was used for inter-group comparisons and a 0.05 confidence interval was determined. Data about students opinions about teaching material prepared according to constructivist principles was grouped as follows; averages between 1.00-1.66 were labeled "no", averages between 1.67 - 2.33 were labeled "partially" and averages between 2.34 - 3 were labeled as "yes" and were interpreted accordingly. SPSS (Statistical Package for the Social Sciences) software was used for statistical analysis of the research data.

FINDINGS AND DISCUSSIONS

In this section, findings of statistical analysis of the collected data and discussions of these findings are presented. In presentation of findings and discussions the same order as that of the objectives of the study is used for internal consistency.

1. To answer the question "Is there any significant difference between the learner attitudes of the learners in the experimental group, which used teaching materials that designed regarding the principles of constructivist learning, and control group, which used traditional teaching materials in their social science courses?" arithmetic averages and standard deviations of attitude measure scores were calculated and the difference between the averages of each group was tested through t-tests. Findings for the pretest scores of test and control groups' scores for attitude measure towards Social Studies course is presented in Table 3.

Table 3. Findings on Pretest Scores of experiment and Control Groups Scores on Attitude Measure towards Social Studies Course

Student Groups	Sample Size (N)	Arithmetic Mean ($\overline{X}$)	Standard Deviation (SD)	t Value	Degree of Freedom (Df)	Level of Importance (P)
Experiment Group	20	129.25	12.63	0.39	38	> 0.05
Control Group	20	130.30	13.51			

$t_{Table} = 2.021$

As can be seen in Table 3 there is a 1.05 point difference between the pretest scores of test group and control group students attitude measures towards Social Studies course in the control groups favor. To test the meaningfulness of this difference t-test was performed on the group averages and a t=0.39 was determined. This is below the 2.021 lever which corresponds to the t value for a degree of freedom of 38 at 0.05 importance level. This shows that the difference between the arithmetic averages of the two groups is statistically insignificant. This can be summarized as that there is no significant difference between the attitudes of the students in the test and control groups towards Social Studies course prior to the experiment.

Later, to determine the effectiveness of the experiment, the existence of a meaningful difference in the retest mean scores of the test and control group was investigated. Findings of the retest scores of the test and control group on the attitude measure towards Social Studies course are presented in Table 4.

Table 4. Findings on **Retest Scores of Experiment and Control Groups Scores on Attitude Measure towards Social Studies Course**

Student Groups	Sample Size (N)	Arithmetic Mean ($\overline{X}$)	Standard Deviation (SD)	t Value	Degree of Freedom (Df)	Level of Importance (P)
Experiment Group	20	127.80	13.36	-1.19	38	> 0.05
Control Group	20	133.20	15.22			

t_{Table}= 2.021

As we can observe from Table 4, the test group students scored 5.4 points higher than the control group in the retest. A t test was applied to find if this difference was meaningful and a t value of 1.19 was obtained, which is below the t=2.021 reference value, meaning that there is no statistically significant difference between the arithmetic averages of the two groups. According to the scores on the attitude measure towards Social Studies applied at the end of the experiment there is no meaningful difference in the attitudes of the test and the control groups. This result shows that the teaching techniques employed in the test and control groups have no different effects in affecting the students attitudes towards Social Studies course. These results can be thought of as confirming the view that attitudes develop in life and there is no quick way to change them.

2. To answer the question "Is there a difference in terms of academic success between test group students using teaching materials prepared according to constructivist learning principles and control group students where traditional teaching was used?" a multiple choice achievement test was used as a pretest to measure the success of test and control group students. Arithmetic means and standard deviations of students scores on this test were calculated and the differences between the score was tested using t test. The scores achieved by the experiment and control groups on the achievement pretest are shown on Table 5.

Tablo 5. Findings on the Experiment and Control Groups Scores on the Multiple Choice Pretest Achievement Test

Student Groups	Sample Size (N)	Arithmetic Mean ($\overline{X}$)	Standard Deviation (SD)	t Value	Degree of Freedom (Df)	Level of Importance (P)
Experiment Group	20	41.35	9.44	0.033	38	> 0.05
Control Group	20	41.25	9.93			

t_{Table}= 2.021

As it can be seen from Table 5 there is a 0.10 point difference between the pretest scores of the experiment and control group students in favor of the test group. T test was performed on the arithmetic means of group's scores to test if this difference is meaningful and a t=0.033 value was obtained. This is less than the standard t score of 2.021 and this shows that the difference between the mean scores of the groups is statistically insignificant. There is no significant difference between the achievement levels of the students in the test and control groups in Social Studies prior to the experiment.

Later, to test the effectiveness of the experiment the existence of a meaningful difference between the mean scores of the groups on the posttest composed of multiple choice items and essays were examined. Findings about the posttest scores of the test and control groups are presented in Table 6.

Table 6. Findings on the Posttest Scores of the Experiment and Control Groups

Student Groups	Sample Size (N)	Arithmetic Mean ($\overline{X}$)	Standard Deviation (SD)	t Value	Degree of Freedom (Df)	Level of Importance (P)
Experiment Group	20	64.40	10.69			
				3.53	38	> 0.05
Control Group	20	51.65	13.88			

t_{Table}= 2.021

According to the findings in Table 6, there is a 12.75 point difference between the posttest scores of the test and control group students in the test group's favor. The meaningfulness of this difference was tested through t testing and a t value of t=3.25, which is larger than the standard t value of t=2.021. According to this result there is a statistically significant difference between the posttest scores of the groups in the test group's favor.

Posttest results from the achievement tests show that the teaching methods employed for test and control groups have different levels of effectiveness. This study shows that in Social Studies course, learning environments where teaching materials prepared in accordance to constructivist learning principles are used is more effective than traditional teaching. This finding of the present study is parallel with findings of Soeharto (1998), Lord (1999), Abboutt, Jeffery and Duane (2003) and Turgut (2001) where research in different course subjects showed that constructivist theory increased student success.

3. To answer the question "Is there a difference between the retention levels of test group students where material prepared in accordance to constructivist learning principles are used and control group students where traditional teaching is used?" 20 days after the posttest implementation the multiple choice item and essay achievement tests were implemented again and the arithmetic means and standard deviations of students' scores were calculated and the difference between means was tested by t testing.
Findings about the scores of students in the achievement test implemented to determine retention levels are given in Table 7.

Table 7. Findings about the Scores of Students in the Achievement Test Used to Measure Retention

Student Groups	Sample Size (N)	Arithmetic Mean ($\overline{X}$)	Standard Deviation (SD)	t Value	Degree of Freedom (Df)	Level of Importance (P)
Experiment Group	20	64.75	14.15			
				2.25	38	> 0.05
Control Group	20	54.40	14.92			

t_{Table}= 2.021

As seen in Table 7 there is a 10.35 point difference in the test groups favor as far as the groups mean scores for the retention test is concerned. To test the meaningfulness of this differences t test was performed on the groups' mean scores and a t=2.25 value was obtained. This is higher than the standard t value of t=2.021 and means that the difference in the retention levels of the groups is statistically significant.

Retention level results obtained from the achievement test shows that the teaching methods employed towards the test and control groups gave different levels of effectiveness. This study demonstrates that in increasing the retention levels of students in Social Studies courses learning environments where material prepared in accord to constructivist learning principles are more effective than traditional teaching methods. This finding is consistent with Koç's (2002) findings. Koç (2002) found significant differences between the retention levels of constructivist and traditional classes in favor of the constructivists in his research on university students.

4. In the fourth part of the study the question "What are the opinions of students regarding teaching material in Social Studies courses where teaching material prepared in accordance to constructivist learning principles are

used?" is answered. Towards this end an evaluation questionnaire regarding teaching material prepared in accordance to constructivist learning principles was administered. Findings of this survey are presented in table 8.

Table 8. Students Views on Teaching Material Prepared According to Constructivist Learning Principles

Constructivist Teaching Material Checklist		Yes	Partially	No	$\overline{X}$
1. Did the material provide you with an opportunity to discover information by association to previous knowledge?	*f* %	17 51.5	16 48.5	- -	2.60
2. Did the material determine your viewpoints and opinions regarding the subject before giving information about the subject?	*f* %	23 69.7	10 30.3	- -	2.69
3. Did the material feed your curiosity by allowing discovery, introducing the concepts and application?	*f* %	24 72.7	7 21.2	2 6.1	2.66
4. Did the material present you with instructions such as "compare", "determine", "classify", "analyze", "guess", "form" aimed to set you in motion in the learning process?	*f* %	26 78.8	6 18.2	1 3.0	2.75
5. Did the material provide case scenarios and questions designed to help you develop different viewpoints on event?	*f* %	26 78.8	6 18.2	1 3.0	2.75
6. Did the material give you opportunities to form and express your own viewpoints?	*f* %	21 63.6	11 33.3	1 3.0	2.60
7. Did the material help you make real life connections by giving examples?	*f* %	17 51.5	16 48.5	- -	2.51
8. Did the material support your autonomy and initiative?	*f* %	22 66.7	11 33.3	- -	2.66
9. Did the material provide opportunities for interaction between you and the teacher or other students?	*f* %	25 75.8	7 21.2	1 3.0	2.72
10. Did the material direct you towards different resources such as books, encyclopedia and web sites by providing open ended, curiosity fuelling and thought provoking questions?	*f* %	24 72.7	8 24.2	1 3.0	2.69
11. Did the material provide for questions regarding "How" you learned alongside the questions about "What" you learned?	*f* %	25 75.8	7 21.2	1 3.0	2.72
12. Did the material direct you towards primary sources such as documents, documentaries and the like?	*f* %	13 39.4	13 39.4	7 21.2	2.18
13. Did the material provide for problem based learning, cooperation based learning and sample case examination during the learning process?	*f* %	28 84.8	3 9.1	2 6.1	2.78
Average					2.64

Table 8. summarizes students responses to the questionnaire. For the items titled: "Did the material provide for problem based learning, cooperation based learning and sample case examination during the learning process?" ($\overline{X}$ = 2.78), "Did the material present you with instructions such as "compare", "determine", "classify", "analyze", "guess", "form" aimed to set you in motion in the learning process?" ($\overline{X}$ = 2.75), Did the material provide case scenarios and questions designed to help you develop different viewpoints on events?"($\overline{X}$ = 2.75), "Did the material provide opportunities for interaction between you and the teacher or other students?" ($\overline{X}$ = 2.72), "Did the material provide for questions regarding "How" you learned alongside the questions about "What" you learned?" ($\overline{X}$ = 2.72), "Did the material determine your viewpoints and opinions regarding the

subject before giving information about the subject?" ($\overline{X}$ = 2.69), "Did the material direct you towards different resources such as books, encyclopedia and web sites by providing open ended, curiosity fuelling and thought provoking questions?" ($\overline{X}$ = 2.69), "Did the material feed your curiosity by allowing discovery, introducing the concepts and application?" ($\overline{X}$ = 2.66), "Did the material support your autonomy and initiative?" ($\overline{X}$ = 2.66), "Did the material provide you with an opportunity to discover information by association to previous knowledge?" ($\overline{X}$ = 2.60), "Did the material give you opportunities to form and express your own viewpoint?" ($\overline{X}$ = 2.60), "Did the material help you make real life connections by giving examples?" ($\overline{X}$ = 2.51), students' responses averaged as "**yes**". Only for the item titled "Did the material direct you towards primary sources such as documents, documentaries and the like?" ($\overline{X}$ = 2.18), the students' response averaged "**partially**".

The arithmetic mean of all of the students' views on constructivist teaching material is 2.64 on a scale of 3. Accordingly it can be stated that the students accept the constructivist teaching material as appropriate to the determined constructivist learning principles. This in turn indicates that the experiment was performed in accordance to previously determined principles.

RESULTS and SUGGESTIONS

The results obtained through this study show that teaching material prepared according to constructivist learning principles increase the academic success and retention levels of students in Social Studies courses. Also students have found the material prepared according to constructivist learning principles appropriate to constructivist learning principles.

In light of the results and findings of the study the following suggestions are brought forth:

1. The teaching material prepared for this research in accordance to constructionist theory can be used by teachers in Social Studies courses and taken as example.
2. Teachers can be provided with occupational training on preparing material in accordance to constructionist theory.
3. Other Social Studies units can be prepared as activity booklets according to constructionist learning principles.
4. The following research can be carried out on teaching material prepared according to constructionist learning principles:
    - Effects of material prepared according to constructionist learning principles on students attitudes towards course, achievement and retention can be examined for other course subjects.
    - Effectiveness of material prepared according to constructionist learning principles on development of students' critical thinking, creative thinking and problem solving skills can be researched.
    - Research on effectiveness of teaching material prepared according to constructionist learning principles on developing students' attitudes towards cooperation and team work can be patterned.

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