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The effect of worksheets based upon 5e learning cycle model on student success in teaching of adjectives as grammatical components

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Abstract

This study aims to determine the effect of the worksheet which is prepared after 5E learning cycle model concerning the teaching of the subject of adjectives as grammatical components on the success of the student. Combined research method where quantitative and qualitative research patterns are used in conjunction. Semi-experimental pattern with pretest-endtest control group was used for the quantitative aspect of the study for the qualitative aspect of which phenomenology pattern was used. Control group of the study consists of 56 sixth-grade students from Erzurum 23rd July Primary School in the educational year of 2010-2011. Data of the study were obtained using the success test prepared for the subject of adjectives and the interview form questioning the students' opinion on the work process. While predictive statistical tests were used in the analysis of quantitative data, content analysis technique was used to analyze the qualitative data. In conclusion of the study, it was understood that the worksheets prepared according to 5E learning cycle model increased student's success, that the students preferred the lessons performed with worksheets prepared according to 5E learning cycle model and they were not bored in these lessons.

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Keywords: 5E learning cycle model, grammar teaching, worksheet, student success;

1. Introduction

In today's world which is going through an *age of information*, the accumulation of information is on the increase in parallel with rapid changes in the field of science and technology. This rapid change in the process of creating and using the information also changes the expectations of societies from individuals.

Today, individuals are expected to produce information rather than consume it. (Yıldırım and Şimşek, 2006). When defining education, it is emphasized that the aim is to effect a desired behavioral change in the individual (Özdemir, 2004; 244). Modern societies attempt to effect such desired changes in the behavior of the individual through a student-centered educational approach rather than a teacher-centered one. For that purpose, educational researchers put contemporary teaching models which enable the individuals to be more active and encourage them to think in educational environments into the service of educators.

In addition to behavioral and cognitive theories, constructivism through which the radical changes in the last 20 years of the 20th century have been anticipated for the most part have lately come up in the agenda of education (Duman, 2004). Constructivism which has made a profound influence in the USA in recent years is an information theory based on the studies of many philosophers, psychologists and educators (Glicman, 2004). Constructivist

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approach has left its mark on the primary and secondary education programs in Turkey (Aydın, 2007), in addition to those in countries as America, New Zealand, Israel, Canada, Switzerland and Australia (Matthews, 1993).

The nature of knowledge and learning itself have been the basic foundation of constructivism (Brooks and Brooks, 1999). According to constructivist theory, knowledge is not something acquired passively through our senses or various means of communication or which exists in the outside world (Açıköz, 2005). Constructivist learning is the process of creating a link between what is already known and the new learnings and of incorporating each new information into the existing knowledge. However, this must not be perceived as a process of dumping pieces of information one on top of the other. The individual, if he/she has actually constructed the information, will be able to make his/her own interpretation of it and establish the knowledge from the foundation upwards (Şaşan, 2002;49). Constructivist approach is student-centered; but this does not make it necessary that the teacher should be kept outside the learning process. On the contrary, constructivist teaching requires the teacher to take an active role which is characterized as specialization, knowledge and professionalism (Selley,1999;4). In constructivist approach, teachers become time planners, models, guides, development supervisors and facilitators of knowledge (Fosnot, 2007; 121-122). In order for the constructivist approach to be applied in educational environments in a correct and effective way, it is essential for teachers to know the teaching models and teaching methods based on constructivist approach very well. One of such teaching models based on constructivist approach the most commonly applied in educational environments recently is the learning cycle.

The learning cycle model is an active teaching approach primarily based upon Piaget's cognitive development theory and constructivism. The basic principle in the learning cycle is that students form the concepts on their own and solve the problems which they face with the help of their learning experiences. In this way, students will have a better understanding of the operation of scientific process (Ören and Tezcan, 2009;104). One of the learning cycle models based on constructivist approach the most commonly applied in educational environments recently is 5E learning cycle model.

Developed by Rodger Bybee, 5E learning model has positive effect on cognitive learning stages such as interpretation, analysis and evaluation and supports these stages with researches (Saka, 2006; Saygın et al. 2006; Aydoğmuş et al. 2010; Ergin et al. 2007). 5E learning cycle model enables to learn a new concept or to try to understand a concept that is known in all aspects. This is a linear process. For the concepts to become meaningful, students need to use their previous knowledge to explore new concepts (Ergin et al. 2007;193). 5E learning cycle model consists of five stages which are engagement, exploration, explanation, elaboration and evaluation.

With the primary education program for the year 2005, Turkish language courses are now being taught based on constructivist learning approach in Turkey. Although many studies have been conducted in the branches of science and mathematics regarding course teaching processes based on constructivist learning approach; there is only an insufficient number of studies on how it should be applied in Turkish language teaching. That is why Turkish Language teachers have difficulty in finding sources that will guide them on how course teaching process is supposed to be based on constructivist approach. In addition, the effect of Turkish Language courses taught based on constructivist learning approach on the success of students is not fully established. This study aims to determine the effect of the worksheet which is prepared after 5E learning cycle model concerning the teaching of the subject of adjectives as grammatical components on the success of the student. For this purpose, answers were sought for the following questions:

1. Is there significant difference between pretest and endtest scores of students in the control group who studied with worksheets arranged according to constructivist learning approach?
2. Is there significant difference between pretest and endtest scores of students in the experimental group who studied with worksheets arranged according to 5E learning cycle model?
3. Is there a significant difference between experimental and control groups for their pretest scores?
4. Is there a significant difference between experimental and control groups for their endtest scores?
5. What are the positive and negative opinions of students who studied with the worksheet prepared according to 5E learning cycle model?

2. Method

2.1. Research Pattern

Qualitative and quantitative research methods were used in conjunction in the study. Semi-experimental pattern with pretest-endtest groups was used as the quantitative method, and phenomenology pattern was used as the qualitative method.

2.2. Study Group

Control group of the study consists of 56 sixth-grade students from Erzurum 23rd July Primary School in the educational year of 2010-2011. “Knowledge of adjectives achievement test” was applied as the pretest to all three of the six-grade classes in 23rd July Primary School and the study was conducted on classes 6/A and 6/B between the success status of which no significant difference was observed at the end of the application. Class 6/A was determined as the control group and Class 6/B was determined as the experimental group in the study. Detailed information on the experimental and control groups are given in

Table 1. Distribution of students to experimental and control groups.

		Total
Experimental Group	n	28
	%	50
Control group	n	28
	%	50
Total	n	56
	%	100

2.3. Data Collection

As data collection tool, achievement test on the knowledge of adjectives prepared to determine the success levels of students on the subject of adjectives and the student interview form in which the opinions of students on 5E learning model were recorded were used in the study.

2.3.1. Adjective Knowledge Achievement Test and Pilot Application

Adjective knowledge achievement test was used both as pretest and endtest in the study. Questions given in OKS, Private Schools Admittance Examns, DPY, PYBS and SBS exams between the years 2000-2010 were scanned to determine the questions to be included in adjective knowledge achievement test. Out of these, 15 questions that are related to the purpose and gains of the subject of adjectives in 2005 Primary Education Turkish Language Program to make up the adjective knowledge achievement test. As the adjective knowledge achievement test consisted of questions which were previously tested for reliability and validity, no pilot application was performed.

2.3.2. Preparation of Student Interview Form

A student interview form containing two open-ended questions was prepared to be applied on the experimental group in order to get student opinions on the courses in which the worksheet prepared according to 5E learning cycle model is used. In this form, students were asked to state their opinions on positive and negative aspects of courses where the prepared according to 5E learning cycle model is used.

2.3.3. Preparation and Pilot Application of the Worksheet Based on 5E Learning Cycle Model

An extensive literature review was performed in the preparation of the worksheet based on 5E learning cycle model which was used in the study. This review led us to worksheets based on 5E learning cycle model prepared especially for science and mathematics courses. As 5E learning cycle model is more commonly used in science and mathematics courses, it was considered necessary to adapt this model to grammar teaching. For this purpose, 2005 Primary Education Turkish Language program and 6th-grade teacher’s guidebooks were reviewed. The worksheet used in the study consisted of five sections based on the stages of 5E learning cycle model. Cognitive stages in the process of teaching the subject of adjectives were given in an integrated body in a planned and orderly form on the worksheet. Also the objectives and gains of the subject of adjectives in 2005 Primary Education Turkish Language program was helpful in determining the exercises to be included in each section of the worksheet.

Pilot application of the worksheet based on 5E learning cycle model was performed with 10 6th-grade students. Shortcomings detected at the end of pilot application were corrected and the worksheet was given its final form.

2.3.4. Worksheet arranged according to 5E Learning Cycle Model:

1. Part: Engagement-Attention-getting

The first part of the study was made up of two exercises prepared in order to activate the previous knowledge of students and arouse interest on the subject of adjectives.

The preliminary knowledge that the students are supposed to possess in order to be able to learn the subject of adjectives is the subject of "nouns". Therefore, in the first exercise, a question was asked them not only to activate their previous knowledge on nouns but also to remember the functions of nouns.

The second exercise was prepared to raise interest on adjectives. In parallel with this purpose; a visual supplied with dialogues was given. Based on the visual, the students were enabled to make a connection with their previous knowledge on nouns and the subject of adjectives they are to learn..

2. Part: Exploration

The exercise that was performed in the second part of the worksheet consisted of three directive questions prepared in a manner to enable the students to find out what the functions of adjectives are and in which way they affect nouns.

3. Part: Explanation

The third part of the worksheet consisted of a single explanatory exercise that enabled the students to access the knowledge of adjectives. First, an explanation part was given in the exercise. In this part, it was emphasized that the knowledge which the students gained in the 2nd part were the common characteristics of adjectives and they were asked to define the adjective in light of the exercise in the 2nd part. At the end of the exercise; the groups were asked to compare their definitions of adjectives with that of other groups and to reach a common definition of adjectives in order to correct any fault or deficiency in their knowledge.

4. Part: Elaboration of Knowledge

The fourth part of the worksheet consists of seven exercises which enable the students to learn the subject of adjectives in more detail and to apply which they learnt to a new situation.

First exercise was prepared for the students to form the knowledge of descriptive adjective. In this exercise, the students were given sentences formed with descriptive adjectives. The students were asked to form the knowledge on how descriptive adjectives affect nouns in terms of color, situation and form and to make a definition of descriptive adjectives.

In the second exercise, nouns are given and they are asked to use these nouns with different descriptive adjectives to let the students apply the knowledge of descriptive adjective to new situations

The third exercise was prepared for the students to form the knowledge of demonstrative adjectives. In this exercise, the student were given a paragraph containing demonstrative adjectives and were asked to find which quality of the nouns the underlined demonstrative adjectives demonstrated. At the end of the exercise, the students were asked to make a definition of demonstrative adjectives in light of what they learnt.

The fourth exercise was prepared for the students to reinforce the knowledge of demonstrative adjectives. In the exercise, the students were given sentences formed with demonstrative adjectives and were asked to find out which quality of the nouns these adjectives demonstrated.

The fifth exercise was prepared to enable the students to apply the knowledge of demonstrative adjectives to new situations. In the exercise, the students were given nouns and were asked to use these nouns together with the demonstrative adjectives with different functions.

The sixth and seventh exercises were prepared to build the knowledge of adjective clauses in students. An explanation was made before the sixth and seventh exercises which emphasized that, in order for a word to be an adjective, it had to describe or demonstrate a preceding noun; in other words, form a clause with a preceding noun. In the sixth exercise, the students were asked to find the adjective clauses based on this explanation. The seventh exercise was prepared to enable the students comprehend that they can use the words as adjective clauses, pronouns and nouns in a sentence. For this purpose, sentences where the same word was used in different functions were included in the exercise and the student were asked to discuss with their group partners to find out the reason for this alternation.

5. Part: Evaluation

The fifth part of the worksheet consisted of three exercises to evaluate what the student had learnt up to this part.

The first exercise was prepared to determine the extent of the students' knowledge on the function of adjectives and descriptive and demonstrative adjectives. At the first stage of the exercise, 2 lines were given from the poem "Uçun Kuşlar" ("Fly, You Birds!") by Rıza Tevfik BÖLÜKBAŞI and the students were asked to find the adjectives in these lines. At the second stage of the exercise, the students were asked to rewrite the poem by leaving out the adjectives in it and discuss with their friends what differences of meaning took place and the reason for these differences.

The second exercise was prepared to evaluate the extent to which the students are able to apply their knowledge on adjectives to new situations. In the exercise, the students were given pictures of a cat, an apple and a pencil. They were asked to form adjective clauses based on these pictures and use these clauses in a sentence.

The third exercise was prepared in order to measure the students' comprehension of whether a word is used as an adjective. In the exercise, sentences were given where the same word was used in different functions and the students were asked to find out those which were used as adjective.

2.3.5. Course Teaching Processes in Experimental and Control Groups

At the end of the adjective knowledge achievement test applied as pretest, it was determined that there was no significant difference between experimental and control groups and courses began to be given according to this results. Group work method was applied to enable students from experimental group to benefit more from the course given with the worksheet based on 5E learning cycle model. Therefore, students in the experimental group were divided in seven groups each consisting of four students. To ensure the reliability of the study, it is necessary that the educational environments in both the experimental and control groups have similar characteristics. Therefore, courses in the control group were taught by group work method. Students in the control group were divided in seven groups each consisting of four students.

The subject of adjectives were taught based on constructivist learning approach both in the experimental and control groups. However, while the worksheets based on 5E learning cycle model which is a learning model based on constructivist learning approach were used in the experimental group, the exercises in the student workbooks were used in the control group.

Adjective knowledge achievement test applied as pretest at the end of 4-hour courses in experimental and control groups was applied as endtest this time.

2.4. Data Analysis

Where the results of pretest and endtest applied to the experimental and control groups are to be analyzed, t-test and its non-parametric alternative, Wilcoxon test were preferred from among predictive statistical methods in dependent samples and t-test and its non-parametric alternative Mann-Whitney U Test were applied in independent samples. Content analysis method was applied in the analysis of the qualitative data of the study.

3. Findings

3.1. Findings from the first study problem

Table 1: Arithmetic mean and Wilcoxon test values according to pretest-endtest results of the control group

Control group	N	X	z	p
Pretest	28	31,90	-4,653	0.00
Endtest	28	76,66		

$p > 0.05$

When Table 1 is examined, it was confirmed that there was a significant difference between pretest and endtest results of students from the control group ($z: -4,653; p < 0.05$). The difference between pretest achievement results and endtest achievement results of control group students points to the fact that their success levels have increased in the course of the process.

3.2. Findings from the second study problem

Table 2: Arithmetic mean and Wilcoxon test values according to pretest-endtest results of the experimental group

Experimental group	N	X	Z	p
Pretest	28	31,66	-4,646	0.00
Endtest	28	95,47		

$p > 0.05$

When Table 2 is examined, it was confirmed that there was a significant difference between pretest and endtest results of students from the control group ($z: -4,646; p < 0.05$). The difference between pretest achievement scores

and endtest achievement scores of experimental group students points to the fact that the success level of the class has increased with the effect of the worksheets based on 5E Learning cycle model.

3.3. Findings from the third study problem

Table 3: Arithmetic mean, standard deviation and t values of experimental and control groups based on pretest achievement scores

Group	N	X	S.S.	t	p
Control	28	31,90	9,31	,098	0.922
Experimental	28	31,66	8,81		

$p > 0.05$

When Table 3 is examined, it can be seen that no significant difference was observed between pretest achievement scores of students from control and experimental groups ($t: ,098$; $p > 0.05$). In other words, pretest achievement results of control and experimental group students are similar.

3.3. Findings from the fourth study problem

Table 4: Arithmetic means and Mann-Whitney U values of experimental and control groups based on endtest achievement scores

Group	N	X	U	z	p
Control	28	16,38	52,50	-,5,670	0.00
Experimental	28	40,63			

$p > 0.05$

When Table 4 is examined, it can be seen that a significant difference was observed between endtest achievement scores of students from control and experimental groups ($U_t: 52,50$; $p < 0.05$). Average endtest achievement score of the experimental group on which the worksheets based on 5E learning cycle method were applied is higher than the average achievement score of the control group. These points to the fact that the worksheets developed according to 5E learning cycle model are more effective on the success of students than the exercises in student work books.

3.4. Findings from the fifth study problem

Positive and negative opinions of students who studied with the worksheet based on 5E learning cycle model are given in Table 5 and Table 6:

Table 5: Positive opinions of students who studied with the worksheet prepared according to 5E learning cycle model.

Positive opinions of students	f	%
Courses were very fun and enjoyable.	58	50,1
I liked the study model very much.	15	12,9
Courses should always be taught according to the model.	12	10,3
This model makes it easy to understand the subject.	22	19
I understood how knowledge is constructed thanks to this model.	9	7,7
I got more out of group work method	15	12,9

Table 6: Negative opinions of students who studied with the worksheet prepared according to 5E learning cycle model.

Negative opinions of students	f	%
I had difficulty in storing worksheets.	1	50
There were times when I got bored during group discussions.	1	50

4. Conclusion and Discussion

Following conclusions were made in light of the findings of the study:

4.1. Results of Adjective Knowledge Achievement Test.

“Adjective knowledge achievement test” was applied as pretest in order to determine whether there was a significant difference between “adjective knowledge achievement statuses” of experimental and control group students, before proceeding with the study. The difference observed at the end of the pretest was found significant to the significance level of $p > 0.05$. In other words, it was determined that the levels of knowledge which students from experimental and control groups had on adjectives were similar before the study and course teaching processes started in experimental and control groups accordingly. Adjective knowledge achievement test applied as pretest at the end of the courses in both groups was applied as endtest this time.

Class achievement statuses were found by taking the arithmetic means of pretest and endtest results of both groups in order to determine the effect of courses taught in experimental and control groups on the success of students. While the average success of the experimental group on the knowledge of adjectives was 31,66 before the application, it reached 95,47 after it. While the average success of the control group on the knowledge of adjectives was 31.90 before the application, it reached 76.66 after it. Based on this, it was concluded that there was an increase in the success of both groups as a results of courses taught according to constructivist approach in the experimental and control groups, but the courses performed in the experimental group had a more positive effect on the success of students.

In the worksheet prepared according to 5E learning cycle model, the cognitive stages in the process of teaching the subject of adjectives were given in a planned and integrated order in the worksheet and the subject of adjectives were given the experimental group in an integrated structure.

In the control group, the subject of adjectives was taught using the exercises in the students' workbooks taking the guidelines in the teachers' guidebook into consideration. Exercises in student workbooks were prepared according to a single cognitive learning stage and were placed in the grammar section of each reading passage dispersedly.

This indicates that the worksheets prepared according to 5E learning cycle model is have a higher positive effect on the success of students as it is involves an integrated and planned structure.

4.2. Results Obtained from Student Interview Form

“Student Interview Form” consisting of two open-ended questions was applied at the end of the course in the experimental group in order to present opinions of students on the worksheets prepared according to 5E learning cycle model. In conclusion of the findings in these forms, it was seen that;

1. Students found the courses taught with the worksheets based on 5E learning cycle model funny and enjoyable,
2. Students like the courses taught with worksheets based on 5E learning cycle model
3. Students wanted that the worksheets based on 5E learning cycle to be used in other courses as well;
4. Students had an easier and better grammar learning experience in courses taught with worksheets based on 5E learning cycle model,
5. Students thought that, in courses taught with worksheets based on 5E learning cycle method, the knowledge was not provided by the teacher, but is built as a results of discussions with their friends; in other words, they gave it a meaning by constructing it in their minds,
6. Students thought that the use of group work method increased the efficiency in courses taught with worksheets based on 5E learning cycle model,
7. Students were satisfied with the performance of exercises in their worksheets as a group; but they had problems as worksheets must be kept by only one student from the group.
8. It was observed that groups who reached a conclusion through group discussions became bored as they wait for other groups to finish their work.

5. Suggestions

In light of the conclusions made in the study, researchers who are to make studies on the subject and teachers who actively take part in the education system are provided with the following suggestions:

1. The study aimed to determine the effect of worksheets based on 5E learning cycle model on the success of students for the teaching of the subject of adjectives. As for other grammar subjects, worksheets based on constructive learning model must be developed to fully prove the success of the system.
2. Turkish Language course consists of the learning areas of reading, listening/watching, speaking and grammar. Therefore learning cycle models used in constructive learning approach must also be used in the learning areas of listening/watching, speaking, writing in Turkish language course and the worksheets must be developed and applied accordingly.

3. 5E learning cycle model, one of the constructivist learning approaches in grammar teaching, was used in the study. Worksheets must be prepared for other learning cycle models and the most suitable model for grammar teaching must be determined.
4. In the study, courses were performed in experimental and control groups by the group work method. Studies to be made must include both the individual work and the group work. This way, it must be determined whether constructivist applications in Turkish language teaching is more effective individually or in groups.
5. According to constructivist approach, learning takes place by the students' own construction and interpretation of the knowledge in their minds. Therefore, the individual learning speed of the student is important in learning. For this reason, in such parts of the study where group discussion is applied, it was seen that the students who reach a conclusion earlier due to their individual learning speed became bored as they wait for other groups to finish their work. Therefore, in studies to be made, the students must be homogenously distributed to groups taking their individual learning speed into account.
6. In the study; it was seen that the students from the control group had problems as to by which member of the group the worksheets based on 5E learning cycle model are to be kept. In courses where the worksheets prepared according to 5E learning cycle model are used, worksheets that are analyzed must be copied at the end of the course and handed out to group students if group work is applied.
7. With the primary education program for the year 2005, Turkish language courses are now being taught based on constructivist learning approach in Turkey. However, due to the fact that teachers have limited knowledge of constructivist approach, that teachers are accustomed to teach by conventional methods and due to lack of resources, the courses have not become fully conforming to constructivist learning approach so far. In-service training programs must be provided for teachers on course teaching and material preparation based on constructivist approach. These training programs must follow a practical, rather than theoretical course and the teachers must be provided with the opportunity to review the materials prepared by professionals based on constructivist approach.

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