

THE EFFECTS OF MNEMONIC KEY WORD METHOD ON SCIENCE LESSONS: ACCESS AND ATTITUDE OF STUDENTS

Dr. Gngr KESKNKILI
Selcuk University Education Faculty
Konya, TURKEY

Prof. Dr. Ali Murat SNBL
Selcuk University Education Faculty
Konya, TURKEY

ABSTRACT

The aim of this research is to define the affect of Keyword Mnemonics in 6th class Science Lesson on the students' achievements and their attitudes. Treatment started with the application of achievement and attitude pretests for the experiment and control groups. Afterwards, while keyword mnemonics were used for the experiment groups, traditional method was used for the control groups during the courses. At the end of the courses the achievement and attitude post test was applied to each group.

At the end of the research it is seen that the students who were trained by using the key word mnemonics had higher achievements than the ones trained by using the traditional method. A significant difference was not found between the control group and the experiment group in terms of attitude points.

Keywords: Science education, mnemonics, keyword method.

INTRODUCTION

Mnemonic strategies are tools that facilitate learning and remembering a lot of information difficult to remember. In order to make this education permanently memorable, use of strategies that consist of memory supportives in the learning process are suggested (Ormrod, 1990; Fulk 2000; Scruggs ve Mastropieri, 2000). Mastropieri and Scruggs (1998), have stated that techniques like concentration, keeping notes, increasing the significance level, using pictures, preventing mixing, increasing the participation, enabling students to think and comment on the subject, increasing the number of repetition can also be helpful to store the information but they do not particularly aim at students to remember new information that they often fail to remember and learn. In this respect mnemonic strategies can be useful in learning new and unusual information.

Mnemonic strategies first of all provide the placement of the material to be learned into a structure or organization of this material. Secondly, they help the students to develop connection between their former knowledge and the new information they get and the third theme is that they furnish criteria for information storage and retrieval of memory supplements in order to provide necessary clues for students to remember the information later on (Ormrod, 1990). Mnemonic strategies are divided into two parts as visual and verbal. Verbal memory supplements are about adjusting initials and creating rhymes but visual memory supplements are used with visual images like placement method, chaining method, word method of suspension and key word method (Senemođlu, 1997).

Key word method is a mnemonic strategy that operates with using a visual material defining the meaning of the information to be learned and using a word connoting this information.

For example: “Perfumes of the stars are reaching to the ozone layer” can be a tool sentence when working on the plot “stratosphere contains a layer called the ozone layer”. Here the key word is “star” to remember the word stratosphere.

Açıkgöz (1984) states that key word method had been used in foreign vocabulary learning and it was observed that there was a hundred percent increase in remembering the foreign words. In another research of Hogben and Lawson (1998) it was confirmed that the key word method had positive results in short-term and long-term remembrance. Similarly Doğan (1995) validated the significant impacts of the key word method in his research of the utility ratio of this method in simultaneous translation of medicine education. Ellis (1998) used this method in teaching new terms, important names, places and events and determined that the method had positive effects for all students especially the students with learning disability.

Mnemonic strategies had been used in various branches and in teaching disparate information proving their efficacy in the result of many studies. In these studies you can see different usages of different mnemonic techniques (Carlson, Kincaid, Lance and Hodgson,1976; Carlson, Buskist and Martin, 2000; Carney and Levin, 2000; Franke, Levin and Carney 1991; Dretzke and Levin, 1990; Olçum ,2000; Rummel, Levin and Woodward, 2003; Carney and Levin, 2003; Stephens and Dwyer, 1997; Carney, Levin and Stackhouse, 1997; Uberti, Scruggs and Mastropieri 2003).

In science and technology courses generally concepts are abstract so the students encounter lots of new words and have difficulty in understanding the facts. As a result they may have difficulties in remembering this information or mix them. This research in which achievement of the key word method and attitudes in the process of science learning may contribute the teachers to inform the students about the usage of mnemonic strategies and present data for upcoming investigations.

In this case, the aim of this research is to define the affect of Keyword Mnemonics in 6th class Science Lesson on the students' achievements and their attitudes. Hypothesis of the research are as follows:

1. There is considerable difference between the access of information of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
2. There is considerable difference between the access of perception of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
3. There is considerable difference between total access of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
4. There is considerable difference between attitude scores of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.

METHOD

Test pattern

In the research two patterns were used as the initial test and the last test control group. The research was conducted on two groups. The groups were dispatched to the experimental and control groups randomly (equal probability assignment). In the control group the traditional teaching was continued. The experimental group used the key word method in the learning process.

Participants

The experimental group of the research consisted of the students of the 6-G and 6-K classes in Mareşal Mustafa Kemal Primary school in the I. Period of 2004-2005 academic year in Konya province, Selçuklu district. 6-K was the experimental group (n:41) and 6-G was the control group (n:37). Stabilized groups were sent to the

experimental and control groups coincidentally. Diagnosis related to the balance of the groups took place under the contents heading.

Treatment

Treatment started with the application of achievement and attitude pretests to the experiment and control groups. Afterwards, while keyword mnemonics were used for the experiment groups, traditional method was used for the control groups during the courses. At the end of the courses the achievement and attitude post test was applied to each group. Experimental procedure lasted for 6 weeks. Achievement test and attitude scale were applied to the two groups as a final test.

Data collection tools

The data were obtained by using the following tools.

It is science lesson of the sixth grade students and under the topic "a travel to the organism's internal structure", the subjects "Multi-cellular livings different cell groups in the compatible structure for their tasks: The regular structure of tissues and plants formed by cells, tissues and organs", regarding their target and behaviours , were prepared by the researcher in the light of an expert opinion.

60 questions prepared in regard of target and behaviours were applied and tested on the seventh grade students in Ali İhsan Dayıođlugil Primary school which had the same socio-economic status with the school to be the new subject and as a result of this pilot experiment, the reliability of the test was 0,90. At the end of the validity and reliability calculations, a test containing 45 questions was obtained. The 30- item attitude scale for science lessons which was prepared by Baykul (1990), was subjected to a pilot experiment in Ali İhsan Dayıođlugil Primary school. The pilot experiment was made in two classes of the 63 sixth grade students. Some questions were not included to the criterion after the pilot experiment. The 22- item attitude scale was conducted after the pilot experiment was applied to the subject group.

Data Analysis

Arithmetic means and standard deviations were calculated, the t test was used in data analysis. The SPSS 11.0 program was used to analyze the data.

FINDINGS

This section deals with diagnosis and commentaries about the test groups and subjects testing.

Findings on the Subject Groups

Table 1: Comparison of Experimental and Control Groups in Pre-Test Scores

Level of knowledge	n	Mean	Std. Dev.	T	p
Control	37	14,73	7,078	0,018	0,98
Experiment	41	14,76	5,924		
Level of comprehension	n	Mean	Std. Dev.	T	p
Control	37	4,65	2,974	0,407	0,685
Experiment	41	4,39	2,635		
Total	n	Mean	Std. Dev.	T	p
Control	37	19,38	9,745	0,115	0,909
Experiment	41	19,15	8,042		
Attitude	n	Mean	Std. Dev.	T	p
Control	35	86,31	16,803	0,526	0,6
Experiment	35	83,97	20,275		

In Table 1, the level of knowledge, comprehension, total results of the pilot experiment and results of attitude points of the experiment and control groups are seen. In comparison of the pilot experiment points of these two groups, the substantive t method was used. In the pilot experiment level of knowledge the average of the control group was 14,73 +- 7,08; and the average of experiment groups was 14,76+- 5,92. The t value which was calculated on both groups points was 0,018. Regarding this result, there was no substantial difference in the pilot experiment knowledge level ($p>0,05$). In the pilot experiment level of understanding the average of the control group was 4,65+-2,97; the experiment groups average was 4,39+-2,64. The t value which was calculated on both groups points was 0,407. Regarding this result, there was no substantial difference in the pilot experiment level of understanding ($p>0,05$). Depending on the total pilot experiment results of knowledge and understanding levels ,the points of the control group was 19,38+-9,75 and the experiment groups average was 19,15+-8,04. The t value which was calculated on both groups' points was 0,115. Regarding this result, there was no substantial difference in the total pilot experiment level ($p>0,05$).

The average attitude points of the experiment and control groups were 83,97 in the experiment group; 86,31 in the control group. However, the standard deviations were found successively 20,275 and 16,803. The t value which was calculated on both groups' points was 0,526. Regarding this result, there was no substantial difference in the pilot experiment attitude level.

Findings on the research subjects

Findings on the first hypothesis

In science lesson of the sixth grade students, the information about the level of knowledge points of the two groups that used the traditional way of learning and the key word method, are given in the Table 2.

Table 2: Experiment and control groups' scores of knowledge access levels

Students	n	Pretest		Post-test		Achievement		t	p
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		
Control	37	14,73	7,078	22,76	6,639	8,03	4,622	-5,872	0,00
Experiment	41	14,76	5,924	29,56	3,543	14,8	5,478		

In Table 2, a comparison was made between knowledge levels of the control and the experiment group. The control groups' average knowledge level was 8,03 +- 4,622; the experiment groups' average knowledge level was 14,08 +- 5,478. The t test calculated to confirm the difference between the two groups was found -5,87. According to this result there was substantial difference between the knowledge levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher knowledge level than the students in the control group who used the traditional way of learning.

Findings on the second hypothesis

Table 3: Cognition (Understanding) levels of experiment and control groups

Students	n	Pretest		Posttest		Achievement		t	p
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		
Control	37	4,65	2,974	7,38	2,531	2,73	2,893	-3,501	0,001
Experiment	41	4,39	2,635	9,34	1,682	4,95	2,711		

In Table 3, a comparison was made between cognition levels of the control and the experiment group. According to the table, the average cognition point of the control group was 2,73 +- 2,893; the experiment groups' average was 4,95 +- 2,711. The t test calculated to confirm the difference between the two groups was found -3,501. According to this result there was substantial difference between the cognition levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher cognition level than the students in the control group who used the traditional way of learning.

Findings on the third hypothesis

Table 4: The total points of the control and experiment groups

Students	n	Pretest		Posttest		Achievement		t	p
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		
Control	37	19,38	9,745	30,14	8,638	10,76	6,784	-5,529	0,00
Experiment	41	19,15	8,042	38,9	5,019	19,76	7,516		

The control groups' total points were 10,76+-6,784; and the experiment groups' total points were 19,76+-7,516 according to the table 4. The t test calculated to confirm the difference between the two groups was found -5,529. According to this result there was substantial difference between the total levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher level than the students in the control group who used the traditional way of learning.

Findings on the fourth hypothesis

Table 5: The attitude points of the experiment and control groups

Students	n	Pretest		Posttest		Difference		t	p
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		
Control	35	86,31	16,803	90,09	17,231	3,7714	13,89051	-0,701	0,486
Experiment	35	83,97	20,275	90,51	15,625	6,5429	18,81386		

The attitude average points in the final testing of the students were 90,09 for the control group; and 90,51 for the experiment group. The standard deviation of the final test points of the control group and the experiment group was found successively 15,625 and 17,231. The difference between the pilot experiment and the final test average points was 6,5 in the experiment group but 3,77 in the control group. According to the calculated t values, there was not a substantial difference between the two groups' attitude points. The memory supportive strategy applied had not created a substantial difference in attitudes.

DISCUSSION

According to the findings of the research, between accesses of information of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson, a considerable difference has been observed in favor of the group on which mnemonic key word method has been used. Erden and Akman (1996) stated that mnemonic supporters expedite learning of verbal information. Ülgen (1996) also stated that mnemonic supporters may have significant effects on learning concepts. It can be considered that verbal information and concepts that are available in Science lesson content expedite students' recollection and exemplify mental images easily via mnemonic supporter strategies.

According to other findings of the research, in perception and total access levels a considerable difference has been observed in favor of the experimental group. Mastropieri and Scruggs (1998) stated that student success increases in the tests evaluating the success when teaching with mnemonic strategies and they correlated this with their more recollection of necessary information to answer the questions in tests evaluating perception. These detections of Mastropieri and Scruggs can also be considered as substantiations of the research in which key word method is used.

It is determined that there has been no significant difference between experimental and control groups in aspect of attitude scores at the end of the application in research. Changing attitudes of students is a time consuming activity. This activity can be supposed as the reason why the students have not showed difference about their attitudes during the research is being performed.

CONCLUSION

A considerable difference has been observed in aspect of information, perception and total access levels of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson. It can be said that no significant difference has been observed between attitude scores of the groups on which mnemonic key word method and traditional teaching have been used.

Acknowledgement: This article has been presented at the 2nd International Conference on New Trends in Education and their Implications – ICONTE, 27- 29 April 2011, Antalya – TURKEY.

BIODATA AND CONTACT ADDRESSES OF AUTHORS



Güngör KESKİNKILIÇ is Assistant Professor in Educational Curriculum Department in Selcuk University, Konya, TURKEY. She received her Bachelors degree in 2002 at Selcuk University Educational Faculty Science Education department, also received her MS and Doctoral degree at Selcuk University Educational Curriculum and Teaching department. Her research interests are science education, teacher training and curriculum assessment.

Assist. Prof. Dr. Güngör KESKİNKILIÇ
Selçuk Üniversitesi
Eğitim Fakültesi, Meram /Konya
42090/ TÜRKİYE
E. Mail: gkeskinkilic@selcuk.edu.tr



Ali Murat SÜNBÜL is Professor in Educational Curriculum Department in Selcuk University, Konya, TURKEY. He received his Bachelors degree in 2002 at Hacettepe University Educational Faculty Educational Curriculum department, also received his MS and Doctoral degree at Hacettepe University Educational Curriculum and Teaching department. His research interest is curriculum development, teacher training and curriculum assessment.

Prof. Dr. Ali Murat SÜNBÜL
Selçuk Üniversitesi
Eğitim Fak. Meram /Konya
42090/ TÜRKİYE
E. Mail: sunbul@selcuk.edu.tr

REFERENCES

- Açıkgöz, K. Ü. (1984). "Yabancı Dil Sözcüklerinin Öğretilmesinde Bellek Destekleyici Anahtar Sözcük Yönteminin Etkileri", Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü.
- Baykul, Y. (1990). İlkokul Beşinci Sınıftan Lise ve Dengi Okulların Son Sınıflarına Kadar Matematik ve Fen Derslerine Karşı Tutumda Görülen Değişmeler ve Öğrenci Seçme Sınavındaki Başarı ile İlişkili Olduğu Düşünülen Bazı Faktörler. Ankara: ÖSYM
- Carlson, N. R. , Buskist, W. & Martin, G. N. (2000). Psychology: The Science of Behavior- European Adaptation (6. ed.). Great Britain: Pearson Education Limited.
- Carlson, R. F., Kincaid, J. P., Lance, S.,& Hodgson, T. (1976). Spontaneous Use Of Mnemonics And Grade Point Average. The Journal of Psychology, 92, 117-122.
- Carney, R. N., Levin, J. R. (2000). Fading Mnemonic Memories: Here is Looking Anew, Again. Contemporary Educational Psychology 25, 499-508.
- Carney, R. N., Levin, J. R. (2003). Promoting Higher-Order Learning Benefits By Building Lower Order Mnemonic Connections. Applied Cognitive Psychology. 17: 563-575.
- Carney, R. N., Levin, J. R. & Stackhouse T. L. (1997). Brief Research Report: The Face-Name Mnemonic Strategy From a Different Perspective. Contemporary Educational Psychology 22, 399-412.
- Doğan, A. (1995). Simultane Tıp Çevirisi Eğitiminde Bellek Destekleyici Anahtar Sözcük Yönteminin Etkililik Derecesi. Yayınlanmamış Doktora Tezi. Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü.
- Dretzke, B. J., Levin, J. R. (1990). Building Factual Knowledge About the U.S. Presidents via Pictorial Mnemonic Strategies. Contemporary Educational Psychology. Vol 15, Issue 2, 152-169.

- Ellis, E.S. (1998) (Visual And Auditory LINCS to Background Knowledge: A Key for Learning New Terms http://www.ldonline.org/ld_indepth/teaching_techniques/ellis_lincs.pdf)
- Franke, T. M., Levin, J. R., & Carney, R. N. (1991). Mnemonic Arwork-Learning Strategies: Helping Students Remember More Than "Who Painted What?". Contemporary Educational Psychology. Vol 16, issue 4, 375-390.
- Fulk, B. (2000). Make Instruction More Memorable. Intervention in School and Clinic, Vol 35, no 3, 183-184.
- Hogben, D., Lawson, M. J. (1998). Learning and Recall of Foreign Language Vocabulary: Effects of a Keyword Strategy for Immediate and Delayed Recall. Learning and Instruction, vol 8, no 22, 179-194
- Mastropieri, M. A. & Scruggs, T. E. (1998). Enhancing School Success with Mnemonic Strategies. Intervention in School and Clinic, March. http://www.ldonline.org/ld_indepth/teaching_techniques/mnemonic_strategies.html
- Olçum, Y. (2000). İlköğretim 4. Sınıf Sosyal Bilgiler Dersinde Bellek Destekleyicilerin Erişi ve Kalıcılığa Etkisi. Yayınlanmamış Doktora Tezi. Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü.
- Ormrod, J. E. (1990). Human Learning(2. ed.). New Jersey: Prentice Hall.
- Rummel, N., Levin, J. R. & Woodward, M. M. (2003). Do Pictorial Mnemonic Text-Learning Aids Give Students Something Worth Writing About? Journal of Educational Psychology. v 95, i 2, p 327.
- Scruggs, T. E. & Mastropieri, M. A. (2000) The Effectiveness of Mnemonic Instruction for Students with Learning and Behavior Problems: An Update and Research Synthesis. Journal of Behavioral Education, vol. 10, Nos.2/3, 163-173.
- Senemoğlu, N. (1997). Gelişim Öğrenme ve Öğretim: Kuramdan Uygulamaya. Ankara: Spot Matbaacılık.
- Stephens, J. A. H., Dwyer, F. M. (1997). Effect Of Varied Mnemonic Strategies In Facilitating Student Achievement of Different Educational Objectives. International Journal of Instructional Media, 24, 1; Proquest Educational Journals pg.75.
- Uberti, H. Z., Scruggs, T. E & Mastropieri, M. A. (2003). Keywords Make the Difference: Mnemonic Instruction in inclusive Classrooms. TEACHING Exceptional Children, Vol. 35, No.3, 56-61.