The effectiveness of computers on vocabulary learning among preschool children: A semiotic approach

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Abstract

Semiotics has recently achieved some prominence as a theoretical foundation for foreign language learning/teaching. Though there have been a number of research on the semiotics in foreign language learning, the practical use of semiotics in preschool classroom environment still remains unanswered. What is more, the effectiveness of computers on vocabulary learning among preschool children is still an obscure area, which attracts the attentions of researchers, scholars and practitioners. Thus, the study aims to investigate if there is any significant difference in preschool children's vocabulary gain depending upon the computer assisted vocabulary instruction or the traditional vocabulary instruction both adopting a semiotic approach. The sample group of the study included 35 preschool children (5-years) who are enrolled in Balıkesir University Necatibey Faculty of Education Kindergarten. In this quasi-experimental study, the children were assigned to computer assisted vocabulary instruction group (16) or traditional vocabulary instruction group (19), the experimental and control groups respectively. Before the experiment, the children were given a pre-test, which measured the target vocabulary the children had already known. While the experimental group learned the target vocabulary through computer-assisted instruction, the control group was given the same words via traditional vocabulary instruction. Following the experiment, the same test was given to the children as the post-test. The findings of the present study indictated that both instruction types were effective in teaching vocabulary and that no significant difference was found between the groups regarding their vocabulary knowledge.

Keywords: Vocabulary learning, semiotic approach, computer assisted vocabulary instruction, preschool children, foreign language learning.

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1. Introduction

Semiotics, which includes the study of signs and sign processes called semiosis, has recently gained a profound importance as it holds a multi-disciplinary and inter-disciplinary nature in a variety of disciplines. The practical use of semiotic theories to education, particularly to foreign language learning, which has paved the way for the development of a completely innovative and contemporary discipline called educational semiotics, has also been at the very focus of many researchers. Emerged in the nineteenth century with the studies of two distinguishing scholars Ferdinand de Saussure and Charles Sanders Peirce, semiotics, or the study of semiosis, is concerned with 'the ways we represent our world to ourselves and to others' (Bopry, 2002). Explicitly, to Saussure (1916) language consists of words or lexemes, which are symbols, not indexes or icons. Correspondingly, semiotics is the study of signs where a sign is defined as anything that has meaning to somebody in some respect for Pierce (1948). More specifically, semiotics can be defined as the discipline that helps in studying signs, culture and meaning. Semiotic issues concerning the employment of meaningful sign systems have interested many researchers and theorists committed to young children as meaning makers (Halliday, 1978; Wells, 1993). In the earlier stages of language learning, the most important materials may conceivably be pictures for the young language learners since a picture represents a wide variety of meaning by the use of signs. According to semiotics, the picture is considered either as a material, or a conveyor or an agent of meaning about any issue in focus as it is commonly 'based on logic, from an understanding of social dynamics on the conventional and personal level and from an understanding of emotional aesthetics' (Malmstrom, 2011).

Related literature indicates that there have been some studies conducted at preschool level to support children's vocabulary learning in their foreign language learning. To begin with, Collins (2010) investigated the effects of detailed description and elucidation; elementary level vocabulary gain; and home reading practices on preschoolers in order to find out whether storybook reading is effective in their sophisticated vocabulary learning. It was found that richly explained texts and initial L2 vocabulary, along with repetitive home reading activities significantly contribute to advanced-word-learning through stories. In another study (Silverman & Hines, 2009), traditional and multimedia-enhanced read-aloud vocabulary instructions were compared in terms of their effects on vocabulary gain of English-language learners (ELLs) and non-English-language learners (non-ELLs). The results of the study showed that there was a positive effect for ELLs on a researcher-designed measure and on a measure of general vocabulary knowledge. In contrast, the result revealed that the multimedia-enhanced instruction did not provide considerable benefit for non-ELLs. In another study (Gonzalez et al., 2011), trained preschool teachers implemented an intervention that included teaching new vocabulary through pictures, definitions, and discussion of target words. The results demonstrated that children in the intervention group scored higher than the children in the control group not only on measures of expressive and receptive vocabulary but also on a standardized measure of receptive vocabulary. A recent study (Silverman et al., 2013) carried out with 264 children, attempted at comparing the effect of reading aloud activities on preschool children's vocabulary gain by the implementation of two activities; read aloud plus extension intervention and read aloud only intervention. The findings indicated that the effects of the reading aloud plus extension intervention were more significant than those of the reading aloud only intervention in terms of target vocabulary learning. However, it was also concluded that none of the intervention, whether be it 'plus intervention' or 'only intervention', had an effect on general word knowledge. In another study (Coyne et al., 2009), embedded instruction, in which target words were introduced solely within the read aloud experience, was compared to extended instruction, in which words were taught during read aloud and children had a chance to interact with target words outside of the context of the story. The results revealed that learning the words through extended instruction was more effective than learning via embedded instruction, which resulted in only partial word knowledge. It was also found that while extended instruction may promote deeper learning, it is not as efficient as embedded instruction alone. The study of Aghlara & Tamjid (2011), which was conducted to find the effect of using a digital computer game on preschoolers' vocabulary gain, concluded that the children in the experimental group outperformed those in the control group, highlighting the remarkable

positive effects of using digital computer games. Lastly, Segers & Verhoeven (2003) examined if vocabulary training through computer has any impact on preschoolers' vocabulary knowledge. The result of the study suggested that computer training had positive effects on preschool children's vocabulary learning.

Although previous studies on vocabulary learning of preschool children seem to be sufficient in number, it is evident that there is a lack of research on preschool children's vocabulary learning through computers in English as a Foreign Language (EFL). Computer Assisted Vocabulary Instruction (CAVI), one of the most common applications of Computer Assisted Language Learning, involves the use of computers with the aim of vocabulary learning and instruction (Basoz & Cubukcu, 2014). Vocabulary learning and teaching through the use of computers have been an innovative issue in the context of language teaching since the early history of Computer Assisted Language Learning which is defined as 'the search for and study of applications on the computer in language teaching and learning' (Levy, 1997: 1). Although there is much research on the effects of computers on foreign language vocabulary learning (Boling et al., 2002; Tozcu & Coady, 2004; Nakata, 2008; Kılıckaya & Krajka, 2010; Lin et al., 2011; Oberg, 2011; Kayaoğlu et al., 2011; Gorjian et al., 2011; Fehr et al., 2012; Chiu, 2013), the research on the effects of computers on preschool children's vocabulary gain is very limited (Segers & Verhoeven, 2003). Another limitation is that there is no research on teaching vocabulary through semiosis in EFL preschool context. Thus, this study will contribute to the related literature with respect to the effectiveness of computers on preschool children's foreign language vocabulary learning through semiosis and will serve to fill a gap in the literature. With these concerns in mind, the present study aims to explore the effectiveness of computers on preschool children's vocabulary learning. The study attempts to compare the effectiveness of computer assisted vocabulary instruction with traditional vocabulary instruction both adopting a semiotic approach. Depending on these concerns, the study has three research questions: Does the use of computers have an impact on preschool children's vocabulary gain? Does traditional vocabulary instruction have an impact on preschool children's vocabulary gain? Does the computer assisted instruction group learn more vocabulary than the traditional instruction group?

2. Method

In this quasi-experimental study, the pre-and post-test results of the two groups were compared to each other to find out if there are any significant differences between groups. The present study was conducted with the participation of 35 preschool children (5-years) enrolled in Balıkesir University Necatibey Faculty of Education Kindergarten in the academic year of 2014-2015. The children were randomly assigned to either Computer Assisted Vocabulary Instruction (CAVI) group or Traditional Vocabulary Instruction (TVI) group. There were 10 boys and 6 girls in the CAVI group whereas the TVI group consisted of 10 boys and 9 girls.

Table 1. The distribution of the participants

Groups	Type of Instruction	Number	Girl	Boy
Experiment	CAVI	16	6	10
Control	TVI	19	9	10

Necessary permissions were granted from the Ministry of National Education for the experiment. Before the experiment, the children were given a pre-test. They were randomly assigned to one of the groups; Computer Assisted Vocabulary Instruction (experimental group) or Traditional Vocabulary Instruction (control group). The data were obtained from a vocabulary test developed by the researcher. The vocabulary test included the pictures of 20 target vocabulary. Following the pre-test, the two groups were taught the target vocabulary (cat, dog, chicken, bird, sheep, cow, monkey, horse, lemon, carrot, bear, potato, tomato, orange, banana, apple, mouse, fish, to dance, to run) by the researcher. Both groups studied the same words but with different types of instruction as indicated in Table 1. In the traditional vocabulary

instruction group, the researcher's display of verbal and visual cues provided semiosis for the children whereas the computer itself was the source of semiosis in the Computer Assisted Vocabulary Instruction group. The experiment took four weeks for both groups. Both groups were given the post-test immediately after the experiment (See Table 2).

Table 2. Timetable of the experiment

	Pre-test	Experiment	Post-test
CAVI Group	1st week	4 weeks	5th week
TVI Group	1st week	4 weeks	5th week

The data were analyzed descriptively using the SPSS 21 Software. After the scores of pre- and post-tests were compared for each group through paired-sample t-test, the results of post-tests for both groups were compared through independent-samples t-test.

3. Results and Discussion

Before running t-tests, normality of variances assumptions of t-test was conducted through Kolmogorov Smirnov Test (p>.05). The significance value of .064 indicated that the data were normally distributed suggesting that parametric tests can be conducted for data analysis. This section presents the research questions and attempts to answer them in relevance to the collected data. Each research question is introduced separately in conjunction with the relevant data and findings.

3.1. Research Question 1: Does the use of computers have an impact on preschool children's vocabulary gain?

In the table below, the results of the pre-test for both Computer Assisted Vocabulary Instruction and Traditional Vocabulary Instruction groups are presented. The mean score of the pre-test for the experimental group is .31 whereas the control group's mean score of the pre-test is computed as .36. The mean scores of both groups demonstrated that the groups were similar concerning their target vocabulary knowledge levels before the experiment.

Table 3. The pre-test scores of the two groups

Tests	N	Mean	SD	MD	t	Df	Sig.
CAVI	16	.31	.70	-.055	-.619	33	.853
TVI	19	.36	1.01				

The pre-test scores of the two groups were compared through the use of an independent-samples t-test. The result suggested that there was no significant difference between the CAVI group's (M = .31, SD = .70) and the TVI group's (M = .36, SD = 1.01), t(33) = -.619, p = .853, d = .01 pre-test scores with a small effect size. Thus, both groups were similar regarding their target vocabulary knowledge levels before the experiment, which indicated a reasonable homogeneity of the two groups.

The pre-test was administered as the post-test to the same groups after the vocabulary teaching process. The aim was to make a comparison between the two groups' improvement in their vocabulary knowledge. A paired-samples t-test was performed to compare the pre-test and post-test results of the groups. The findings concerning the experimental group are statistically displayed in the following table:

Table 4. The pre-test scores of the CAVI group

Tests	N	Mean	SD	MD	t	df	Sig.
Pre-test	16	.31	.70	-1.30	-13.57	15	.000
Post-test	16	13.31	4.28				

The pre- and post-test scores of the CAVI group were compared through a paired-samples t-test so as to identify if there is any significant difference within groups. A statistically significant difference was found between the group's pre-test (M= .31, SD= .70) and post-test scores (M=13.31, SD= 4.28), t (15)= -13.57, p< .05 (two-tailed). The eta squared statistic (.09) indicated a large effect size. In other words, the mean scores of both groups revealed that the vocabulary knowledge of the two groups increased after the experiment.

3.2. Research Question 2: Does traditional vocabulary instruction have an impact on preschool children's vocabulary gain?

So as to find out whether the traditional vocabulary instruction (TVI) had any significant impact on preschool children's vocabulary gain, a paired-samples t-test was conducted to compare the pre- and post-test scores of the control group (see Table 5).

Table 5. The pre- and post-test scores of the TVI group

Tests	N	Mean	SD	MD	t	df	Sig.
Pre-test	19	.36	1.01	-1.44	-15.48	18	.000
Post-test	19	14.78	4.31				

The result of the paired-samples t-test demonstrated that there was a statistically significant difference between the group's pre-test (M= .36, SD= 1.01) and post-test scores (M=14.78, SD= 4.31), t (18)= -15.48, p< .05 (two-tailed). The eta squared statistic (.09) showed a large effect size. Thus, the traditional vocabulary instruction had a significant effect on preschoolers' vocabulary gain.

3.3. Research Question 3: Does the computer assisted instruction group learn more vocabulary than the traditional instruction group?

Table 6 illustrates the findings of post-test for both groups. The mean score for the CAVI group (13.31) is almost the same as that for the TVI group (14.78). An independent-samples t-test was carried out to compare the post-test scores of the experimental and control groups. The result signified that there was no significant difference between the CAVI group's (M = 13.31, SD = 4.28) and the TVI group's (M = 14.78, SD = 4.31), t(33) = -1.012, p = .319, d = .02 post-test scores with a small effect size.

Table 6. The post-test results of the CAVI and TVI groups

Tests	N	Mean	SD	MD	t	df	Sig.
CAVI	16	13.31	4.28	-1.476	-1.012	33	.319
TVI	19	14.78	4.31				

According to the results, both groups were similar pertaining to their target vocabulary knowledge levels after the experiment. Hence, both traditional vocabulary instruction and computer assisted vocabulary instruction were effective in teaching vocabulary although they did not differ significantly in their effects on preschoolers' vocabulary knowledge.

4. Conclusions and Recommendations

In the present study, it was found that there was an increase in the mean scores of the both instruction groups when they were examined within themselves. The relationships between words and images were generally well defined by both of the groups. In other words, the

children in each group were adept at differentiating the words and the signs cognitively. It can be concluded that learning may undoubtedly occur regardless of the instruction type (Gagne et al., 2005). The study also revealed that the two groups did not differ in their vocabulary gain although they received different types of instruction. That is to say, both computer assisted instruction and traditional instruction were found effective in teaching vocabulary and there was no significant difference between their effects on the preschool children's vocabulary gain. In contrast to common belief, the findings of the study emphasized that CAVI may not always provide children with superior involvement in vocabulary learning. The teacher is also an indispensable factor in learning vocabulary and computers cannot substitute for teachers. Thus, the findings of the study contradict the earlier research (Segers & Verhoeven, 2003; Aghlara & Tamjid, 2011).

In the light of the results, a number of practical suggestions for language teaching can be presented. The most crucial one is that the use of computers may be a valuable aid to preschoolers' foreign language vocabulary learning. It provides encouraging contexts for learning a foreign language, making the learning environment more motivating for preschool children (Iacop, 2009). This study also proved that the computer assisted instruction had a promoting effect on preschoolers' vocabulary knowledge. Therefore, it would be reasonable for language teachers to employ computers to enhance preschool children's vocabulary knowledge. However, the most fundamental factor in the efficiency of the computer assisted vocabulary instruction is the teacher's ability to control the equilibrium in the child-computer interaction (Iacop, 2009). In the study, it was also found that both computer assisted and traditional instruction positively affected the preschool children's vocabulary gain. Thus, teachers can be recommended to notice that teaching vocabulary in a foreign language incorporates many different types of methods. Consequently, they should adopt an eclectic approach to teaching vocabulary with a combination of diverse instruction types.

Some limitations of the study should be mentioned. The subjects of the study were confined to 35 preschool children (5-years) enrolled in Balıkesir University Necatibey Faculty of Education Kindergarten in the academic year of 2014-2015. Further research may probe the effects of other types of instruction or focus on the attitudes of preschool children towards foreign language vocabulary learning.

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References

Aghlara, L., & Tamjid, N.H. (2011). The effect of digital games on Iranian children's vocabulary retention in foreign language acquisition. *Procedia-Social and Behavioral Sciences*, *29*, 552-560.

Basoz, T., & Cubukcu, F. (2014). The effectiveness of computer assisted instruction on vocabulary achievement. *Mevlana International Journal of Education*, *4*(1), 44-52.

Boling, C., Martin, S.H., & Martin, M.A. (2002). The effects of computer-assisted instruction on first grade students' vocabulary development. *Reading Improvement*, *39*(2), 79-89.

Bopry, J. (2002). Semiotics, Epistemology, and Inquiry. *Teaching & Learning, 17*(1), 5-18.

Chiu, Y.H. (2013). Computer-assisted second language vocabulary instruction: A meta-analysis. *British Journal of Educational Technology*, *44*(2), E52-E56.

Collins, M.F. (2010). ELL preschoolers' English vocabulary acquisition from storybook reading. *Early Childhood Research Quarterly, 25*, 84-97.

Coyne, Michael D., McCoach, D., Betsy, L.S., Zipoli, R. Jr., Kapp, S. (2009). Direct vocabulary instruction in kindergarten: Teaching for breadth versus depth. *Elementary School Journal*, *110*(1) 1-18.

De Saussure, F. (1916). *Cours de linguistique générale.* Paris: Payot.

Basoz, T. & Can, T., D. (2016). The effectiveness of computers on vocabulary learning among preschool children: A semiotic approach *Cypriot Journal of Educational Science. 11*(1), 02-08.

Fachinger, J. (2006). Behavior of HTR fuel elements in aquatic phases of repository host rock formations. *Nuclear Engineering & Design,* 236, 54.

Fehr, C.N., Davison, M.L., Graves, M.F., Sales, G.C., Seipel, B., & Sekhran-Sharma, S. (2012). The Effects of individualized, online vocabulary instruction on picture vocabulary Scores: An Efficacy Study. *Computer Assisted Language Learning*, *25*(1), 87-102

Gagne, R.M., Wager, W.W., Golas, K.C., Keller, J.M., & Russell, J.D. (2005). Principles of instructional design. *Performance Improvement*, *44*(2), 44-46.

Gonzalez, J.E., Pollard-Durodola, S., Simmons, D.C., Taylor, A.B., Davis, M.J., Kim, M., & Simmons, L. (2011). Developing low-income preschoolers' social studies and science vocabulary knowledge through content-focused shared book reading. *Journal of Research on Educational Effectiveness, 4*(1), 25–52.

Gorjian, B., Moosavinia, S.R., Ebrahimi Kavari, K., Asgari, P., & Hydarei, A. (2011). The impact of asynchronous computer-assisted language learning approaches on English as a foreign language high and low achievers' vocabulary retention and recall. *Computer Assisted Language Learning*, *24*(5), 383-391.

Halliday, M.A.K. (1978). *Language as Social Semiotic*. Baltimore: University Park Press.

Iacop, I. (2009). The effectiveness of computer assisted classes for English as a second language. *Ann.Univ. Tibiscus Comp. Sci. Series*, *7*, 141-148.

Kayaoğlu, M.N., Akbas, R.D., & Oztürk, Z. (2011). A small scale experimental study: Using animations to learn vocabulary. *TOJET: The Turkish Online Journal of Educational Technology*, *10*(2), 24-30.

Kılıckaya, F., & Krajka. J. (2010). Comparative usefulness of online and traditional vocabulary learning. *TOJET: The Turkish Online Journal of Educational Technology*, *9*(2), 55-63.

Levy, M. (1997). *Computer assisted language learning: Context and conceptualization*. Oxford: Oxford University Press.

Lin, C. C., Chan, H. J., & Hsiao, H.S. (2011). EFL students' perceptions of learning vocabulary in a computer supported collaborative environment. *TOJET: The Turkish Online Journal of Educational Technology*, *10*(2), 91–99. Retrieved from http://www.tojet.net/articles/v10i2/10224.pdf/

Malmstrom, E. (2011). Beyond the word, within the sign: Inquiry into preschool children's handmade pictures about schooling. *Education Inquiry*, *2*(1), 111-126.

Nakata, T. (2008). English vocabulary learning with word lists, word cards and computers: implications from cognitive psychology research for optimal spaced learning. *RECALL-HULL THEN CAMBRIDGE*, *20*(1), 3-5.

Oberg, A. (2011). Comparison of the effectiveness of a CALL-based approach and a card-based approach to vocabulary acquisition and retention. *Calico Journal*, *29*(1), 118-144.

Peirce, C. S. (1948). *Collected Papers*. Vol. 7 and 8, ed. by A. W. Burks. Cambridge, MA: Harvard University Press.

Segers, E., & Verhoeven, L. (2003). Effects of vocabulary training by computer in kindergarten. *Journal of Computer Assisted Learning*, *19*(4), 557-566.

Silverman, R., Crandell, J.D., & Carlis, L. (2013). Read alouds and beyond: The effects of read aloud extension activities on vocabulary in head start classrooms. *Early Education & Development*, *24*(2), 98-122.

Silverman, R., & Hines, S. (2009). The effects of multimedia-enhanced instruction on the vocabulary of English-language learners and non-English-language learners in pre-kindergarten through second grade. *Journal of Educational Psychology*, *101*(2), 305-314.

Tozcu, A., & Coady, J. (2004). Successful learning of frequent vocabulary through CALL also benefits reading comprehension and speed. *Computer Assisted Language Learning*, *17*(5), 473-495.

Wells, G. (1993). Text, talk, and inquiry: Schooling as semiotic apprenticeship. *Language and learning. Hong Kong: Institute of Language in Education and University of Hong Kong Department of Education,* 18-51*.*