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The Effect of Allosteric Learning Model on the Problem Solving Skills of 7th Grade Students in English Courses*

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Abstract

In this study the purpose is to determine the effect of allosteric learning model on the problem solving skills of 7th grade students in English courses. Mixed method dealing with quantitative and qualitative research patterns was used. In the quantitative dimension, the paired pretest-posttest control group design from the quasi-experimental design and in qualitative dimension, case studies pattern were used. This study was conducted on a working group consisting of 70 students. In the quantitative dimension, problem-solving skills test developed by the researchers was used. Besides, with the semi-structured interviews, qualitative data was collected. To analyze the quantitative data t-test was used and to analyze the qualitative data, descriptive analysis and content analysis were used. As a result of analysis of data obtained, there are significant differences in favor of the experimental group. In the light of the findings obtained from this research: There is not a significant differentiation between the scores of the experimental and control groups' pre-test. There is not a significant differentiation between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model. There is a significant difference in favor of posttest between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model. There is a significant difference in favor of experimental group between the points related to problem-solving skills of posttest of experimental group which is subjected to allosteric learning model and the posttest of control group which is not subjected to it. When looked at the students' opinions on the effectiveness of allosteric learning model: It is seen that allosteric learning model activities are learner-centered and other ones used before the model are teacher-centered. Students chose the activities according to the fact that they are "appropriate for their level" and they can "participate actively". Also, students loved the activities which are "individual" or "group". It is found that students faced some problems while "preparing and reaching the materials". Finally, it is obtained that they tried to solve the problems they faced by "data collecting" or "identifying" them.

Keywords: learning-teaching process, allosteric learning, problem-solving

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İngilizce Dersinde Allosterik Öğrenme Modelinin 7. Sınıf Öğrencilerinin Problem Çözme Becerilerine Etkisi

Öz

Bu çalışmanın amacı, İngilizce dersinde allosterik öğrenme modelinin 7.sınıf öğrencilerinin problem çözme becerilerine etkisini belirlemektir. Nicel ve nitel araştırma desenlerinin birlikte ele alındığı karma yöntem kullanılmıştır. Araştırmanın, nicel boyutunda, yarı deneysel desenlerden, öntest-sontest eşleştirilmiş kontrol gruplu desen; araştırmanın nitel boyutunda ise, nitel araştırma desenlerinden durum çalışması deseni kullanılmıştır. Bu çalışma, 35'i deney 35'i kontrol grubu olmak üzere Siirt Sancaklar Ortaokulu'nda 2014-2015 eğitim-öğretim yılında öğrenim gören toplam 70 öğrenci ile yürütülmüştür. Nicel boyutunda, 1. 2. 3. ve 4. alt problemlere cevap aranırken araştırmacılar tarafından geliştirilen problem çözme becerileri testi kullanılmıştır. Bunun yanında, 5. alt probleme cevap aramak için yarı yapılandırılmış görüşme formu uygulanmıştır. Normal dağılımın görüldüğü gruplarda, nicel verileri analiz etmek için t-test ve nitel verilerin analizi için içerik analizi kullanılmıştır. t-testi ile elde edilen veriler sonucunda, deney grubu lehine anlamlı farklılık görülmüştür. Bu çalışmadan elde edilen bulgular ışığında: Deney ve kontrol grubu öğrencilerinin ön test problem çözme becerileri arasında anlamlı bir farklılığın olmadığı; Allosterik öğrenme modelinin uygulanmadığı kontrol grubu öğrencilerinin ön test ve son test problem çözme becerileri testinden aldıkları puanlar arasında anlamlı farklılığın olmadığı; Allosterik öğrenme uygulamasına tabi tutulan, deney grubunun ön test ve son test, problem çözme becerilerine ilişkin puanları arasında son test lehine anlamlı farklılık; Allosterik öğrenme uygulamasına tabi tutulan deney ve allosterik öğrenme uygulamasına tabi tutulmayan kontrol grubunun son test problem çözme becerilerine ilişkin puanlarının analizi sonucunda deney grubu lehine anlamlı farklılık bulunmuştur. Allosterik öğrenme modelin etkililiğine ilişkin öğrenci görüşlerine bakıldığında: Allosterik öğrenme modeli etkinliklerinin öğrenci merkezli; daha önce uygulanan etkinliklerin ise öğretmen merkezli olduğu görülmüştür. Öğrenciler ''düzeye uygunluk'' ve ''etkin katılım'' doğrultusunda etkinlikleri seçmişlerdir. Öğrenciler 'bireysel ve grup'' şeklinde yapılan etkinlikleri daha çok sevmişlerdir. Öğrenciler etkinliklerini yaparken, materyali hazırlamada ve materyale ulaşmada problemlerle karşılaşmışlardır. Öğrencilerin karşılaştıkları problemleri, bu problemler hakkında bilgiler toplayarak ve problemi tanımlayarak çözmeye çalıştıkları sonucuna ulaşılmıştır.

Anahtar Sözcükler: öğrenme-öğretme süreci, allosterik öğrenme, problem çözme

Introduction

Learning is the long-term, permanent change occurring in behaviors as a result of individual lives. These changes were explained with many models and theories from the past to the present. One of them is "allosteric" learning model (Topbaş, 2013, p. 98). In the allosteric learning model, an individual realizes learning by using a variety of existing conception not with a simple chain paths. These conceptions help the students to analyze the knowledge and rebuild it or hinder the students' learning (Pei, 2006; WuTao, 2010). According to the allosteric learning model, to overcome these obstacles, first of all the obstacle should be identified and necessary information should be obtained (Giordan, 2000).

Giordan (2012) explains the obstacles in the learning of individuals in the allosteric learning by likening the bond between the amino acids and their creating the enzymes. So, how enzymes can change form and function according to the environment, in the same way, individuals can change their mind affected by environmental conditions (Topbaş, 2013, p. 98). In this regard, Moradi, Brunel and Vallespir (2008) describe that learning in the allosteric learning model is not connected to a single factor but it occurs in an environment called as 'didactive environment' with the relationship of different conditions. In a learning occurred in the didactive environment, firstly questioning takes place in the conceptions and interrogation stage is reorganized. In this way, it consists of a radical change in the individual's mental structure (WuTao, 2010). By this change, old conception gives its place to the new one (Budak, 2010). Educators have great missions during the process of the new knowledge's transfer to the real life and the environment of the individuals. Because, in this model, they play the role of knowledge designer instead of directly presenting the knowledge to the students. With this important mission, teachers should provide the necessary 'didactive environment' and direct the students to the questioning process by several ways (Pei, 2006). It is essential that they should identify the conceptions of students in this environment. To do this, they try to make the students draw pictures about the subject, face positive/negative situations to reason and discuss about the subject with the help of information they get (Giordan, 2000). In short, it is questioned whether students have problem-solving skills with allosteric learning or not. Individuals identify the problems and find solutions to them with the ability of problem solving (Mayer, 1998). In the process of solving these problems, every student choose a different way. For example, while some students can make easy solutions, some can create different ones and internalize the information obtained (Snyder & Snyder, 2003). In other words, the students develop their problem solving skills with allosteric learning model. Furthermore, in the studies from past to present, the contributions of allosteric learning model to the cognitive structure of students and teaching-learning process have been investigated. These contributions of allosteric learning model to the teaching and learning and the changes on the cognitive structure particularly attracted the attention of scientist working in the field of science (Honorez 2000; Giordan, 1995) and a lot of research and study are conducted on this subject. But there are few or almost no studies in social and educational sciences. Lack at this point is the basic premise of the study.

Purpose of the Study

The main purpose of this study is to determine the effect of allosteric learning model on the problem-solving skills of 7th grade students in English courses. In order to achieve this aim, the questions below were examined:

1) Is there a significant difference between the points related to pretest problem-solving skills of the experimental and control group?
2) Is there a significant difference between the points related to problem-solving skills of pretest and posttest of control group?
3) Is there a significant difference between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model?
4) Is there a significant difference between the points related to problem-solving skills of posttest of experimental group which is subjected to allosteric learning model and the posttest of control group which is not subjected to it?
5) What are the students' opinions on the effectiveness of the allosteric learning practices?

Method

In this study trying to determine the effect of allosteric learning model on the 7th grade students' problem solving skills in English courses, mixed method dealing with quantitative and qualitative research patterns was used. In the quantitative dimension of the research, 1st, 2nd, 3rd and 4th sub-problems were examined. The paired pretest-posttest control group design from the quasi-experimental design was used. And in the qualitative dimension of it, the 5th sub-problem was studied. In order to provide data diversity and make quantitative findings clearer, case studies pattern was applied from the qualitative research design.

In order to find answers to the 1st, 2nd, 3rd and 4th sub-problems, a working group, consisting of 70 students; 35 experimental and 35 control group, was designed. In the 7th grade of the specified school there are four classes. From these four classes, two were included in the scope of research. One of them was determined as the experimental group and the other one as the control group. While constructing the experimental and control groups "random sampling" from probability-based sampling methods was used. In order to find an answer to the 5th sub-problem, 33 participants from 35 in experimental group were determined on a voluntary basis.

For data collection, in the quantitative dimension, problem-solving skills test developed by the researchers was used while searching answers to the 1st, 2nd, 3rd and 4th sub-problems, before and after implementation of the unit 'Environment'. Besides, for the 5th sub-problem, after the application with the semi-structured interviews with the pupils, qualitative data was collected.

The implementation process of the study lasted four weeks at both groups and it lasted about six weeks with the implementation period of the pre-test and post-test. To provide allosteric learning environment, a 'didactive environment', mentioned before, was designed in the experimental group. Students were divided into 2 and 3 person groups and to uncover their conceptions, concept maps, case studies and videos were utilized with a variety of visual materials. In this didactic environment, students were encountered with the stimulus bearing an imbalance and questions in their cognitive structure. In this way, students were convinced that there is insufficient existing cognitive structure and they need to learn. Activities implemented in courses were applied as Giordan (1995) revealed the allosteric learning methods as follows:

1. Introduction: At this stage, the students are expected to face the problem and compare the existing information with new data and to enter into an imbalance (Budak, 2010).

In the activities held by the researchers, students are asked questions about the problems around them and several pictures and videos are used. Hence, an imbalance in their existing knowledge could occur.

2. Discovery: At this stage, while student are collecting data, they are expected to recognize and reproduce the problem using various methods to reach a certain integrity and to take place in an opposite side of the issue.

Students at this stage, are given various scenarios on the subject and were asked to collect data on their topic. Concept maps prepared by the researchers were given to them to complete the empty space and were asked questions how they can use their concepts found while problem solving. During these activities, students have worked in groups of 2 and 3 and researchers visiting between groups have guided them in this 'didactic environment'.

3. Deepening: It is intended to provide an environment that students can understand the new knowledge is really functional and test its functionality.

At this stage, students made experiments through simulation about environmental issues and had the opportunity to discuss and debate the data revealed by researchers.

4. Transfer: At this stage, it is intended to show the students that the new information is linked with the existing data, and thus learning is easier.

At the end of the research, it is understood with the opinions of the students that the knowledge they got is useful for them.

The unit of "Environment" was implemented according to the current program with the students in the control group and through this, students studied with the

books and individually. The subjects that will be learnt are reported to the students in advance.

For the quantitative data analysis of the study, in order to compare the groups' pre-test and post-test scores independent samples t-test; to compare the control and experimental groups' pre-test and post-test scores in their own paired samples t-test were used in the groups normal distribution seen. Also, in this research, in order to test the reliability of raters of problem-solving skills, interclass correlation- R1 (interclass reliability coefficient) was calculated. The *intraclass correlation* is commonly used to quantify the degree to which individuals with a fixed degree of relatedness (e.g. full siblings) resemble each other in terms of a quantitative trait. In the analysis of qualitative data descriptive analysis and content analysis were used.

Findings and Interpretations

In this part, the findings of the research are presented in accordance with the sub-problems and they are interpreted.

Findings and Reviews on the First Sub-Problem of the Research

The findings and reviews of first sub-problem expressed as *"Is there a significant difference between the points related to pretest problem-solving skills of the experimental and control group?"*

The average of the scores obtained from the Experimental and control group students' pre-test 'Problem Solving Skills Test' are given in Table 1.

Table 1

t-Test Results of the Experimental and Control Group Students' Pre-Test 'Problem Solving Skills Test'

Groups	N	$\bar{x}$	S	sd	t	p
Experimental Group	35	61.40	24.10		0.112	.091
Control Group	35	60.80	20.38	68		

When the data in Table 1 observed, a significant difference is not seen on the average of the scores obtained from the experimental and control group students' pre-test 'Problem Solving Skills Test'. [$t_{(68)} = 0{,}112$; $p>0.05$]. Considering the arithmetic mean of the groups, while average score pre-test problem-solving skills of the experimental group students is $\bar{x}$ =61,40, average score pre-test problem-solving skills of students of the control group is $\bar{x}$= 60.80 on a hundred point scale. This finding can be interpreted as the groups are close to each other and no difference between groups ($p>0.05$) have been observed and the groups are equal.

Findings and Reviews on the Second Sub-Problem of the Research

The findings and reviews of first sub-problem expressed as *"Is there a significant difference between the points related to problem-solving skills of pretest and posttest of control group?"*

The average of the scores obtained from the points related to problem-solving skills of pretest and posttest of control group are given in Table 2.

Table 2

t-Test Results of the Control Group Students' Pre-Test and Posttest 'Problem Solving Skills Test'

Results	N	$\bar{x}$	S	sd	t	p
Pre-test	35	60.80	20.38		0.476	.64
Post test	35	61.31	20.90	34		

Analyzing the data in Table 2, as a result of paired samples t-test performed to determine whether there is a difference between the pre-test and post-test in the control group, it is found $\bar{x}$ = 60,80 and $\bar{x}$=61,31. This finding can be interpreted as pre-test and posttest scores of the control group are close to each other and there is not a significant difference.

Findings and Reviews on the Third Sub-Problem of the Research

The findings and reviews of third sub-problem expressed as *"Is there a significant difference between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model?"*

The average of the scores obtained from the points related to problem-solving skills of pretest and posttest of experimental group are given in Table 3.

Table 3

t-Test Results of the Experimental Group Students' Pre-Test and Posttest 'Problem Solving Skills Test'

Results	N	$\bar{x}$	S	sd	t	p
Pre-test	35	61.40	24.09		3.006	.05
Post test	35	66.11	24.58	34		

Analyzing the data in Table 3, as a result of paired samples t-test performed to determine whether there is a difference between the pre-test and post-test in the experimental group examined the effect of Allosteric learning model on the problem solving skills, it is found $\bar{x}$ = 61,40 and $\bar{x}$ = 66,11 and a significant difference is seen [$t_{(34)}$ = 3,006, $p<0.01$]. This finding can be interpreted as the implemented model has a positive effect on the students' problem solving skills.

Findings and Reviews on the Fourth Sub-Problem of the Research

The findings and reviews of fourth sub-problem expressed as *"Is there a significant difference between the points related to problem-solving skills of posttest of experimental group which is subjected to allosteric learning model and the posttest of control group which is not subjected to it?"*

The average of the scores obtained from the Experimental and control group students' posttest 'Problem Solving Skills Test' are given in Table 4.

Table 4

t-Test Results of the Experimental and Control Group Students' Posttest 'Problem Solving Skills Test'

Groups	N	$\bar{x}$	S	sd	t	p
Experimental Group	35	66.11	24.58		0.880	.39
Control Group	35	61.31	20.90	68		

When the data in Table 4 observed, a significant difference is seen on the average of the scores obtained from the experimental and control group students' post-test 'Problem Solving Skills Test' [$t_{(68)}$ = 0,880; p>0.05]. Considering the arithmetic mean of the groups, while average score posttest problem-solving skills of the experimental group students is $\bar{x}$ = 66,11, average score posttest problem-solving skills of students of the control group is $\bar{x}$ = 61.31 on a hundred point scale. This finding can be interpreted as the learning model makes a significant difference in the groups' problem solving skills.

Findings and Reviews on the Fifth Sub-Problem of the Research

The findings and reviews of third sub-problem expressed as *"What are the students' opinions on the effectiveness of the allosteric learning practices?"*

The students' opinions on the effectiveness of the allosteric learning practices are given in Table 5.

Table 5

The Descriptive Analysis Results of the Students' Opinions on the Effectiveness of the Allosteric Learning Practices

		Source		Coding Density	
	Category	f	%	f	%
What is the difference of Allosteric learning model activities from the ones you did in the English courses before?	Learner-centered activities	31	93.9	33	94.3
	Teacher-centered activities	2	6.1	2	5.7
	Total	33	100	35	100
What did you care while choosing the activities related with Allosteric learning model? Why?	Suitability for level	15	45.5	16	43.2
	Active participation	18	54.5	21	56.8
	Total	33	100	37	100
What is your favorite activity? Why?	Individual Activities	20	60.6	21	56.8
	Group Activities	13	39.4	16	43.2
	Total	33	100	37	100
While doing activities which problems did you encounter? Why?	Preparation of the materials	22	66.7	22	66.7
	Reaching the materials	11	33.3	11	33.3
	Total	33	100	33	100
How did you solve the problems?	Data collection	18	54.5	18	54.5
	Identifying the problem	15	45.5	15	45.5
	Total	33	100	35	100

As seen in Table 5, in the interviews with students, the difference of the activities carried out in accordance with the allosteric learning model from the ones carried out before is asked. In the opinions of the students, it is found that allosteric learning model activities are learner-centered and the ones done before are teacher-centered.

In the descriptive analysis of the interviews done with 33 students, allosteric learning model activities are "learner centered" [fun with activities (f=12) creativeness (f=7) active participation (f=6) the feeling of responsibility (f=2) the feeling of sharing (f=2) according to students' interests (f=2).]. From this finding, it can be said that with allosteric learning model activities, lessons are more fun [ex. 1-2-3-4-5-6-7-8-9-10-11-12]; and in teacher centered activities, expressions are more used [ex. 13-14].

> *"…in this new model, our teacher guides us, shows interest, lessons are more fun."* (D_3)

> *"…new activities are easier and courses are funny."* (D_7)

> *"…allosteric learning model was funny."* (D_{10})

"...we had more fun compared to other activities." (D_{12})

"...this model is enjoyable..." (D_{13})

"...different from old ones and we passed funny times." (D_{14})

"...more fun. We are learning better." (D_{18})

"...more fun than the ones in the book..." (D_{19})

"...different from the activities in the book and more fun..." (D_{20})

"...we had enjoyable and better time." (D_{23})

"...these activities are more fun..." (D_{26})

"We used to write the words in our notebooks and memorize them, with allosteric learning model we learn by entertaining." (D_{29})

"...when our teacher expressed us orally, I used to learn better..." (D_9)

"When the teacher explained, it was better. She used to tell us the meaning of the words and what we should do. Thus we used to make the exercises according to it." (D_{11})

In the descriptive analysis of the interviews done with 18 students, while choosing allosteric learning model activities, the students cared for "active participation" [funny activities (f=11) usefulness (f=5) productivity (f=2).] and in the interviews done with 15 students, they cared for "suitability for level" [appropriate for their level (f=8), arousing their interests (f=4), informing them (f=3).] From this finding, it can be said that when students choose allosteric learning model activities, they pay attention for the activities to be funny and suitable for their.

"...I thought whether it is funny or not." (D_3)

"...I chose them whether I'm having fun or not." (D_4)

"...entertaining activities..." (D_9)

"...I considered them to be entertaining." (D_{10})

"...enjoyable activities..." (D_{16})

"...I looked for which activity is more enjoyable..." (D_{18})

"...I chose the ones both funny and enjoyable." (D_{20})

"...I thought them to be enjoyable..." (D_{23})

"…I wanted the activities to have games in them." (D_{24})

"…their being enjoyable was important for me…" (D_{25})

"I chose the colorful and creative activities. Also I cared for the one that would entertain me and teach me new things. If I have fun, I learn better." (D_{33})

"…I thought about my level…" (D_{5})

"…suitable for my English level…" (D_{8})

"…I looked whether the activities are appropriate for me ..." (D_{13})

"…I cared for the ones that I can do and understand." (D_{14})

"…appropriate for my understanding…" (D_{15})

"…I chose the ones suitable for my level…" (D_{22})

"…with the help of my teacher, the ones suitable for me…" (D_{26})

"I decided on the ones according to my level. Because the ones that I can't do would be boring and I would have hard time." (D_{27})

In the descriptive analysis of the interviews done with 20 students, while doing allosteric learning model activities, the students loved mostly "individual activities" [stories (f=7) drawing pictures (f=6) concept maps (f=3) videos (f=2) exercises in the books (f=2).] and "group activities" [drama (f=5), discussion (f=4), group work (f=2) experiment (f=1) project work (f=1).] From this finding, it can be said that the allosteric learning model activities students loved the most are stories and drama.

"…the story I read about the environmental issues…" (D_{10})

"…the story was educative…" (D_{17})

"…I loved the story very much…" (D_{22})

"…the story was nice…" (D_{24})

"…the story helped me overcome the problem…" (D_{25})

"…the story was nice, I learned new vocabulary." (D_{26})

"The story about environmental problems was educative thus, I compared my thoughts and the one in the story." (D_{33})

"…drama we performed in the class was nice…" (D_{4})

"…we had fun in drama activity…" (D_5)

"…drama we performed about environment problems…" (D_{19})

"…the dialogue we wrote and performing it..." (D_{23})

"The discussion what we must do about the environment issues and after that we performed drama. They were really funny. (D_{31})

In the descriptive analysis of the interviews done with 22 students, while doing allosteric learning model activities, the students faced some problems. These are "preparation of materials" [organizing knowledge (f=17) lack of time (f=3) not knowing the role in group (f=2). In the descriptive analysis of the interviews done with 11 students, they faced the problem of reaching materials [not reaching the sources (f=7) classifying the knowledge (f=4).] From this finding, it can be said that students faced the problems of organizing the knowledge and reaching the materials.

"…while producing solutions and putting forward the solution ways…" (D_1)

"…while bringing together the English words…" (D_2)

"…while filling the concept map." (D_5)

"…when searching ways for solution and writing them." (D_6)

"…I could write the concepts I knew well, but while writing the ones original I had trouble." (D_{10})

"…while filling the concept map…" (D_{11})

"…I did not get the point how to fill concept map." (D_{13})

"…couldn't remember the words, so I couldn't write sentences." (D_{16})

"…I got bores while writing sentences." (D_{17})

"…I could not remember the words and did not know what to do." (D_{18})

"…while producing creative solutions …" (D_{19})

"…the activities I had to make interpretations…" (D_{22})

"…I had difficulty in producing creative solutions about environmental problems." (D_{23})

"…while answering the questions. I didn't understand them." (D_{24})

"…to remember some concepts in concept map." (D_{25})

"...trying to express myself in English …" (D_{28})

"Generally, I felt difficulty at the beginning of the unit. Because I didn't know much at first and where and how to use the words." (D_{31})

"…where to find right conceptions" (D_3)

"…where to find English words …" (D_4)

"…I faced with some problems while trying to find necessary words." (D_{12})

"…when I had to write the answers. As I could not find the words." (D_{26})

"…I did not know which sources I have to reach." (D_{27})

"…I could not find where to find..." (D_{29})

"I had troubles with English words, didn't know the meaning of the sentences. I could not think where to find them." (D_{32})

In the descriptive analysis of the interviews done with 18 students, how the students choose the problems they face while doing allosteric learning model activities, they applied for data collection [getting help from people around (f=11) searching from different sources (f=7)] and 15 students said that they applied for identifying the problem [putting forward the problem (f=8) discussing the difference from other problems (f=7)]. From this finding, it can be said that while students are solving the problems, they applied for getting help from people around and putting forward the problem.

"…getting help from my teacher…" (D_3)

"…my teacher helped me and I asked the unknown words." (D_4)

"…we worked in group and tried to solve…" (D_5)

"…I asked my classmate…" (D_{11})

"…I asked my teacher…" (D_{12})

"…I wanted help from my teacher when I had trouble…" (D_{15})

"…I asked my mates and they told me the ones that I could not understand." (D_{19})

"...I tried to get help from my mates..." (D_{20})

"...I tried to find solutions by talking with my friend." (D_{21})

"...I asked my group friends..." (D_{28})

"I asked the problem I faced to my group mates. We talked about it and still we couldn't deal with it and asked our teacher. She helped us." (D_{31})

"...I thought for a while on the problem and searched for the possible solutions." (D_6)

"...thinking about the problem ..." (D_7)

"...tried to understand it at first and then searched for it." (D_9)

"...at first, I thought about it myself and wrote the solutions that have come to my mind..." (D_{13})

"...reasoning and trying to understand it from another perspective..." (D_{24})

"...thought for a while and solved it..." (D_{27})

"...checked out the activities and searched for the problem..." (D_{32})

"I tried to think about the problem and understand it. After that, I wrote different ways of solutions." (D_{33})

Conclusion and Discussion

In the light of the findings obtained from this research trying to find out the effect of allosteric learning model on the problem solving skills of the students in English course:

There is not a significant difference between the scores of the experimental and control groups' pre-test. There is not a significant difference between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model. There is a significant difference in favor of posttest between the points related to problem-solving skills of pretest and posttest of experimental group which is subjected to allosteric learning model. There is a significant difference in favor of experimental group between the points related to problem-solving skills of posttest of experimental group which is subjected to allosteric learning model and the posttest of control group which is not subjected to it. When looked at the students' opinions on the effectiveness of allosteric learning model:

It is seen that allosteric learning model activities are learner-centered and other ones used before the model are teacher-centered. Students chose the activities according to the fact that they are “appropriate for their level” and they can “participate actively”. Also, students loved the activities which are “individual” or “group”. It is found that students faced some problems while “preparing and reaching the materials”. Finally, it is obtained that they tried to solve the problems they faced by “data collecting” or “identifying” them.

From this point of view, it is clear that in developing problem solving skills, providing practical information on educational environments, where the pupils actively participate in the learning process and cognitively disturb themselves in order to reconstruct their knowledge, play an important role. Also, Mayer (1998) suggests that problem solving skill is best learned within personally meaningful contexts, and that the problem solvers may need guidance in their interpretation of success and failure in problem solving in the educational environments similar to ‘didactive environment’ mentioned in this research about allosteric learning model.

As a result of this research, it can be said that allosteric learning model is more effective in arousing the pupils’ problem solving skills than the existing teaching program in English teaching.

Suggestions

- In English Language Teaching Program, as a new learning model, allosteric learning model may be used.
- Teacher may include activities in their courses which will arouse the pupils’ problem solving skills.
- Program developers may implicate the real-life problems in the books or workbooks prepared according to the existing curriculum.
- Allosteric learning model can be implemented in other courses and new researches may be conducted.

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