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The development of English computer aided education program for acquisition of color, number and shape concepts in preschool children without foreign language education background

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Abstract

The impact of computers on children is seen as visual and audial. Visual effects on the screen is made by shapes and writings. Each new image on the screen carries a novelty for the child. Thus they act as a stimulator. Children, keeping up with the flow of information on the screen constantly intensify their attention and have to be warned in each new screenshot. Computer training lets the children learn through the play. Also it's an attractive tool for the children (Arıcı ve Demir, 2009). By reviewing the literature it can be said that small children can learn faster by the help of computer-assisted education. Therefore this study's purpose is to prepare a computer-assisted training programme to teach colors, numbers and shapes names in English to 60-72 months children who do not have any foreign language education and also do not know anything about foreign language. This study also aims to examine the impact of the prepared programme on the acquisition of basic foreign language concepts. The computer aided education programme includes basic English concepts like colors, numbers and shapes. A further objective of the study is to arouse curiosity of the children to different languages and to improve the children's awareness to other languages. 160 children participated in the research. "Color, Number, Shape Names English Evaluation Form" used to examine the children's knowledge about the color, number, shapes names in English before the programme and after the programme. As a result of the analysis, the developed computer-assisted training programme in English (color-number-shape) has been found effective in teaching English names of colors, numbers and shapes to the children who doesn't have any prior English knowledge.

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Keywords: Computer aided language learning, english basic concepts,

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1. Introduction

Last improvements in the education technologies necessitate implementation of modern approaches such as learner autonomy in foreign language learning and teaching fields (Can, 2012). Fast, scientific and technologic developments in information era create new possibilities for educational practices by increasing flexibility in education. Accordingly, computer which is the most prevelant technological tool used in education field turns to be a necessity rather than a luxury (Kozikoğlu, 2013). Computer, with its importance for both social life and education practices, differs from traditional educational apprehension by representing an alternative which addresses diverse senses. Taking advantage of information technologies for increasing efficiency in language teaching and offering different solutions to students is crucial for our country's problematic foreign language education which is far beyond desired success (Kozikoğlu,2013).

Effect of computers on children can be observed as visual and auditory. Visual effect is formed by the shapes and writings on the screen. Every new image on the screen is a new experience for the child. That is why it is a stimulator at the same time. Child has to focus his/her attention on information flow constantly and be stimulated by each new screen image. Computer aided education enables child learn through play. It is also an interesting tool for child (Arıcı & Demir, 2009).

Computer aided education method, whose effect on academic success is being studied, can be used successfully with many learning methods (Tomakin &Yeşilyurt,2013). Then, it would be inevitable to make use of computer for teaching children in preschool period which is the most rapid development period. Computer has many benefits such as representing different alternatives and materials in language learning, adjusting in line with student's learning speed, individualization of the teaching, enabling student to have selfcontrol in the process, promoting the motivation, increasing student's success and making education interesting (Kozikoğlu,2013).

Effect of computers on children can be observed as visual and audio. Visual effect is formed by the shapes and writings on the screen. Every new image on the screen is a new experience. That's why it is a stimulator at the same time. Child has to focus his/her attention on information flow constantly and be stimulated by each new screen image. Computer aided education enables child learn through play. It is also an interesting tool for child. Child gets different shapes and results by using different buttons and by changing images on the screen. For example, finding out two same shapes among many options and placing one shape into another are perceived as play by children whereas they are actually learning to distinguish different geometric shapes (Arıcı & Demir, 2009).

Foreign language teaching is a long term and consistent phenomenon which has impact on child's brain development. Computer aided education (CAE) not only creates fast and high level interaction but also enables students learn foreign language in a shorter time period. CAE is an interdisciplinary field CAE is used in the fields such as foreign language teaching, second language acquisition, linguistics, semantics as well as in researches about teaching listening, speaking, reading and writing skills (Tomakin & Yeşilyurt, 2013). A meta-analysis study conducted by Nicholas Vernadakis, Andreas Avgerinos, Efi Tsitskari and Evridiki Zachopoulou (2005) found out that computer is more accessible for children and they can learn faster because of the fact that children learn better with images and sounds. McCarrick and Xiaoming (2007) claimed that playing with computer increases child's social, cognitive, language developments and their motivations as opposed to general assumption that computer disrupts the communication. In Demir's (2007) research that compared traditional and computer aided education for three and four years old children, it was found that children who had computer aided education are more successful in acquisition of color concept. Kaçar and Doğan (2007) also put forward that, in a sample of 6 years old children attending preschool institutions, the children who had computer aided education are more successful in acquisition of number and shape concepts compared to those had general education methods. Moreover, the opinions of the participants' families were also evaluated. According to all of the families, computer aided education is necessary in preschool period.

Clements (2002) claimed that children's interaction with computer in the early period improves their critical thinking, problem solving and decision making skills. When related literature was examined, on the basis of previous researches on computer aided education and researches supporting the results related to importance of language education, it would be put forward that young children experience rapid learning with computer aided education and early introduction to foreign language education improves children's cognitive development and awareness. For this reason, the aim of this study is to create a computer aided education program that would teach the concepts of color,

number, shape in English to 60-72 month old children who are not aware of another language and did not have any foreign language education previously, and to analyze the program's effect on children's foreign language learning.

Problem : Is computer aided foreign language education program effective on preschool children's acquisition of color, number, shape concepts in English?

2. Material and method

2.1. Population and sampling

In Anatolian side of İstanbul province, Fikirtepe and Yenisahra districts in which low income families reside were chosen as sampling of the research. One school was chosen from each district by purposeful sampling method. After interviews with school manager and educators about children's economic conditions, it was confirmed that parents are from low socioeconomic status, All of the children from three different kindergartens in these two schools participated in the research. In total, 160 children participated in the research, 78 (48,8%) of the participants are girls whereas 82 (51,2%) are boys. The participants have an age mean of 5.68 years with standard deviation of 0.46. There is no computer in the classrooms of children. 134 of children have computers at home whereas 26 of them do not. When looking at the number of children in the families, it was found that 53 (33,1%) of children have one, 56 (35%) of them have two, 41 (25,6%) of them have three, 7 (4,4%) of them have four, 3 (1,9%) of them have five siblings. When looking at the education levels of the parents, it was found that 65 (40,6%) mothers are primary school and 21 (13,1%) mothers are high school graduates, 51 (31,9%) mothers have university and 23 (14,4%) mothers have master degrees. On the other hand, 58 (36,3%) fathers are primary school and 29 (18,1%) fathers are high school graduates, 59 (36,9%) fathers have university and 14 (8,7%) fathers have master degrees.

2.2. Data collection tools

English Instrument for Color, Number and Shape Concepts : Instrument for color, number and shape concepts designed by Dağal, Balat, Kamburoğlu and Şallı was used in the research. The instrument consists of 27 items. 10 items test color, 10 items test number and 7 items test shape concepts' names in English. Assessment is done as "1" for correct answers and "0" for incorrect answers. Total score or each concept group can be evaluated separately. This research is based on total score.

Information Form: It includes questions regarding children's gender, date of birth, number of children in the family and education levels of the parents.

Education Program of Color, Number and Shape Concepts in English in the Computer: Four different programs were designed to teach children color, number and shape concepts in English. Firstly, colors, numbers and shapes were introduced in each part of the program. Afterwards, students listened the songs about the concepts. Then, they practiced color, number and shape concepts in the computer. At the second week, children played computer games, designed by researchers, about color, number and shape concepts taught previous week. Different pictures in the Adobe Flash program were used to depict the 27 different concepts. Program gives the child chance to repeat with a feedback that has an appropriate voiceover. Child can repeat as much as he/she desires. Within Community Service course, the undergraduate students contributed to the current study in part of the pre implementation regarding evaluation of the program with children. The program aims to teach these concepts: colors; red, yellow, blue, green, orange, purple, brown, black, white, pink, numbers; 1-10 and shapes; circle, triangle, square, rectangle, heart, star, ellipse.

Data Collection Procedure: Implementation of the research lasted ten weeks. In the first week, researchers got acquainted with the children and implemented **'English Instrument for Color, Number and Shape Concepts'** individually. Researchers carried out all the evaluations, program development and implementation with Community Service course students. Beginning from the second week, the program was introduced to children and the first program was put into practice. Four laptop mice that will be used in the study with children were introduced and children were allowed to use them freely. All program implementations were carried out individually with each child and it took between 15 and 20 minutes on average for children to use the program. Educator made child watch

the program, made him/her repeat when needed and repeated the question on the screen at the last part of the program when it was necessary. Child tried to find correct answer by clicking with mouse and was given feedback with phrases such as "You did fine, very well" for correct answers. Four different programs were implemented for eight weeks. The program used in the first week was implemented in the second week by redesigning it to use only questions. Four week program was designed in a way that each week will be repeated with the questions next week. **English Instrument for Color, Number and Shape Concepts** was re-implemented with children as post-test at the last week.

3. Findings

The findings about the development of english computer aided education program for acquisition of color, number and shape concepts in preschool children without foreign language education background presented below.

Table 1. Arithmetic mean and standard deviation results of participants' scores regarding pretest and posttest of English color, number, shape concepts

N=160	X	Ss	Sh
Pretest	10,67	5,96	0,47
Posttest	22,72	4,30	0,34

Table 2. T-test analysis of participants' pretest and posttest scores regarding English color, number, shape concepts

	x	Ss	Sh	t	df	p
pretest- posttest	-1,21	6,10	0,48	-24,972	159	0,000

It was found that there is a significant difference between the pretest and posttest scores of children in the English color, number, and shape concepts. ($p<.05$).

Table 3. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English color concept

N=160	X	Ss	Sh
Pretest	4,09	2,66	,21
Posttest	8,88	1,77	,14

Table 4. T-test analysis of children's pretest and posttest scores in English color concept

	x	Ss	Sh	t	df	p
pretest- posttest	-4,78	2,90	0,23	-20,932	159	0,000

It was found that there is a meaningful difference between children's pretest and posttest scores in English color concept ($p<.05$).

Table 5. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English number concept

N=160	X	Ss	Sh
Pretest	4,69	3,32	,26
Posttest	9,11	1,65	,130

Table 6. T-test analysis of participants' pretest and posttest scores in English number concept

	x	Ss	Sh	t	df	p
pretest- posttest	-4,42	3,26	0,26	-17,153	159	0,000

It was found that there is a meaningful difference between children's pretest and posttest scores in English number concept (p<.05).

Table 7. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English shape concept

N=160	X	Ss	Sh
Pretest	1,89	1,65	,13
Posttest	4,72	1,83	,14

Table 8. T-test analysis of participants' pretest and posttest scores in English shape concept

	x	Ss	Sh	t	df	p
pretest- posttest	-2,84	2,29	0,18	-15,692	159	0,000

It was found that there is a meaningful difference between the children's pretest and posttest scores in English shape concept (p<.05).

Table 9. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English color, number and shape concept

		X	Ss	Sh
Girls	Pretest	4,36	2,44	0,28
	Posttest	9,14	1.46	0,16
Boys	Pretest	10,24	6,46	0,71
	Posttest	21,80	4,80	0,83

Table 10. T-test analysis of participants' pretest and posttest scores in English color, number, shape concept

	x	Ss	Sh	t	df	p
Girls pretest- posttest	-4,78	2,73	0,31	-15,424	77	,000
Boys pretest- posttest	-1,156	6,42	0,70	-16,293	81	,000

Children's pretest and posttest scores in English color, number and shape concepts were analyzed in terms of gender and it was found that there is a meaningful difference between pretest-posttest scores of boys and girls (p<.05).

Table 11. Arithmetic mean results of the participants' pretest-posttest scores in terms of their mothers' level of education

Mother's level of education	N	Mean score of pretest	Mean score of posttest
Primary School	65	8,7231	21,8308
High School	23	12,0476	22,8095
Undergraduate	21	12,5686	23,1765
Graduate	51	10,7391	24,1739

Table 12. Variance analysis of participants' pretest-posttest scores in terms of their mothers' level of education

	Source of variance	Kt	Sd	KO	F	p
Pretest	Between groups	470,188	3	156,729	4,723	,003
	Within groups	5176,912	156	33,185		
	Total	5647,100	159			
Posttest	Between groups	110,807	3	36,936	2,035	,111
	Within groups	2831,093	156	18,148		
	Total	2941,900	159			

The children's mean scores regarding English color, number, shape concepts were analyzed in terms of their mothers' level of education and it was found that there is a meaningful difference ($p<.05$) in the pretest scores, whereas there is no a meaningful difference ($p>.05$) in the posttest scores in terms of their mothers' level of education. When children's mean scores were analyzed in terms of their mothers' level of education, it was found that the children of mothers with undergraduate and high school degree have higher scores in the pretest. In general, absence of a meaningful difference between posttest scores can be interpreted as computer aided education program removes the difference which is the result of mothers' different level of education, in other words it is an indication of the positive effect of the program.

Scheffe test was used because of the fact that there is a meaningful difference in the pretest results. Analysis of Scheffe test is presented in the Table 13.

Table 13. Scheffe Test for participants' pretest scores in terms of their mothers' level of education

		Mean difference	Standard deviation	Sig.
Primary school	High school	-3,32454	1,44596	,157
	Undergraduate	-3,84555*	1,07761	,006
	Graduate	-2,01605	1,39764	,557
High school	Primary school	3,32454	1,44596	,157
	Undergraduate	-,52101	1,49364	,989
	Graduate	1,30849	1,73870	,904
Undergraduate	Primary school	3,84555*	1,07761	,006
	High school	,52101	1,49364	,989
	Graduate	1,82950	1,44690	,660
Graduate	Primary school	2,01605	1,39764	,557
	High school	-1,30849	1,73870	,904
	Undergraduate	-1,82950	1,44690	,660

Children's mean scores of English color, number and shape concepts in terms of their mothers' level of education were examined with scheffe test according to variance test result. It was found that there is a difference between the pretest scores of children of mothers with primary school degree and children of mothers with undergraduate degree. The difference is in favor of children of mothers with undergraduate degree.

Table 14. Arithmetic mean results of participants' pretest-posttest scores in terms of their fathers' level of education

Father's level of education	N	Mean score of pretest	Mean score of posttest
Primary School	58	7,9828	21,8621
High School	29	14,3448	22,7586
Undergraduate	59	11,6102	23,1017
Graduate	13	10,6923	24,6923

Table 15. Variance analysis of participants' pretest-posttest scores in terms of their fathers' level of education

	Source of variance	Kt	Sd	KO	F	p
Pretest	Between groups	862,354	3	287,451	9,375	,000
	Within groups	4752,338	155	30,660		
	Total	5614,692	158			
Posttest	Between groups	101,898	3	33,966	1,855	,140
	Within groups	2838,366	155	18,312		
	Total	2940,264	158			

Participants' mean scores of English color, number, shape concepts in terms of their fathers' level of education were analyzed and it was found that there is a meaningful difference ($p<.05$) in the pretest scores, whereas there is no a meaningful difference ($p>.05$) in the posttest scores related to fathers' level of education. When children's mean scores were analyzed in terms of their fathers' level of education, it was found that children of fathers with high school degree have higher scores in the pretest. Absence of a meaningful difference between posttest scores of children in terms of their fathers' level of education can be interpreted as a success of computer aided education program. The difference between posttest scores in terms of mothers' level of education was not meaningful in the same way.

Table 16: Scheffe Test for participants' pretest scores in terms of their fathers' level of education

		Mean difference	Standard deviation	Sig.
Primary school	High school	-6,36207*	1,25932	,000
	Undergraduate	-3,62741*	1,02386	,007
	Graduate	-2,70955	1,69915	,470
High school	Primary school	6,36207*	1,25932	,000
	Undergraduate	2,73466	1,25575	,196
	Graduate	3,65252	1,84817	,276
Undergraduate	Primary school	3,62741*	1,02386	,007
	High school	-2,73466	1,25575	,196
	Graduate	,91786	1,69651	,961
Graduate	Primary school	-6,36207*	1,25932	,000
	High school	-3,62741*	1,02386	,007
	Undergraduate	-2,70955	1,69915	,470

Children's mean scores for English color, number, and shape concepts in terms of their fathers' level of education were examined with scheffe test according to variance test result. It was found that there is difference between the pretest scores of children of fathers with primary school degree and children of fathers with high school degree. The difference is in favor of children of fathers with high school degree. It cannot be made any evaluation for the comparisons of other groups due to absence of difference.

4. Discussion and suggestions

Computer increasingly takes place in lives of children. In the region where the research took place, most of the children have a computer in their homes despite the fact that they are not aware of existence of another language. Keeping this in mind, the aim of this study was to design an English computer aided education program that would teach concepts of color, number, shape in English to 60-72 month old children who are not aware of existence of another language and did not have foreign language education previously, as well as to analyze its effect on children's foreign language learning. Results of the research show that computer aided foreign language education program has an effect on children who did not have foreign language education previously.

In Chude and Miksad's (1997) research, children aged from 2 years 10 months to 5 years 0 month were given computer aided education. Then, computer aided education was compared with traditional education and it was found that level of cognitive development of children who participated to computer aided education improved more. In Schetz's (1989) research done with 22 students that were not good at concepts, articulation and language, training was given to children about amount, quality, time/sequencing, names and verbs through computer aided education. According to their teacher's opinions, there was 41% improvement in the performances of the students.

Peng, Wah and Ishak's (2009) research results also put forward that computer aided education has huge impact on young children's literacy education.

In the computer aided education program used in this research, games also took place for English word teaching. Likewise, Chuang and Chen's (2007) research indicated that video games increased 3rd grade students' cognitive development.

It is seen in the literature that computer aided education is used in many education models. In general, every computer aided education program is found to be more effective than other education programs. Although computer is usually used in the foreign language education, researches about foreign language education with computer aided education were not found in the literature. It is known that foreign language education in young ages is very important and learning with computer aided education is faster. In this context, frequent use of computer aided education program in foreign language education, making research about effectiveness of computer programs which are being already used in foreign language education or being designed for the same purpose, contributing to the literature through designing new and advanced programs can be suggested as the results of this study.

References

Arıcı, N., & Demir, C. (2009). Okul Öncesi Çocukları İçin İngilizce Kelime Eğitim Programı. 5. Uluslararası İleri Teknolojiler Sempozyumu (IATS'09),. Karabük: Karabük Üniversitesi.

Baturay,M; Yıldırım, S; Daloğlu, A.(2009). Web-Tabanlı Aralıklı Tekrarın Yabancı Dil Öğrencilerinin Kelime Hatırda Kalıcılığına Etkisi. Eurasian Journal of Educational Research, 34, 17-36.

Can, T. (2012): Yabancı Dil Öğretimi Bağlamında Öğrenen Özerkliğinin Sanal Öğrenme Ortamları Yoluyla Desteklenmesi ;Hasan Ali Yücel Eğitim Fakültesi Dergisi Sayı 17, 72-85.

Clements, H.D. (2002) Computers in early childhood mathematics. Contemporary İssues İn Early Childhood 3(2),160-181.

Chuang, T-Y; Chen, W-F. (2007). Effect of Computer-Based Video Games on Children: An Experimental Study, The First IEEE International Workshop on Digital Game and Intelligent Toy Enhanced Learning.

Chude, R; Miksad, J. (1997). Computer Assited Instruction and Cognitive Development. Child Study Journal. 27(3),237-254.

Demir, N. (2007) Okul öncesi öğrencilerine renk kavramının kazandırılmasında bilgisayar destekli ve geleneksel öğretim yöntemlerinin karşılaştırılması, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, İlköğretim Bölümü, Okul Öncesi Öğretmenliği Anabilim Dalı, Yüksek Lisans Tezi, Konya.

Kaçar, Ö.A. Doğan, N. (2007) Okul öncesi eğitimde bilgisayar destekli eğitimin rolü, Akademik Bilişim, Dumlupınar Üniversitesi, Kütahya.

Kozikoğlu, İ. (2013) : Yabancı Dil Öğretiminde Bilgisayar Kullanımına İlişkin Öğretim Elemanlarının Görüşleri YYÜ Eğitim Fakültesi Dergisi, Cilt:X, Sayı:I,373-394.

McCarrick, K., & Xiaoming, (2007). Buried treasure: The Impact of Computer Use on Young Children's Social, Cognitive, Language Development and Motivation, AACE Journal, 15(1), 73-95.

Peng, C-F; Wah, Teh Y ; Ishak, Z (2007). Computer-Assisted Instruction in Teaching Early Childhood Literature. Wseas Transactions on Information Science and Applications.9(6). 1493-1502.

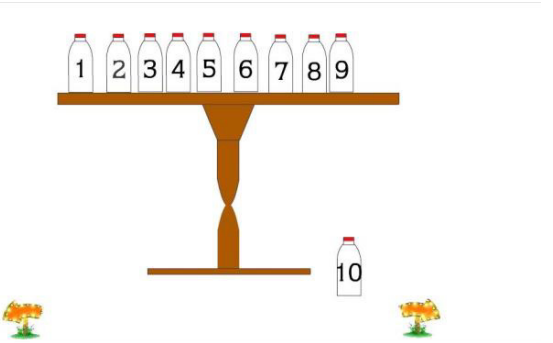
Scheds, K. F. (1989). Computer-Aided Language/Concept Enrichment in Kindergarten: Consultation Program Model. Language, Speech, and Hearing Services in Schools. 20(1), 2-10.

Tomakin, E, Yeşilyurt, M. 2013: 248 Bilgisayar Destekli Yabancı Dil Öğretim Çalışmalarının Meta Analizi: Türkiye Örneği YYÜ Eğitim Fakültesi Dergisi Cilt:X, Sayı:I,248-263.

Vernadakis, N; Avgerinos, A; Tsitskari, E; Zachopoulou, E. (2005). The Use of Computer Assisted Instruction in Preschool Education: Making Teaching Meaningful. Early Childhood Education Journal, Cilt:33, Sayı:2, 99-104.

Examples from the "Color, Number and Shape Concepts Computer Aided Programme"

"Click the purple balloon"
"Click the blue balloon…."



"Put number ten on the table"