

Effect of the Computer-Based Concept Maps on Comprehension of the Listened Text and Retention

Abdullah ŞAHİN^{1*}, Gülnur AYDIN¹ & Esin ŞAHİN¹

¹Atatürk University, Kâzım Karabekir Education Faculty, Turkish Education Department, Erzurum, Türkiye
*E-mail: abdsahin25@atauni.edu.tr

Abstract: *In this study it is attempted to determine the effect of the computer-based concept maps of comprehending and remembering the listened text. With 20 and 19 students respectively, 6A and 6D classes were studied in 2007-2008 education year in Turkey, at Turgut Özal Primary School, Erzurum. Students were divided into two groups as experimental group and control group according to the previous year's native language course notes and the results of the listening evaluation forms. Course process of four hours realized with computer-based concept map method in experimental group and with traditional method in the control group. Listening tests were implemented to both group following the course process and retention tests were implemented to both group four weeks after the courses. Results showed that experimental group, in which the text was listened with the support of the computer-based concept maps, was more successful than the control group in both listening and retention tests.*

Keywords: *education, computer-based concept maps, concept maps, native language course, listening skills, development*

INTRODUCTION

As a system, Language that individual gains by birth and gradually improves by the time, sets forth the most important aspect of human life. The development of language is related to the development process of the conceptualization of symbols and meanings "Language projects individual's speciality to integrate intellectual data in order to form meaningful composites" (Alpöge, 1991; 10). In other words, how the individual designs his/her emotions and thoughts, when expressing them, is a significant aspect of the language development. Individuals need to share their emotions and knowledge with each other. Language is the main component of the sharing process for reaching out to the other person as well. There is a need to fully and correctly comprehend the passed information in order to realize the sharing process. Listening skill, founded in pre-birth phase, is enabled at this point; and the development of this skill is the most crucial among others. The most widely used skill is the listening skill in both social and educational life. This skill in which the development of the skill is the pre-condition for native language courses since it is frequently used in every media, is defined as "comprehending, interpreting, evaluating and organizing the introduced thoughts in conservation, defining the relations among them, and choosing and separating the ones that we find worthy of keeping in our memory" (Taşer, 1996; 214). Listening is the active phase of perception, reminiscence, evaluation, and answering (DeVito, 1995). One method that is used for implementing this process in an effective way is the use of concept maps. Concept maps have a significant effect for conceptualizing the listened words, visualizing them in the mind, and composing a meaningful whole out of them.

Only two dimensioned visual organizations make it possible for the information to be perceived easily integrating with schemes whereas gaining and implementing this information for achieving a deeper learning (Reif and Heller, 1982, 102-127). Concept maps consist of graphically presenting the thoughts in two dimensioned visuals; when visualization from central concepts to sub concepts is realized, and then the system of thoughts outlines a hierarchic construction. Additionally, concept maps also define the relations between the sub-thoughts located below the main thought (Deshler, 1990, 34-41; Buzan, 1993, 19).

Novak and Gowin (1984) argue that all activities in classes should be organized and implemented so that students should not learn by reciting but by individual invention. Likewise, Cleminson (1990; 429-445)

emphasizes that “learning should not be viewed for big and passive student groups but should be an active implementation for producing and constructing the concepts, where students do work, from the works studies about conceptual learning.

Concept maps are directly related to the constructivist native language education in respect to students’ active role in learning. Student would pass the intended message through mental construction process; and therefore the quality and retention of the education would significantly increase. “Concept maps are an educational strategy for helping a better comprehending the subjects, integration of the old information with the new ones, improving the conceptual perception level of the students, and increasing their success” (Heinze, Fry & Novak, 1990). This study was schemed with the belief that this educational strategy should be exploited for comprehending and remembering the listened expressions

This study was conducted with the aim of determining how much the use of concept maps for development of listening/watching skills, in native language education of the 6th grade students, which affects the academic success. Experimental and control groups were formed to measure the success and retention level and to make a comparison with the traditional method; it has been tried to find out whether a difference, in relation to academic success and retention levels, between lessons conducted with concept maps and tradition method exists in this study.

METHOD OF STUDY

Control grouped empirical research pattern, in which the results of the Native Language Grade Means and Listening Evaluation Forms were used and Listening-Retention Tests were applied, was used for this study. Listening text was realized with traditional method in the control groups whereas computer-based concept map method was used in the experimental group. It has been proved by the empirical studies that concept map method, which is developed by Novak (2003), supports both meaningful comprehending and learning. The effect of the computer-based concept maps, however, was tried to be detected with this study. Listening tests, which measure how much they understood what they listened, were applied to experimental and control groups immediately after the lesson. Furthermore, the same test, as a retention test, was applied to the students during four weeks after the research to measure the success of retention.

The study group of the study consists of the students studying in the 6/A and 6/D classes at Turgut Özal Primary School, Erzurum Province, Turkey. 6/A class, with 20 students, was chosen as the experimental group while 6/D class consisting of 19 students was determined as the control group. Native language grade means belonging to the previous year and results of the listening evaluation forms were used for leveling the students since students would not able to answer the pre-test without listening to the text first. Students in experimental and control groups were leveled according to the native language grade means belonging to the previous year and results of the listening evaluation forms (Table 1).

Table 1. Leveling the Experimental and Control Groups according to Native Language Grade Means and Listening Evaluation Forms

	Groups	N	Arithmetic Mean	Standard Deviation	U	p
Grade Means	Experimental	20	69,82	11,00	136,500	,132
	Control	19	66,18	12,29		
Listening Evaluation Form	Experimental	20	3,37	0,48	161,000	,415
	Control	19	2,96	0,82		

The difference between grade means and listening evaluation forms of the experimental and control groups are seen to be negligible with a $p > 0.05$ value when Table 1 is analyzed. These findings show that there was no real difference between experimental and control groups.

Mandatory primary education in Turkey lasts for 8 years. The lessons have been studied with a constructivist approach in 6th and 7th grades since 2005. With the recent changes, Turkish lessons do not just consist of listening, speaking, reading, writing, and grammar but also includes other intellectual activities such as visual reading, visual presentation, textuality, arrangement, classification, inquiry, criticism, analysis-synthesis,

interrelations, and evaluation. Listening texts have been provided to teachers in the CD media as well as Teacher Guideline Books within this approach. Teachers have been playing the audio files in these CDs, in which no visual elements are contained, for the students to listen. CDs are not obtained by students and only texts are contained in their course books. Students have been included in various activities for comprehending the text after listening to it; also attending conversation, writing, and grammar activities derived from the text. Listening text has been conducted by the teacher in control groups, in which the traditional method is implemented, with the above mentioned approach. On the other hand, the text has been listened by computer-based concept map method to comprehend the text which has been implemented for limited time of four hours

Data Acquisition

Grade means of native language lessons belonging to 6/A and 6/D classes were gathered from the school management before initiating the research. The teacher of the lesson was then asked to fill out the Listening Evaluation Forms, which is prepared according to the students' gain, for each student using his/her one year's observations. In this form, 22 entries were listed for measuring the performances of the students such as "He/she defines words and word groups according to what is listened. He/she states the relationship between the title and context of the listened text. He/she specifies the subject of what is listened." Consequently, the teacher was ensured to determine the listening skills of the students who are in the process of education, for one year. Native language grade means and points of Listening Evaluation Forms were used for equaling the experimental and control groups.

The text titled "Children are Scientists by Birth" was studied in the experimental group with computer-based concept maps while traditional methods were used in the control group. The text which is used for both experimental and control groups was taken from the CD contained in Teacher Guideline Books provided by the publishing house (Öğretmen Kılavuz Kitabı, 2007). Therefore both groups listened the same vocalizing person. The difference in the experimental group was that the same text was listened with additional use of concept maps.

Listening tests, containing 10 multiple choice questions, were then applied after the study of the text. The same test was applied to both groups after 4 weeks as a retention test. The test was created in accordance with the target behaviors mentioned in the 6th grade native language course book appearance validity as ensured by asking the specialists about the created questions and content validity as secured by using signal tables. Multiple choice questions with 4 alternatives were created since the implementation was conducted on second phase students. Inner consistency of the listening tests was found to be high, with 0.83 Cronbach Alfa Coefficient, according to the analyses. The number of correct answers that the students give in listening test was taken as the success point. One of the questions asked in the test is given as an example below:

According to the text, which one of the below is the qualities of the children that our society and world need?

- A) Almost everyday watches TV and Access internet.
- B) Makes experimentals in order to reach the knowledge
- C) They are industrious as they work continuously.
- D) They are unwilling to ask questions to elders.

Concept maps, prepared as ppt file and consisting of 24 pages, was monitored in synch with the listening of the text. The text used was titled "Children are Scientists by Birth" that is listened in the schools when the theme Science and Technology is studied. The last page of the monitored concept map is given in the figure below:



Figure 1. The Last Page of the Concept Map Created for the Listening Text

Concepts maps contained keywords derived from the context of the listening text as well as few visuals, as can be seen in Figure 1. The students watched the concept map that is encountered with the read text and tried to trace the map in their conscious as a schema.

ANALYSIS OF THE FINDINGS

Mann-Whitney U Test was used for analyzing the data acquired in the research. These analyses were conducted by SPSS for Windows 12.00 statistical computer program.

Findings and Interpretation

Mann-Whitney U Test was used after the implementation to determine whether a difference exists between listening successes of the students in experimental and control groups. Arithmetic means of the listening and evaluation successes and standard deviation values of the students in experimental and control groups are given in Table 2; and the results of the Mann-Whitney U Test can be seen in Table 3.

Table 2. Arithmetic Means and Standard Deviation Values of Listening Test Belonging to Experimental and Control Groups

LAST TESTS	Groups	N	Arithmetic Mean	Standard Deviation
Listening Test	Experimental	20	8,05	1,67
	Control	19	6,42	2,12

Table 3. Mann-Whitney U Test Values of Listening Test Belonging to Experimental and Control Groups

	Groups	N	Mean Rank	Sum of Ranks	U	P
Listening Test	Experimental	20	24,90	498,00	92,000	,005
	Control	19	14,84	282,00		

The differences between the listening test successes of experimental and control groups after the implementations were found to be significant in the level of $p < 0.005$ as can be seen in Table 3. Means of points, measuring the experimental group's listening success, are seen to be more than the control group's means when Table 2 is examined. These findings showed that Computer-Based Concept Maps education method

implemented to the experimental group is more effective for comprehending the listened text than the traditional education method.

Listening tests were once more implemented to experimental and control groups four weeks after in order to determine retention levels of the text. Mann-Whitney U Test was then conducted to determine whether a difference exists in retention levels of the students listening between experimental and control groups. Arithmetic means of listening retention test's success points and standard deviation values can be seen in Table 4; and Mann-Whitney Test results can be seen in Table 5. The tests were both conducted four weeks after the implementations on experimental and control groups.

Table 4. Arithmetic Mean and Standard Deviation Values of Retention Tests Belonging to Experimental and Control Groups

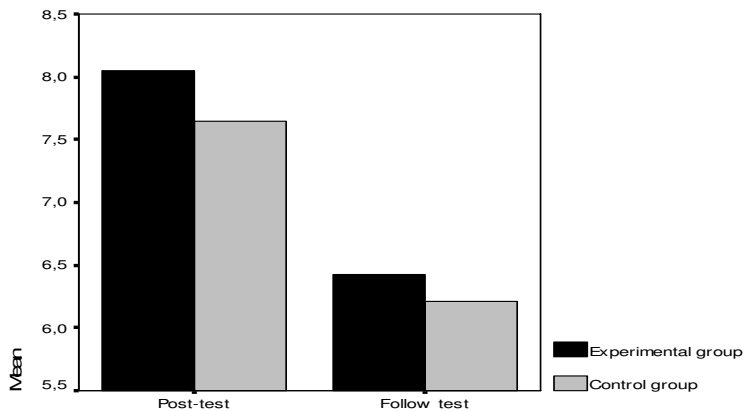
Retention Test	Groups	N	Arithmetic	
			Mean	Standard Deviation
	Experimental	20	7,65	1,27
	Control	19	6,21	1,78

Table 5. Mann-Whitney U Test Values of Listening-Retention Test Belonging to Experimental and Control Groups

Retention Test	Groups	N	Mean Rank	Sum of Ranks	U	P
	Control	19	15,76	299,50		

The differences between the retention test successes of experimental and control groups after the implementations were found to be significant in the level of $p < 0.005$ as can be seen in Table 5. Means of points, measuring the experimental group's listening success, are observed to be more than the control group's means when Table 4 is examined. These findings showed that Computer-Based Concept Maps education method implemented to the experimental group is more effective for remembering the listened text than the traditional education method.

The results showing the difference between experimental and control groups can be seen Graphic 1.



Graphic 1. Results Showing the Difference between Experimental and Control Group

DISCUSSION

There was a meaningful difference, in advantage of experimental group, regarding the listening-retention test points between experimental group students, lectured using of computer-based maps, and control group students, lectured using traditional education method, about the development of listening skills in this study. These results show that listening text with the accompaniment of computer-based concept maps enables comprehension easier and more concrete than traditional education method. "Effects of computer-based concept maps on student success in science education" was examined in an empirical study conducted by Aykanat et al. (2005); and there was also a meaningful difference regarding final test points between experimental and control groups within this study. Moreover, Simone et al. (2001) stated that using technology with concept maps supported and increased the development of the students in their research.

Concept maps, which show the relations between keywords of the listened text and form a visual presentation, have significance in shaping the cognitive structure and generating meaningful learning. This method, recurrently useable for every branch of education, is effective for developing the listening skills in native language lessons.

The students' attempt for giving their attention and determining the keywords while listening without using visual elements might cause them to miss the textual flow. The method of computer-based concept maps, however, increases the student success and remembrance by the help of its properties such as achieving attention and concretization of the information with visual aid, and having more enjoyable courses. Additionally, Altıntaş and Altıntaş (2008), in their empirical study using control groups titled "Effect of the use of concept maps in primary education 5th grade social information courses on the academic success of students", concluded that lessons conducted by using concept maps increase the success, by determining the ways of organizing the meanings, and also raise the efficiency. All, Huycke and Fisher (2003), on the other hand, state that schematization, encoding and visual presentation of information in concept map strengthens the intellect in their research.

CONCLUSION

Listening is emphasized to be one of the most neglected skills although it forms a foundation for other language skills and teachers spend most of their times in class reading, writing, and grammar education. Moreover, it is expressed that practice is needed for developing the listening skill, just like other skills, in researches concerning listening skills (Akyol, 2006; 1; Özbay 2005; 13). The frequent use of computer-based concept map method in listening education would be beneficial since the method validates the students to construct what they have learned besides significantly increasing retention.

REFERENCES

- Akyol, H., (2006). Yeni Programa Uygun Türkçe Öğretim Yöntemleri. Ankara: Kök Yayıncılık.
- All A, Huycke, L, Fisher M (2003). Instructional Tools for Nursing Education: Concept Maps: Nursing Education Perspectives, 24 (6): 311-316.
- Alpöge, G. (1991). Çocuk ve Dil, Yapı Kredi Yayınları, İstanbul.
- Altıntaş, G. and Altıntaş, U., (2008). İlköğretim 5. Sınıf Sosyal Bilgiler Dersinde Kavram Haritası Kullanımının Öğrenci Akademik Başarısı Üzerindeki Etkisi, Kastamonu Eğitim Dergisi, vol.16, no.1, pp. 391-400.
- Aykanat, F., Doğru, M., Kalender, S., (2005). Bilgisayar Destekli Kavram Haritaları Yöntemiyle Fen Öğretiminin Öğrenci Başarısına Etkisi, Kastamonu Eğitim Dergisi, vol. 13, no. 2, pp. 391-400.
- Buzan, T. (1993). The Mind Map Book, BBC Books London.
- Cleminson, A. (1990). Establishing and epistemological base for science teaching in the light of contemporary notions of the nature of science and of how children learn science. Journal of Research in Science Teaching, Vol. 27, no.5, pp.429-445.
- Deshler, D. (1990). "Conceptual Mapping: Drawing Charts of Mind in" Fostering Critical Reflection in Adult, ed. J.Mezirow, Jossey-Bass, San Francisco pp. 34-41.
- Devito, J. A. (1995). The Interpersonal Communication Book. New York. NY: Harper Collins College Publishers.
- Heinze-Fry, J. and Novak, J. (1990). Concept Mapping Brings Long-Term Movement Towards Meaningful Learning, Science Education, 74, 461-472.
- Novak, J. (2003). Teaching and Learning, Cell Biology Education, 2:122-132.
- Novak, J.D. and Gowin, D. B. (1984). Learning How to Learn. New York: Cambridge University Press, USA.

İlköğretim Türkçe 6. Sınıf Türkçe Öğretmen Kılavuz Kitabı ve Dinleme CD'si, Koza Yayın Dağıtım A.Ş., Ankara 2007.

Özbay, M., (2005). Bir Dil Becerisi Olarak Dinleme Eğitimi. Ankara: Akçağ Yayınları.

Reif, F. and Heller, J.I. (1982). "Knowledge Structure and Problem Solving in Physics", Educational Psychology, (17):102-127.

Simone, C., Schmid, R., McEven, L. (2001). Supporting The Learning Process With Collaborative Concept Mapping Using Computer-Based Communication Tools And Process, Educational Research and Evaluation, 2-3: 263-283.

Taşer, S. (1996). Konuşma Eğitimi, Papirus Yayınları, İstanbul.

APPENDIX

Translation of Figure 1

Çocuklar Doğuştan Bilim Adamıdır: Children are Scientists by Birth

Ay: Moon

Çimen: Meadow

Düş: Dream

Ayak: Foot

Sorular: Questions

Yetişkinler: Adults

Cevapsız: No Answer

Çocuklar: Children

Ansiklopedi: Encyclopaedia

Kitap: Book

Merak: Curiosity

Yanıt Bulma Zevki: the Pleasure of Finding Answers

Soru Sormak: Asking Questions

Akıl: Intellect

Güler mi?: Laughing?

Deneyler: Experiments

Denemeler: Try-outs

Öğrenmek: Learning

Bilim Adamları: Scientists

Çevreye Dikkat: Attention to Environment

Engeli Aşmak: Overruling Obstructions

Toplumumuz: Our Society

Dünyamız: Our World

Değerlisiniz: You are valuable