



An Examination of the Effect of Supportive Educational Programs on Early Learning Skills of 61 to 72-month-old Turkish Children *

Maide ORÇAN**

Adalet KANDIR***

ABSTRACT: This study was undertaken to examine the effect of the Supportive Education Program for Early Learning Skills (SEPELS) on early learning skills of six-year-old children attending to nursery school. The study has an experimental model and applied with a pre-test/post-test design. The sample of the study is composed of 61-72-month-old children attending nursery classes of the primary schools chosen randomly. Test of Early Learning Skills (TELS) was administrated to collect data for the study. In this study, the researcher prepared and applied SEPELS to find out the effects of the SEPELS on children's Early Learning Skills (ELS). As a result of this study, it was found out that average ELS scores of the children in the experimental group were significantly higher than those of the ones in the control group.

Key words: Early learning skills, thinking skills, language skills, numerical skills, supportive education program

Introduction

In children, there is a parallelism between development and learning and the best development in children is through learning. This can be achieved by making children curious and providing opportunities to do research. To contribute children's cognitive development, it is highly important to provide them with opportunities to ask and answer questions, to do research and to exhibit their problem solving skills. The improvement of learning skills forms the basis of information. Children's improvement of learning skills and concepts at an early age provides them with opportunity to organize and classify the information they receive. Emphasizing the improvement of children's learning skills at an early age makes it possible for them to gain different structural experiences as well (Beaty, 2000; Charlesworth and Radeloff, 1991; Jackman, 2005).

In the development of learning skills, thinking skills which are related to cognitive development are very important issues. As the child starts to understand his/her environment and the world, the process of thinking starts too. This means that the child's learning life which lasts from babyhood to adulthood starts as well. Thinking skill includes all processes that enable child's understanding of the world and acquisition of information related to objective social environment and enables them to use the acquired information. Learning skills of the children includes cognitive skills like thinking skill, language skill, numerical skill and problem solving and they develop in interaction and thus complete each other. Learning skills are to be studied in this dimension as well. Learning skill which is one dimension of thinking skill signifies the beginning of a process which enables early development of skills like perception, mixed classification, problem solving. Thinking skill in children represents natural skills such as observation, organization and association. Children examine the results of the activities done; they get feedback about the data and analyze the data in a more systematic way. Teaching learning skills is a part of education system, and teachers are to address these skills in their daily studies with children. Using thinking skills children focus on "know how to" as much as "know what to" (Glevey, 2008; Wegerif, 2007). Children need to be able to assess the importance of information besides knowing how to get access to information. They cannot achieve this before their thinking skills develop. This background requires skill development at early ages and it is important for them that thinking skills regarded to be valuable for themselves and others. Anyone who plays role in child education is to know and apply the methods that will set the child free and learn to

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** Dr., Selçuk University, orcan@selcuk.edu.tr

*** Assoc. Prof. Dr., Gazi University, akandir@gazi.edu.tr

ask questions, solve problems and be eager to explore. Only in this way can children's thinking skills be developed as a whole (Benson, 2008).

Development of children's learning skills in early childhood is also related to cognitive and language development. The effect of language in the development of children's learning skills is an undeniable fact. Thanks to their linguistic skills children can transfer what they learn, assess their own situation, arrange their thoughts, reach a conclusion and then explain the reasons behind them (Copley, 2000).

As pre-school period is a period when the child actively acquires learning skills and basic concepts, necessary thinking methods and skills are to be developed in this period so that children can grasp mathematics which s/he will study later years. Mathematics is a highly important and necessary tool for children to acquire and develop thinking skills at an early age. Life itself is mathematical and the child experiences this for the rest of his/her life. As math positively affects children's learning skill, it is to be handled carefully. This will also form the basis for their thinking skills. With the acquisition of basic skills necessary for math and other skills in this period, the basis for mathematical knowledge and concepts which the child will need later at school is formed. This will help the child in education life ahead of him/her and increase the rate of success. Moreover, it will make the child productive and efficient by equipping him/her with problem solving skills. Pre-school children's acquisition of the concept of number is closely related with their being able to classify similar objects, that is, having classification skill, ordering skill, that is, organizing differences in objects, and understanding the concept of matching one-to-one, which means numerical equation. Therefore, pre-school teachers are to allocate sufficient amount of time for classification, ordering and matching one-to-one and the children are to be able to assess their skills using objective scales. The acquisition of concepts related to numerical skills, assessment of thinking and language skills are of great importance for the development of children' learning skills (Charlesworth, 2005; Copley, 2000).

Traditional education systems are insufficient in teaching thinking, language and numerical skills to children. Especially, the approach promoting rote-learning and solving problems step by step - using already known methods- mostly limits the development of thinking skills of children and prevents their early learning. Above all, such approaches create great difficulties in child's using his/her full potential and in developing their thinking skills (Clements and Sarama, 2009).

If the importance of early learning skills in children's life is not understood, children can develop a rather closed thinking pattern when they grow up. There are many theories about how children think and learn, but one thing is certain that if we are to develop children's thinking skills, we should focus on activities in which children actively participate rather than being passive. For example, Piaget gives place to learning; Vygotsky emphasizes the importance of social environment and that children's thinking skills can develop with social experiences and cultural interactions and Bruner's study attracts attention to the importance of language and how children can control their thinking skills using language. Binet is of the opinion that thinking skills can be developed using some techniques. Besides, it is of great prominence to provide children with opportunities to use and apply their critical thinking skills and creativity so that children can exhibit their skills of thinking, asking questions, being a member of a group, learning and contributing to other ideas. Given that thinking skills are basic parts of education in early childhood, the necessity for the creation of opportunities to develop these skills comes forth. It is a fact that children need to be provided with experiences which give them opportunities to be active, to get interested in materials and objects, to find solution to problems, to make decisions, to work with others, to ask questions. Besides, they are to be given opportunities to have their own unique learning experiences (Ari, 2008; Benson, 2008; Charlesworth ve Radeloff, 1991; Charlesworth, 2005; Eastman, 2001; Jackman, 2005; Venn and Jahn, 1998).

In Turkey and all over the world, many studies are being carried on the assessment of early learning skills of pre-school children. However, although there are studies carried out in Turkey to examine language development, conceptual development, and mathematical development and thinking system separately, there are no studies which examine them all as a whole. Therefore, there is a need for studies on this issue and for well-designed Early Learning Skills Programs. To fill in this gap, this study aims to develop and test a Supportive Education Program for Early Learning Skills.

1. Method

The study had a pre-test/post-test experimental design model with a control group.

1.1. Sample

The universe of the study was composed of five six-year-old children attending nursery classes of primary schools in the city center of Konya affiliated with Ministry of Education. The sample included 62 children -32 of them being in the experimental group and 30 of them being in the control group- randomly cluster sampling chosen among students attending primary schools located in Konya city center. In the experimental group, 16 of the children were male, while 16 were female, and 16 of the children in the control were male, whereas 14 were female.

1.2. Instrument

In the study, General Information Form which includes questions about parents and the child and Test of Early Learning Skills were used.

1.2.1. General Information

In the General Information Form developed by the researchers to find out demographic characteristics of the sample group, information about the gender of the children, whether they attended pre-school institution before and educational background and ages of parents were included.

1.2.2. Test of Early Learning Skills - TELS

Test of Early Learning Skills - TELS, was developed by Somwari in 1977 and was first applied in the USA and Canada to a group (randomly chosen) of 20.088 pupils. Reliability and validity studies of the test were carried out in Canada and the US. It was seen that the items of the tests were appropriate for three-to-five-year-olds. The same test was applied to 545 children between 36-67-month old as a norm study in 1978. The Test of Early Learning Skills developed by Somwari – TELS composes of sub-dimensions of Thinking Skills, Language Skills and Numerical Skills. The test includes 54 items, that is, each dimension is composed of 18 items. The aim of the test is to determine individual skills and educational requirements related to children's learning skills, to help teachers develop an education program appropriate for educational requirements, to develop children's learning skills or to help the assessment of educational programs developed (Başaran, 2006).

The adaptation of the test to Turkish children was made by Başaran (2006). In the study, the Early Learning Skill Test whose validity and reliability for Turkish children was done by Başaran was used to collect data.

1.3. Development of Supportive Education Program for Early Learning Skills (SEPELS)

In the Early Learning Skills Supportive Program developed by the researchers the main aim was to support early learning skills (language, thinking, and numerical skills) of pre-school five-to-six year olds.

In the beginning, the literature was reviewed to examine national and foreign early learning skills programs and an initial study was done to determine early learning skill objectives and target behaviors to be taught in these programs.

In the second phase, to develop education program, the sub-dimensions of the test: Thinking Skills (comparing similarity, seeing and remembering, hand and eye coordination, classification, ordering, diagnosing divergences, establishing rules, deducing and defining similarities), Language Skills (understanding words, using pronouns, adverbs and adjectives, using verbs, understanding the functions of words, interpreting sentences and asking questions), Numerical Skills (understanding values of the numbers counting, knowing the numbers, comparing numeric values, combining appropriate numbers, understanding measurement, comparisons-like bigger, smaller, larger-, knowing money values, comparing lengths, keeping numbers in memory and understanding problems including adding, subtracting and division), and the items related to them were examined one by one. In line with these examinations, the first step of the Supportive Education Program for Early Learning Skills was developed by preparing objectives and target behaviors aiming at developing these skills.

The Supportive Education Program for Early Learning Skills was prepared by taking individual differences and developmental features of children into consideration in line with the determined objectives and target behaviors and with the principle of starting from close environment to distant environment, from simple to complex and from concrete to abstract.

In the third stage, early learning skill activities and application samples prepared and applied in Turkey and all over the world were examined. These samples were compared with determined objectives and behaviors and integrated with preschool education programs, and appropriate methods and techniques were determined. After that, these activities were transformed into educational situations and necessary educational materials were prepared.

All the activities to be given place in the daily education program (free time activities, language activities, play activities, music activities, science and math activities, preparation activities for reading and writing) were prepared as an activity alone or with the integration of a few activities.

At the fourth stage, the activities and educational situations prepared in line with the objectives and target behaviors determined were reviewed to be covered in 13 weeks and “The Supportive Education Program for Early Learning Skills” was prepared in its final form to be presented to experts to get their opinions.

The final form of Supportive Education Program for Early Learning Skills and materials were sent to four experts-three of whom are experts in child development and one is expert in psychology-to see its validity. We took their views about the program.

The experts were asked to express their views on the “Supportive Education Program for Early Learning Skills”; they were asked to state whether it serves the intended aim, to criticize it in terms of its clarity and understandability, to express their opinion as to which activities are to be changed, corrected or omitted.

Besides, to achieve intended level of success in validation study, the experts were asked to fill in a Likert Scale with five options (No, Little, to Some Extent, to a Great Extent, Completely) to evaluate the success of the objectives of the early learning education program in covering early learning skills, whether it has a balanced distribution of objectives in sub-dimensions of early learning skills, to what extent the objectives related to thinking skill cover “thinking skills”, whether target behaviors expected to be acquired in thinking skill sub-dimension include the objective, to what extent the objectives related to language skills cover “language skills”, whether target behaviors expected to be acquired in language skill sub-dimension include the objective, to what extent the objectives related to numerical skills cover “numerical skills”, whether target behaviors expected to be acquired in numerical skill sub-dimension include the objective, the suitability of the objectives and target behaviors in all sub-dimensions to the development of five or six-year-olds, to what extent target behaviors in all sub-dimension are observable, whether teaching situations are qualified enough to realize target behaviors, the suitability of teaching situations to the development level of five and six-year-olds, whether teaching situations are of quality to attract attention of children, the adequacy of concrete experiences in teaching situation, the appropriateness of the activities given in education situations for early learning skills, the adequacy of time spared daily for the application of education situations, the quality of the materials to be used for the activities, the clarity of the instructions given to children in education, the smoothness in passage from one activity to another, educational situations having consistency as a whole, the clarity of the behaviors expected from children in educational situations. Besides, these criteria were considered by the researcher while developing Supportive Education Program for Early Learning Skills.

In line with the views from experts, statistical analyses of the data were carried out. The result of the statistics indicated that consistency level in the views of experts was very close to perfect.

To determine the reliability of assessment form, the reliability of scorers was considered. It was seen that correlation value in expert views was significant at the level of .001. According to this result, it was understood that experts completely agree with each other in that education program is appropriate. Thus, the SEPELS was used without making any amendment.

1.4. Procedure

This chapter was included the application of tests and Supportive Education Program for Early Learning Skills.

1.4.1. Administration of Pre-tests

General Information Form and Test of Early Learning Skills were given to the experimental and control groups as a pre-test from 17th to 28th September, 2008. General Information Forms given to

be filled in by parents were handed into class teachers by making necessary explanations and they were collected by the researchers from the schools a week later.

During application, instructions were observed very strictly. Before application, researcher had interviewed with nursery teachers and the hours when the test can be applied were determined. We tried to apply it in the mornings when we think the children's attention is higher.

The application almost took 16 to 22 minutes for each child. For each correct answer child gives to test item, 1 point was given and 0 point for wrong answer. The points were first added separately for each sub-dimension and sub-dimension points were gained. Then, the scores for each sub-scale were added and total score for early learning skills was obtained (Başaran, 2006).

1.4.2. The Application of Supportive Education Program for Early Learning Skills

The Supportive Education Program for Early Learning Skills (SEPELS) was applied to the experimental groups in 13 weeks between 1 October and 28 December, 2008. Control groups continued to apply their daily program. The SEPELS was applied to experimental groups by the researcher for 13 weeks on three days (Monday, Wednesday and Friday) a week at least for 30 min and no more than 45 min.

Before starting the education, the teachers and parents were interviewed and they were explained that these studies will contribute to activities pertaining thinking, language and numerical skills and that the aim of this study is to find out whether the SEPELS will affect early learning skills (thinking, language and numerical skills).

The researcher prepared the educational environment and materials according to SEPELS everyday before the application of teaching to experimental groups.

1.4.3. Administration of the Post-tests

After training program was completed, Test of Early Learning Skills was administrated to the control and experimental groups between 31 December and 11 January, 2008 under the same conditions and environment pre-test was applied.

1.4.4. Administration of the Delayed Post-test

Four weeks after post-tests were applied, the experimental and control group between February 4, 2008–February 14, 2008 Test of Early Learning Skills was given as delayed post-test in the same place and under the same conditions as pre-tests and post-tests.

1.5. Data Collection

Pre-test scores for each sub-scale (thinking, language and numerical Skills) and total scores for each child were calculated and transferred to the computer. Obtained pre-test data was assessed and it was found out that there is not a significant difference between the average scores of groups got from scales and it was concluded that the groups were similar to each other. The education program was applied for 13 weeks to experimental groups and immediately after the application of the program Test of Early Learning Skills was administrated to the experimental and control groups as the post-test. Four weeks after the post-test Test of Early Learning Skills was administrated again as the delayed post-test. After that, the data used to conduct necessary analyses with SPSS 13 software.

2. Results

The results of this study carried out to find out whether the Supportive Education Program for Early Learning Skills has effect on 61-72-month old children attending nursery school are grouped as the following:

Demographic characteristics of children and parents;

- The sample was composed of 64 children, 32 of whom were in the experimental group and 30 of whom were in the control group. Fifty per cent of the children in the experimental group were male and 50 % were female, as for the experimental group 53,3 % of them were male and 46,7 % were female.

- The distribution of children attending pre-school educational institutions in the experimental and control groups: it was found out that in the experimental group 84,4% of them did not attend pre-school institution and 60,0 % of the children in the control group did not attend a pre-school education institution before, that is, 40,0 % of the children in the control group and 15,6 % of the children in the experimental group attended a pre-school education institution before.

- Distributions according to parents' educational background: in the experimental group 40,6% of the children's mothers are primary school graduates, 34,4% are high school graduates, 15,6 % of them are secondary school graduates and 9,4 % of them are university graduates; when the education level of the mothers of the children in control group is examined, it was seen that 36,6% are primary school graduates, 33,4 % of them are high school graduates, 26,7% of them are high school graduates and 3,3% are secondary school graduates. As for the fathers of the children in the experimental group, 40,6 % of the fathers are university graduates, 28,1% are high school graduates, 25,0 % of them are primary school graduates and 6,3 % of them are secondary school graduates; as for the control group 50,0 % of the children's father are university graduates, 26,7 % of them are high school graduates, 13,3 % are primary school graduates and 10,0% are secondary school graduates. Accordingly, it can be said that most of the children's mothers are primary school or high school graduates and most of the fathers are university graduates.

- The distribution of children according to their parents ages: 81,3 % of the mothers of the children in experimental group are between 26–35, 12,5 % are between 20–25 and 6,2 % are in age group of 36–45 years, and 65,6 % of the fathers are in age group of 26–35 years and 34,4 % are in age group of 36–45 years. In the control group, it was found out that 73,3 % of the mothers of the children were in age group of 26-35 years, 16,7% of them were in age group of 36-45 years and 10,0 % of them were in age group of 20-25 years and 33,3 % of them were in age group of 36-45 years. It can be said that most of the parents of the children in the experimental and control group was between 26 and 35.

Test of Early Learning Skills and Findings related to Sub-Scales

To see whether the experimental and control groups are similar, Early Learning Skills (thinking, language, numerical skills and ELS) pre-test average scores of the children in experimental and control groups were compared.

To test the effect of SEPELS on children's thinking, language, numerical skills and early learning skills, early learning skills post-test scores of children in experimental and control groups were compared.

To test retention of SEPELS, post-test average score of the experimental group was compared with their delayed post-test scores.

In the analysis of the data, 0.05 was adopted as the significance level.

Pertaining to the homogeneity of Experimental and Control Groups;

To test whether experimental and control groups were taken from the same universe before applying the Supportive Program for Early Learning Skills, and to find out whether there are significant differences between average scores of experimental group and the children in the control group in Early Learning Skills Sub-Scales (ELSSS), thinking, language, numerical skills scores and Early Learning Skills (ELS) scores, pre-test scores of the children in both groups were analyzed with independent t-test. The results of the analysis are given in Table 1.

As seen in Table 1, while the average scores of the children in experimental group in ELS thinking sub-scale was $\bar{X}=7,40$, the average score for control group was $\bar{X}=6,73$. To test whether there is a difference between the two averages, independent samples t-test was administrated. The t value obtained as a result of test (0.971) was not significant ($P>0.05$). Accordingly, there is not a significant difference between the children in the experimental and control group in terms of thinking skills. This result indicates that the groups are equal to each other in terms of the thinking skill variable.

Table 1. n, \bar{X} and t Values for Thinking, Language, Numerical Skills, and ELS Total Pre-test Scores of the Children Experimental and Control Group

	Groups	n	\bar{X}	Ss	t	P
Thinking Skills	Experimental	32	7,40	2,88	0,971	0,337*
	Control	30	6,73	2,57		
Language Skills	Experimental	32	7,00	1,48	0,000	1,000*
	Control	30	7,00	1,76		
Numerical Skills	Experimental	32	6,53	3,21	-0,381	0,705*
	Control	30	6,83	3,02		
ELS (total)	Experimental	32	20,87	6,45	0,196	0,845*
	Control	30	20,56	5,91		

Significance level *0.05

To determine whether the experimental and control groups are similar to each other in terms of language skill variable, language sub-scale pre-test average scores were analyzed with t test. Average pre-test language skill scores of children in the experimental group was 7.0 and that of children in the control group was 7.0. According to t test results, there is not a significant difference between arithmetic means of the two groups ($P>0.05$). Therefore, the two groups are similar to each other in terms of language skills.

To see whether groups are similar in terms of numerical skills, the scores were checked with t-test. The average numerical skills of the children in the experimental group was 6.53, and it was 6,83 for the control group. The difference between these two means is not significant at the level of 0.05. Therefore, numerical skills of the experimental and control groups are similar.

The t-test was used to find out whether there is a difference between the two groups in terms of average ELS scores obtained from addition of thinking, language and numerical skills scores. The ESL average score of experimental group was 20.87, as for control group it was 20.56. The difference between these scores was not significant at 0.05 significance level. Therefore, it can be concluded that groups are equal to each other and come from the same universe.

On the effect of Supportive Education for Early Learning Skills on Children's Early Learning Skills (Thinking, Language, Numerical Skills and ELS);

To compare the effect of the Supportive Education for Early Learning Skills on children's thinking, language, numerical skills and ELS, the post-test average scores of the experimental and control groups. Analysis results are given in Table 2.

Table 2. n, \bar{X} and t Values of the Thinking, Language, Numerical Skill, and ELS of Children in Experimental and Control Groups According to Post-test Scores

	Groups	n	\bar{X}	Ss	t	p
Thinking Skills	Experimental	32	13,15	1,88	5,638	0,001
	Control	30	9,86	2,62		
Language Skills	Experimental	32	10,53	1,21	4,962	0,001
	Control	30	9,03	1,15		
Numerical Skills	Experimental	32	12,68	2,60	4,228	0,001
	Control	30	9,80	2,75		
ELS (total)	Experimental	32	36,37	3,90	6,429	0,001
	Control	30	28,76	5,26		

Significance level was *0.05

The difference between post-test mean score for thinking skills of the experimental group (13.15) and control group thinking skill post-test score (9.86) was compared with t test. The t value (5.638) obtained as a result of comparison was significant at 0.001 level. This value is even more sensitive than adopted significance level 0.05.

The language skills mean score of the experimental group is 10.53, and that of control one is 9.03. The difference between the two mean scores was significant at .05 level. Therefore, supportive education program affects language skills of the children.

While numerical skills mean scores of the children in the experimental group was 12.68 after supportive education program, numerical skills mean score of the children in the control group which did not receive supportive education program was 9.80. Independent t test was used to see whether the difference between mean scores of numerical skills of the two groups was significant. The difference between the two groups was found to be significant at 0.001 level.

To find out whether SEPELS affect mean total scores children obtained from related skills, ELS mean scores of the experimental and control groups were compared with an independent t test. After the supportive education program, the ELS mean scores of the experimental group was 36.37, and those of the children in the control group who did not receive the program was 28.76. The difference between the two groups was significant at 0.05 level, that is, Early Learning Skills mean scores of the experimental group was significantly higher than those in the control group.

On the retention of SEPELS

The children in the experimental group were given the Test of Early Learning Skills before the Supportive Education for Early Learning Skills (pre-test), after it was completed (post-test) and four weeks after it finished (delayed post-test). In order to find out whether the change in Early Learning Skills continued four weeks after the application of the Supportive Education for Early Learning Skills was tested with ANOVA test by comparing the mean scores of the children in the test administrated immediately after the completion of SEPELS and the mean scores measured four weeks after the program was applied. The findings of the comparisons between the children's thinking skills are given in Table 3 and 4.

Table 3. Means and Standard deviations of Pre-test, Post-test and Delayed Post Test Scores of the Experimental Group's Thinking Skills Sub-Scale

Experimental Group	n	\bar{X}	Ss
Pre-Test	32	7,40	2,88
Post-Test	32	13,15	1,88
Delayed Post-Test	32	12,93	1,68

When Table 3 is examined, it is seen that the pre-test mean scores of the children in the experimental group in thinking skills sub- test is 7.40 (Sd=2.88), post-test mean scores 13.15 (Sd=1.88) and delayed post test mean score is 12.93 (Sd=1.68). To determine whether there is a significant difference between the pre-test and post-test mean scores of the children in the experimental group one-way analysis of variance (ANOVA) was applied. Bonferroni test was applied to determine the source of variance. The results of the analysis are given in Table 4.

Table 4. ANOVA Results of Pre-test, Post-test and Delayed Post-test for Thinking Skills Sub-test

Source of Variance	KT	Sd	KO	F	p	Significant difference
Between Subjects	279,333	31	9,011			
Measurement	679,521	2	339,760	119,36	0,000	2-1, 3-1
Error	176,479	62	2,846			
Total	1135,333	95				
1. Pre-test	2. Post-test	3. Delayed Post-test				

As it is seen in Table 4, there found significant difference between pre-test, post-test and delayed post-test in thinking skills sub-dimension ($P < .001$). Children's pre-test score in thinking skills sub-scale is significantly higher than their post-test and delayed post-test scores ($P < .001$). On the other hand, no significant difference was found between the post-test and delayed post-test ($P > .05$). This result indicates that the application of the Supportive Education for Early Learning Skills has a lasting effect on thinking skills of children. That is, the effect of application endures. Comparisons of children's language skills are given in Table 5 and 6.

Table 5. Means and Standard Deviations in Pre-test, Post-test and Delayed Post-test Scores of the Experimental Group from Language Skills Sub-Scale

Experimental Group	n	\bar{X}	Ss
Pre-Test	32	7,00	1,48
Post-Test	32	10,53	1,21
Delayed Post-test	32	10,25	1,16

When Table 5 is examined, language skills sub-scale pre-test mean score of the children in experimental group was calculated to be 7.00 ($Sd=1.48$), post-test mean score was 10.53 ($Sd=1.21$) and mean score for delayed post-test was 10.25 ($Sd=1.16$). In order to find out whether there are significant difference between pre-test, post-test and delayed post-test mean scores of the children in the experimental group in Thinking Skills, one-way analysis of variance (ANOVA) was applied for related groups. In order to determine the source of difference Bonferroni test was applied. Analysis results are given in Table 6.

Table 6. ANOVA Results of Pre-test, Post-test and Delayed Post-test of Experimental Group in Language Skills Sub-scale

Source of variance	KT	Sd	KO	F	p	Significance
Between Subjects	68,490	31	2,209			
Measure	246,521	2	123,260	87,36	0,000	2-1, 3-1
Error	87,479	62	1,411			
Total	402,49	95				

1. Pre-test 2. Post-test 3. Delayed Post Test

When Table 6 is examined, there found a significant difference between pre-test, post-test and delayed post-test in language skills sub-scale ($p < .001$). Children's language skills sub-scale post-test and delayed post-test mean scores are significantly higher than pre-test mean scores ($p < .001$). There was not a significant difference between post-test and delayed post-test ($p > .05$). This result indicates that the application of the Supportive Education for Early Learning Skills has a lasting effect on thinking skills of children. That is, the effect of application endures.

Comparisons of the findings about children's numerical skills are given in Table 7 and 8.

Table 7. Means and standard deviations of Pre-test, Post-test and Delayed Post Test scores of the Experimental Group for Numerical Skills Sub-scale

Experimental Group	n	\bar{X}	Ss
Pre-test	32	6,53	3,21
Post-test	32	12,68	2,60
Delayed post-test	32	12,34	3,01

As it can be seen in Table 7, pre-test mean score of the experimental group in numerical sub-scale is 6.53 (Sd=3.21), post-test mean score is 12.68 (Sd=2.60) and delayed post-test mean score is 12.34 (Sd=3.01). To find out whether there are significant differences between groups, one way analysis of variance (ANOVA) was applied for related groups. To determine the source of difference, Bonferroni test was applied. Analysis results are given in Table 8.

Table 8. ANOVA results of Pre-test, Post-test and Delayed post-test Scores of the Experimental Group for numerical skills sub-scale

Source of Variance	KT	Sd	KO	F	p	Significant Difference
Between Subjects	595,958	31	19,224			
Measurement	765,896	2	382,948	109,86	0,000	2-1, 3-1
Error	216,104	62	3,486			
Total	1577,958	95				
1. Pre-test	2. Post-test	3. Delayed post-test				

When Table 8 is examined, it is seen that there is a significant difference in numerical skills sub-scale of the pre-test, post-test and delayed post-test ($p < .001$). Children's numerical skills sub-scale post-test and delayed post-test score means are significantly higher than pre-test score means ($p < .001$). There is not a significant difference between post-test and delayed post-test ($p > .05$). This result indicates that the application of Supportive Education for Early Learning Skills has a lasting effect on numerical skills of children. That is, the effect of application endures. Comparisons of ELS pre-test, post-test and delayed post-test scores are given in Table 9 and 10.

Table 9. Means and Standard Deviations of ELS Pre-test, Post-test and Delayed post-test Scores

Group	n	\bar{X}	Ss
Pre-test	32	20,87	6,45
Post-test	32	36,37	3,90
Delayed post-test	32	35,18	4,40

When Table 9 is examined, it is seen that ELS pre-test mean scores of the children in experimental group is 20.87 (Sd=6.45), while mean post-test mean score is 36.37 (Ss=3.90) and for delayed post-test mean score is 35.18 (Sd=4.40). To find out whether there is significant difference between ELS, Pre-test Post-test and delayed post-test mean score of children in experimental group one way analysis of variance (ANOVA) was applied for related groups. To find out the source of variance, Bonferroni test was applied. Analysis results are given in Table 10.

As seen in Table 10, there is a significant difference between ELS pre-test, post-test and delayed post-test ($p < .001$). Children's ELS sub-scale post-test and delayed post-test score means are significantly higher than pre-test score means ($p < .001$). On the other hand, there is not a significant difference between post-test and delayed post-test ($p > .05$). This result indicates that the application of the Supportive Education for Early Learning Skills has a lasting effect on numerical skills of children. That is, the effect of application endures.

Table 10. ANOVA results for ELS Pre-test, Post-test and Delayed post-test Scores

Source of Variance	KT	Sd	KO	F	p	Significant Difference
Between Subjects	1714,625	31	55,310			
Measurement	4762,750	2	2381,375	225,32	,000	2-1, 3-1
Error	655,250	62	10,569			
Total	7132,625	95				
1. Pre-test	2. Post-test	3. Delayed post-test				

3. Discussion

The efficiency of SEPELS

In terms of thinking skills, there is not a significant difference between control and experimental group in pre-test mean scores. Whereas the post-test mean score of the experimental group for the same skill is significantly higher than that of the control group, that is, the education program followed affects children's early learning skills. Children's thinking skill has been the subject of many studies as it includes many processes like reasoning, classification, ordering and comparison and it is closely related to language and numerical development. In the educational programs to develop children's thinking skill and to realize target behaviors pertaining to thinking skills, Turkish language activities, game, preparation activities for reading-writing etc. were applied. As a matter of fact, children are expected to develop thinking skills. As thinking skills are closely related to children's language and numerical skills, development in thinking skills will positively affect language and numerical skills. Pagani, Jalbert, and Girard (2006) applied a program enriched with arithmetic sings to children of low-income families. This program includes contrast, matching, grouping and dividing a whole into meaningful parts activities which are the other components of thinking skill. According to result of this study, core perception skills of children and their success in math education-which is linked to this perception was positively affected. The objectives of Barnett, Jung, Yarosz, Thomas, Hornbeck, Stechuk, and Burns (2008) "Tools of Mind" program was achieved with games played with peers and teachers. Control group did not receive any application. It was found out that the program improved children's reasoning skills. The most significant effect was on children's social development and learning activities. As social development and learning are closely related to thinking skill, it can be said that the study by Barnett *et al.* was effective in improving children's thinking skills.

Under the light of the data above, it can be said that SEPELS affects five-six-year-old children's thinking skills.

The Effect of Supportive Education Program for Early Learning Skills Early on Language, Numerical Skills, and Early Learning Skills

There is not a significant difference between pre-test mean score of the control and experimental groups in terms of language skills. However, when early language skills post-test mean scores are examined, the mean scores of children in the experimental group was significantly higher than that of the control group ($p < 0.05$). That is, training affected children's language skills.

Aydn (1997) examined the effect of language education program on language development of children. The program was applied to five and six-year-olds in Social Services Children Protection Institution of Prime-Ministry. In her study, a 10-week language education program was applied to children in experimental group. The statistical data indicated no significant difference in favor of the children in experimental group. Yayla (2003) studied the effect of Language Education Program on the language development of 60-72 month old children from families of low socio-economic level. In her study, the children in the experimental group received Language Education Program for 12 weeks. It was found out that Language Education program positively affected children's language

development. Danişman (2003) studied the efficiency of Systematic Game Activities on language development of five-six-year-olds. In another study, Kefi (2003) compared the effect of Traditional program and High/Scope program in pre-school educational institutions to see which had more positive effect on language development skill of 36 to 72-month-old children. As a result of the study, it was found out that -in terms of language development skills- post-test mean scores of the children who were educated with High/Scope program were significantly higher than that of the children taught with traditional program. Zembat, Aydın and Duman (2006) studied the effect of family inclusive language education program prepared for five year old children on language development. The result of the study indicated that there was a significant difference between pre-test mean score and post-test mean score of the children in the experimental group in language development scale. Şimşek (2007) studied the effect of Turkish language activity program on reading maturity level. The study has an experimental design with pretest, post-test and repeated measurements. At the end of the study, it was found out that the reading maturity of the group which received Turkish language education program was higher compared to the group which did not receive the instruction.

When the data above is considered, it can be concluded that there are many factors that affect children's language development. While the result of a study by Aydın (1997) indicate that language education program did not affect language development of five to six-year-old children, Yayla (2003) and Zembat, Aydın and Duman (2006) who gave the same education for a similar period found education to be effective. When the results of other studies are considered, the idea that "the factors that affect language development" are various is getting more reasonable. As a matter of fact, Lonigan and Whitehurst (1998) studied the variables that affect language development of pre-school children. In the study, language education program which had different variables were applied to similar groups of subjects. As a result of the study, it was found out that the variable "whether reading was done at home or not" was effective in language development education program.

In terms of numerical skills, there was not a significant difference between pre-test mean scores of the control and experimental group in language skill. However, post-test mean score of the children in the experimental group was significantly higher than that of the children in the control group. That is, education program affected numerical skills of children.

Clements (1983) applied two different education programs to pre-school children on the development of numerical development which include logical processes and rational counting strategies and tried to find out whether there was a difference between them. In the study, two experimental groups and one control group were formed randomly. While one of the experimental groups was given education on classification and ordering skills (logical structures), the other experimental group was trained on rational counting strategies and other numerical skills (skill composition). The children in the control group were given a program without logical/mathematical content. When the pre-test and post-test result of the study is examined, it was found out that both experimental groups performed significantly higher both in numerical concepts and logical processes compared to the control group. Besides, there found significant differences between experimental groups in favor of the group which received "compound numerical skills".

Coşkun (1990) studied whether computer assisted instruction affected the learning of numerical symbols from one to five by five-year-old children attending nursery school. Experimental group was given computer assisted instruction, and the control group was taught with traditional nursery school teaching techniques. After instruction, post-test was applied to groups. According to the findings, computer assisted instruction was effective in the learning of numerical symbols from one to five; however, traditional education was as effective as computer assisted instruction. While computer training was effective in the learning, recognition, counting and matching of numerical symbols, traditional training was more successful in the learning of writing numerical symbols.

Ürkün (1992) studied the effect of supportive education program -based on mathematical concepts- applied to 4 to 5 year old pre-school children in terms of age and gender. As a result of the study, it was found out that the children in experimental group were more successful than those in control group.

Dere (2000) compared the effectiveness of constructive and traditional methods in teaching some mathematical concepts to six-year-old children from low socio-economic level attending to pre-school education institutions. In the experimental groups, group plays with constructive and traditional methods, preparation activities for reading and writing and table activities were used to teach some

geometric shapes and numerical concepts. Control group was given no instruction. It was found out that the scores of the children- who were taught with constructed method- in shape and Piaget's numerical protection tests increased more compared to those of the children in traditional method group and control groups. It was found out that children who were given preparation activities for reading and writing with constructive method were more successful than children taught with traditional method.

Sancak (2003) compared the effectiveness of computer assisted and traditional teaching method in teaching numbers (form one to ten) and shapes (square, circle, triangle, rectangular) to six-year-old children attending pre-school educational institutions. The experimental group was given computer assisted education, and the control group was given shape and numerical concept education. The group which received computer assisted instruction was more successful than the group taught with traditional method. When Piaget's numerical Protection Test scores are statistically evaluated, it was found out that there occurred significant difference between computer-assisted group and traditional group. It was determined that the group which received computer assisted instruction was more successful than the group which was taught with traditional teaching method.

Sophian (2004) prepared experimental mathematical program. Experimental education program was applied to 46 children in three Head Start centers with weekly project activities. The results indicated that positive effects of experimental education program were significant though at an intermediate level.

Starkey, Klein and Wakeley (2004) developed nursery mathematic program and applied to pre-school classes in public and private schools recruiting children of low and middle income families. As a result of the study, it was found out that mathematical education program significantly increased mathematical knowledge of the children form both socio-economic levels. Young-Loveridge (2004) researched the effect of a program which used games and numerical books on numerical perception in early childhood period and carried out a study with pre-test and post-test and a control group. Statistical analyses revealed highly significant changes in favor of the participants in the experimental group.

Turhan (2004) studied the effect of supportive education program for mathematical concepts applied to children from low socio-economic level attending nursery class on sentence and numerical maturity. In the study, pre-test and post-test design with control group was used. As a result of the study, it was found out that Supportive Education Program for Mathematical Concept applied to children of low socioeconomic level attending nursery school positively affected sentence and numerical maturity scores.

In a study carried out by Aunio, Hautamaki and Van Luit (2005), the possibility of developing numerical perceptions of pre-school children with two intervention programs called *Let's think!* and *Young children with special educational needs count, too!*. Forty-five pre-school children were randomly assigned to control and experimental groups, and the experimental group was given intervention programs called *Let's think!* and *Young children with special educational needs count, too!*. As a result of the study, it was found out that numerical performance of the children in the experimental group increased significantly.

Demirtaş (2005) studied the effect of High/Scope education program on the acquisition of classification and ordering by six-year-old children as one of the mathematical concepts. In this study, whether children acquired classification and ordering concepts as one of the mathematical concepts as a result of the application of the education program prepared according to High/Scope was researched. As a result, it was found out that "Classification and Ordering Training Program According to High/Scope Approach" applied to six-year-old affected classification and ordering -as one of the mathematical concepts- scores positively.

Yılmaz Bolat and Dikici Sığırtmaç (2006) studied the effect of musical game activities on the development of numerical and operation concepts of six-year old children attending nursery classes of three schools in low socio-economic area. In the experimental group, numerical and operation concepts were given with musical game activities and the children in control groups were taught with other activities than musical game. As a result, the fact that numerical and operation concept instruction given to children was received better by the children in the experimental group reveals the effect of teaching with musical games on learning.

Under the light of the data above, it can say SEPELS given to five-six year old children affect their numerical skills.

As discussed above, SEPELS affect children's thinking, language and numerical skills. Therefore, ELS which was formed by these sub-skills was also expected to be different from the control group. As a matter of fact, while ELS post-test score mean of the children in the experimental was 36,37, ELS post-test means scores of the children in control group was found to be 28,76. The difference between these two mean is significant at the level of $P < 0.05$. That is to say, education given to the children affected their early learning skills.

Retention of the Effect of Supportive Education Program for Early Learning Skills:

The assessment of the retention of SEPELS was achieved with the comparison of the mean scores of the children in the experimental group got from Test of Early Learning Skills re-applied four weeks after thinking, language and numerical skills education program was completed with pre-test and post-test mean scores of the experimental group. In the comparison one-way analysis of variance was used. Difference between pre-test mean scores of experimental group and post-test mean score was significant in favor of the post-test. That is to say, SEPELS affect children's thinking, language and numerical skills.

The retention of SEPELS was investigated. In other words, whether its effect on the subjects was lasting or not was studied. The thinking, language, numeric skills and ELS (total) average scores of the children in the control group got on pre-test, post-test and delayed post test are given in Table 3,5,7 and 9. There found significant difference between pre-test and delayed post-test average scores on all skill dimensions. Besides, the difference between the post-test score means and delayed post-test score means of the experimental group on all dimensions was not significant. This finding makes us think that the effect of SEPELS is lasting.

Young-Loveridge (2004) studied the effect of a program in which games and number books on numeric perception in the early childhood and with this aim in mind s/he carried out a study with pre-test/post-test control group. The results of statistical assessments indicated highly significant changes in favor of the experimental group. However, in the follow-up test administrated six months later, it was found out that this effect diminished. This decrease in the effect was attributed to teachers' following normal program after the program was completed and thus the benefits of the activities decreased.

In a study by Aunio, Hautamaki and Van Luit (2005), the possibility of developing numeric perception of pre-school children with two intervention programs called *Let's think!* and *Young children with special educational needs count, too!* was studied. 45 pre-school children were randomly assigned to control and experimental group and *Let's think!* and *Young children with special educational needs count, too!* were applied to experimental group. As a result of the study, numeric perception performances of the children in the experimental group increased significantly. But the difference between the groups diminished.

The findings about retention of SEPELS are supported by the findings of the studies mentioned above. The follow-up period used in this study is different form the one in Young-Loveridge's (2004) study. In this study, follow-up period was four weeks and means from all skill dimensions was relatively lower than mean scores in post-test. Young –Loveridge (2004) administrated follow-up test six months later, and found no significant difference between post-test and follow-up test results. Similarly, in the study by Aunio, Hautamaki and Van Luit (2005), there was not found any significant difference between post-test scores and scores on the follow-up test, which was administrated six months later. When the results of all three studies are considered, it is seen that the effect of SEPELS tend to decrease as time passes. However, it is thought that it will be useful to repeat follow-up test in certain periods.

In Turkey, many studies have been carried out on numeric and language development of children (Yayla, 2003; Turhan, 2004; Demirtaş, 2005; Şimşek, 2007). However, as these studies did not apply follow-up tests, the results of this study could not be compared with their results.

4. Conclusion

According to results of the study, the Supportive Education Program for Early Learning Skills (SEPELS) made positive contributions to the early learning skills of the children in the experimental

group. To test the retention of Supportive Education Program for Early Learning Skills, Early Learning Skills post-test mean scores and follow-up mean score of the children in the experimental group were compared and it was found out that the effect of training retained four weeks later.

In the light of the findings of the study, the following suggestions can be made:

- For further studies, SEPELS can be enhanced as firstly a one-year program; computer activities, family education, and teacher education (professional education) related to early learning skills can be included it. As a continuation of the SEPELS, similar studies can be carried out with primary schools and the results can be tested as 3, 6, 12-month periods both on the effect of SEPELS and on the retention of SEPELS.
- Pilot schools can be chosen to apply Early Learning Skills Education Program so that larger sample group (scaling-up) can benefit from this education and the results can be tested.
- It can be tried on different study groups with different socio-cultural and socio-economic level, children who have difficulty in early learning skills, and the results can be compared.

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61–72 Aylık Türk Çocuklarının Erken Öğrenme Becerilerine Destekleyici Eğitim Programlarının Etkisinin İncelenmesi

Maide ORÇAN*

Adalet KANDIR**

ÖZ: Bu araştırma anasınıfına devam eden altı yaş çocuklarına uygulanan Erken Öğrenme Becerilerini Destekleyici Eğitim Programı'nın çocukların erken öğrenme becerilerine etkisini incelemek amacıyla yapılmıştır. Araştırma deneme modelinde olup kontrol gruplu ön-test/son-test modeli uygulanmıştır. Araştırma örneklemini tesadüfi örnekleme ile seçilmiş olan ilköğretim okulu anasınıflarına devam eden 61–72 aylık çocuklar oluşturmuştur. Araştırmada veri toplama aracı olarak Test of Early Learning Skills (TELS) uygulanmıştır. Araştırmada çocukların Erken Öğrenme Becerileri'ne Erken Öğrenme Becerileri Destekleyici Eğitim Programı'nın etkisini incelemek amacıyla araştırmacı tarafından Erken Öğrenme Becerilerini Destekleyici Eğitim Programı (EÖBDEP) hazırlanmış ve uygulanmıştır. Araştırma sonucunda deneme grubu çocuklarının Erken Öğrenme Becerileri (Düşünme, Dil, Sayı Alt Becerileri ve Erken Öğrenme Becerileri Toplam Puan) puan ortalamaları kontrol grubundakilerden anlamlı düzeyde yüksek bulunmuştur.

Anahtar Sözcükler: erken öğrenme becerileri, düşünme becerileri, dil becerileri, sayı becerileri, destekleyici eğitim programı

ÖZET

Amaç ve önem: Bu araştırma anasınıfına devam eden 61–72 aylık çocukların Erken Öğrenme Becerilerine Erken Öğrenme Becerileri Destekleyici Eğitim Programının etkisini olup olmadığını ortaya koymak amacıyla yapılmıştır. Okul öncesi çocuklarının erken öğrenme becerilerini desteklemek ve değerlendirmek amacı ile dünyada ve Türkiye'de çeşitli çalışmalar yapılmaktadır. Ancak Türkiye'de okul öncesi dönemde bulunan çocukların dil becerileri, düşünme becerileri ve sayı becerileri gelişimi üzerine ayrı ayrı yapılmış çalışmalar olmasına karşın, bunları bir bütünlük içinde ele alan çalışmalara rastlanmamıştır. Bu nedenle bu konuda yapılmış çalışmalara ve iyi tasarlanmış Erken Öğrenme Becerileri Eğitim Programlarına gereksinim duyulmaktadır. Bu araştırmada, bu gereksinime yönelik Erken Öğrenme Becerilerini Destekleyici Eğitim Programı hazırlanmış ve sınanması amaçlanmıştır.

Yöntem: Araştırma ön-test/son-test kontrol gruplu deneme modelinde düzenlenmiştir. Araştırmanın örneklemini Konya il merkezine bağlı ilköğretim okulları arasından tesadüfi küme örnekleme yoluyla seçilen 32'si deney ve 30'u kontrol grubu olmak üzere toplam 62 çocuk oluşturmuştur. Veri toplama aracı olarak çocuk ve anne-babalara yönelik soruları içeren Genel Bilgi Formu ile Erken Öğrenme Becerileri Ölçeği (Test of Early Learning Skills-TELS) kullanılmıştır. Test of Early Learning Skills-TELS, Somwari tarafından 1977'de geliştirilmiş olup Türk çocukları'na uyarlaması Başaran (2006) tarafından yapılmıştır. Araştırmanın verileri frekans ve yüzdelik dağılımlar, ortalama ve standart sapma değerleri, bağımsız t testi, Anova testi ve Bonferroni testi kullanılarak analiz edilmiştir.

Bulgular: Araştırma sonuçlarına göre kontrol ve deneme grubu ön-test puan ortalamaları arasında önemli bir farklılık bulunmazken aynı beceriler açısından deneme grubu son-test puan ortalamaları kontrol grubu son-test puan ortalamalarından anlamlı düzeyde yüksek bulunmuştur. Dolayısıyla Destekleyici Eğitim Programı'nın deneme grubu çocuklarının erken öğrenme becerilerine olumlu yönde katkı sağladığı belirlenmiştir. Programın kalıcılığını test etmek için deneme grubu çocuklarının erken öğrenme becerileri son-testler puan ortalamaları ile izleme testi puan ortalamaları karşılaştırılmış ve eğitim programının etkisinin dört hafta sonra da devam ettiği görülmüştür.

Tartışma, sonuç ve öneriler: Bu sonuçlar ışığında, destekleyici eğitim programının etkililiği; düşünme, dil, sayı becerileri ve erken öğrenme becerileri üzerinde destekleyici eğitim programının etkisi ve erken öğrenme becerileri için destekleyici eğitim programının kalıcılığı tartışılmış ve önerilere yer verilmiştir.

* Dr., Selçuk Üniversitesi, orcan@selcuk.edu.tr

** Doç.. Dr., Gazi Üniversitesi, akandir@gazi.edu.tr