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### Abstract

In this study, the impact of the Map and Globe Use Training Program on the map and globe reading and interpretation skills of five-year-olds continuing to a preschool program was examined. A semi-experimental model with a pre-test/post-test control group was used to assess the impact of a 10-week map and globe use-training program in the preschools of three educational institutions in Turkey. In addition to the daily life experiences of the children selected for the experimental group in the study, the researchers applied the Education Program on the Use of Map and Globe, while the children in the control group continued to be given regular daily education programs by their teachers. The data were collected using the “Map and Globe Reading and Interpretation Skills Assessment Test for Children Aged Five.” As a result of the study, a statistically significant difference at the level of 0.05 was observed between the mean scores of the experimental and control group members’ map and globe reading and interpretation skills. The result reveals that the applied program is effective and permanent in providing children with map and globe reading and interpretation skills.

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### Introduction

Maps and globes are the basic communication tools of geography and provide visual expression of geographic information (Catling, 2020; Demiralp, 2006; Koç, 2008). The map and globe are the most important sources for obtaining geographical information about different places on the earth, communicating geographical information, and showing geographical information (Bednarz, Acheson, & Bednarz, 2006; Özkan Kılıç, Güleç, & Genç, 2014; Wiegand, 2006). In our daily life, maps are tools with a wide range of uses. “Cartography (map science) and earth science have become a major sector within the information economy” (Wiegand, 2006, p. 1). The widespread use of maps today has revealed the necessity for us to acquire and improve the skills of learning to read, interpret, create, and use maps (Bednarz, Acheson, & Bednarz, 2006; Catling, 2020; Fragou & Mavroudi, 2020; Hanus & Havelková, 2019; Kimerling, et al., 2016; Yılmaz & Korur, 2021). Gaining and improving map skills should be seen as an integral part of the school curriculum (Anderson, 1987; Kaya, 2017).

In contrast to the importance of maps in our lives, it is seen that the map education given to children within the scope of geography courses in schools is inadequate. Children leave school before they learn how to use maps effectively (Cohen, 2011; McClure, 1992; Thurmond, 1985). Experimental studies on map and globe education have shown that children can develop map and globe skills when a systematic and planned education is given (Anderson, 1987; Atkins, 1981; Crabtree, 1968; Davis & Hyun, 2005; Griffin, 1992; Johnson, 1999; McClure, 1992; Niffenegger, 1991; Quintero, 1996; Plumleigh, 1970; Rice & Cobb, 1978; Umek, 2003; Saku, 1990; White, 1995).

The time when teaching map and sphere skills should be started has been a matter of discussion in the literature. Piaget's and Inhelder's work on spatial development in children affected educators to postpone map and globe education to later ages (Anderson, 1987). According to Piaget, euclidean (metric) geometry is fully understood by children after age 11, which is when the concept of the map develops (Plumleigh, 1970). However, research conducted in the early 1960s and early 1970s showed that map skills in children appeared at an earlier age than Piaget predicted (Blaut, 1997; Newcombe & Frick, 2010). Research findings showing that children begin to develop competence in the use of maps in the preschool period (Blades, Sowden, & Spencer, 1996; Blaut & Stea, 1971, 1974; Bluestein & Acredolo, 1979; Davies & Uttal, 2007; Marzolf & DeLoache, 1994; Newcombe & Huttenlocker, 2000) have revealed the necessity of teaching these skills from the preschool period (Blaut, 1997). It has also been emphasized in research that the introduction of map and globe skills in education from preschool has a very important impact on later school achievement (Davies & Uttal, 2007; Heckman, 2006).

Experimental research on the education of map and globe skills in preschool has shown that children are able to improve their map and globe skills when given a systematic and planned education. In his study examining the impact of map and globe training with concrete and personal experiences on four- and five-year-old children, Atkins (1981) used an experimental pattern with a pre-test/post-test control group, and the experimental group was given a four-week training on simple map and globe concepts. At the end of the training, it was observed that the scores of the children in the experimental group were higher compared to the scores of the children in the control group.

Anderson (1987) examined the impact of teaching and verbal ability and gender on map reading, analyzing, and understanding skills in a study conducted with the participation of 108 children aged five and six. In this study, while the experimental group was trained with the traditional method, field activities were applied to the other group. The control group did not receive any training on map skills. As a result of the research, it was found that the children in the experimental group benefited from the educational program, and the children who participated in the study performed better in map skill tasks on the illustrated map compared to the abstract map.

The results of the study by Petty and Rule (2008), in which they investigated the effect of a 10-week education program using various materials on the spatial skills of preschool children, show that the post-test results of the experimental group in which activities to improve spatial skills were taken differed from the post-test results of the control group continuing their normal education. Tzuriel and Egozi (2010) examined the effectiveness of an eight-session training program aimed at the representing and transforming of visual-spatial information in an

experimental study with a pre-test/post-test control group of children with an average age of 6 years and 7 months. At the end of the study, children in the experimental group had a greater increase in spatial performance compared to children in the control group.

Tığcı (2003) examined the effect of a spatial perception education program on children's spatial perception development using an experimental pattern with a pre-test/post-test control group. In the experimental study, which involved 52 children aged six years, an eight-week spatial perception training program was applied to the experimental group. As a result of the study, it was revealed that the applied education program positively affects the development of spatial perception of children aged six years.

Adak Özdemir (2011) examined the effect of a spatial skills training program on spatial skills of 60-67-month-old children in a pre-test/post-test control group with an experimental pattern. The spatial skills training program was applied to the experimental group for 12 weeks while the control group were not given any training on spatial skills and continued with the regular education program. As a result of the study, when the post-test score averages of the experimental and control groups were compared, it was determined that the scores of the children in the experimental group were higher compared to the children in the control group, and spatial skills training had a positive effect on the spatial skills of the children.

The origins of the studies on map and globe skills in the literature date back to the 1940s (Koç, 2008). Studies in this field gained momentum after the 1960s, and interest in this subject has continued until today (Demiralp, 2006). Some of these studies are those in the field of psychology, where children's map and globe skills are tested (Blades, Sowden, & Spencer, 1996; Blades & Spencer, 1990; 1994; Blaut & Stea, 1971; 1974; Bluestein & Acredolo, 1979; Liben, 2008; Liben & Downs, 1993; Liben, Moore, & Golbeck, 1982; Marzolf & DeLoache, 1994). It has been observed that some of the studies are experimental studies in the field of education, conducted to associate the experimental findings of psychologists with the teaching of map and globe skills (Anderson, 1987; Atkins, 1981; Brooks, 2005; Boucher, 2010; Cohen, 2011; Crabtree, 1968; Davis & Hyun, 2005; Fischer, 1968; Gorla & Papadopoulou, 2008; Griffin, 1992; Harwood & Usher, 1999; Johnson, 1999; Plumleigh, 1970; Manzella, 2007; Martin, 1977; Niffenegger, 1991; Quintero, 1996; Saku, 1990; Sullivan, 2008; Umek, 2003; White, 1995). It has been found that the studies conducted with preschool children regarding the ability to improve map and globe skills with a systematic and planned education are quite limited (Anderson, 1987; Atkins, 1981; Davis & Hyun, 2005; Gorla & Papadopoulou, 2008). When the research conducted in Turkey was examined, there was no study conducted directly to improve the map and globe reading and interpretation skills of children aged five years. The number of studies on the education of spatial skills in the preschool period (Adak Özdemir, 2011; Hacısalıhoğlu Karadeniz, 2014; Tığcı, 2003) has been observed to be very low.

The aim of this research is to reveal the impact of the "Map and Globe Use Training Program" on the map and globe reading and interpretation skills of five-year-olds continuing to preschool education. An answer will be sought for the question: "Does the map and globe use education program affect the map and globe reading and interpretation skills of five-year-old children who attend preschool education?"

Sub-problems are as follows:

- 1) Is there a significant difference between the pre-test/post-test score averages of the test group children's ability to read and interpret maps and globes?
- 2) Is there a significant difference between the pre-test/post-test score averages of the control group children's ability to read and interpret maps and globes?
- 3) Is there a significant difference between test and control group children's map and globe reading and interpretation skills post-test score averages?
- 4) Is there a significant difference between the post-test/follow-up test score averages of the test group children's ability to read and interpret maps and globes?

## **Method**

### **Research Method**

In this study, a pre-test/post-test control group quasi-experimental design was implemented. Considering that the unbiased assignment of children to groups in an educational institution will disturb the existing classroom structure and order, experimental and control groups were formed with the appropriate sampling method. In addition to the daily life experiences of the children selected for the experimental group in the study, the researchers applied the Education Program on the Use of Map and Globe, while the children in the control group continued to be given regular daily education programs by their teachers.

### **Study Group**

In determining the schools, the geographic location of the schools, the proximity of the families to these schools, the proximity of the educational and socio-economic levels, the school infrastructures and facilities, easy transportation, and time factors were taken into consideration. The experimental and control groups were determined based on the volunteering of the school administration and teachers regarding the application. The study group consisted of 56 children: 28 experimental group members (16 girls, 12 boys) and 28 control group members (14 girls, 14 boys).

In order to define whether the experimental and control groups differ in terms of map and globe reading and interpretation skills, "Map Reading and Interpretation Skills Test for Five-Year-Old Children" was implemented as a pre-test. Independent t-test results on pre-test scores of children in the experimental and control groups' ability to read and interpret maps and globes are given in Table 1.

Table 1. Independent t-Test Results Regarding the Comparison of Pre-Test Scores of Experimental and Control Groups

<b>Test</b>	<b>Group</b>	<b>N</b>	<b><math>\bar{X}</math></b>	<b>Sd</b>	<b>t</b>	<b>p</b>
Pre-test	Experimental	28	11.21	3.30	-1.68	0.10
	Control	28	12.57	2.70		

For the purposes of the study, the pre-test scores of the test and control groups were compared with the independent t-test (Table 1). According to the findings, pre-test score averages do not differ significantly by group ( $t=-1.68$ ;  $p>0.05$ ). As a result of the analysis, the pre-test score averages of the groups are close to each other, similar in terms of map and globe reading and interpretation skill levels, and the differences that will arise in the acquisition of the ability to read and interpret maps and globes will depend on the procedures to be applied to the experimental and control groups.

### **Data Collection Tools**

In this research, the “Map and Globe Reading and Interpretation Skills Evaluation Test for Children Aged Five” prepared by researchers was used as the data collection tool. This evaluation was used as a pre-test, post-test, and follow-up test in the research. In the process of developing the evaluation test, the scope of the test was first determined; then, taking into account the Turkish Preschool Education Program and studies in the literature, qualifications were established for the acquisition of map and globe reading and interpretation skills for children aged five. Later, studies, activity samples, and theses on the use of maps and globes were examined, an illustrated children's map was drawn to measure map and globe reading and interpretation skills, colorful images were prepared, and evaluation questions were created based on these maps and visuals.

Expert opinion was sought to ensure the content validity of the test. A total of 11 experts were consulted: four lecturers in the field of early childhood education and child development, one faculty member each from the primary school social studies, secondary school geography department, and topographical engineering department, an expert academician from scientific research methods and statistics, and three preschool teachers. In line with the suggestions and contributions of the experts, the competencies for the acquisition of map and globe reading and interpretation skills, question expressions, and the illustrated map and colorful visuals were arranged.

For the validity-reliability analysis of the evaluation test, the item difficulty index and item distinctiveness index were calculated by performing necessary item analyses. “Point double serial correlation coefficient” was used in the calculation of item distinctiveness. The reliability of the test was calculated using the Kuder Richardson-20 (KR-20) formula. According to KR-20, the reliability coefficient of the evaluation test was calculated as 0.76. Fraenkel, Wallen, and Hyun (2012) stated that “a test’s reliability of 0.70 and above will be sufficient for the reliability of that test” (p. 157).

### **Map and Globe Use Training Program**

The aim of the program is to support all development areas of the child, taking into account the development levels and characteristics of children aged five. During the preparation process of the program, the developmental characteristics of five-year-old children and the acquisitions and indicators and explanations about the location in the Turkish Preschool Education Program (MEB, 2013) for the development of map and globe reading and interpretation skills were reviewed, and the concepts indicating direction, location, and

dimension in space were examined.

Later, domestic and international master's and doctoral theses and academic publications and examples of activities aimed at improving the ability to read and interpret maps and globes within the websites prepared for the education of preschool children were examined. In addition, learning theories related to the teaching of map and globe skills were examined, and studies on spatial development in children were found to be based more on Piaget's and Bruner's theory of cognitive development. In the acquisition of map and globe skills, it is seen that Bruner's cognitive development theory supports the introduction of map skills to children at an early age according to Piaget's theory (Anderson, 1987). Researchers following the Piaget tradition have suggested that the acquisition of mapping skills in children occurs gradually, and although these skills emerge at an early age, they are very limited, and the development of mapping skills is linked to the development of symbolic representation in children (Wiegand, 2006).

As a result of the literature review, when preparing the map and globe use training program, Bruner's cognitive development periods were taken into consideration and his views on conceptual development and his emphasis on the learning process were taken into account. While preparing the training program, activities aimed at introducing the concepts of maps and globes were planned by following a sequence. With the planned activities, it is aimed to teach children the name of the concept of map and globe, the definitions, characteristics, and importance of these concepts using model globes and maps, thus helping them distinguish between map and globe. In addition, different map examples were shown to the children, especially due to age and developmental characteristics, and illustrated maps and sketches were emphasized.

In the planned activities, attention was paid to the children making sense of their environment with actions and movements and to interact with concrete objects and materials. While providing map skills (location, perspective, signs, distance/scale, and direction) to children, games were used both as a method and as a type of activity; the movement activities were mainly used to increase children's motivation and interest in learning and their curiosity using various materials. In order to ensure the content validity of the curriculum prepared, opinions of a total of 10 field experts were taken, including one program development specialist, five lecturers from child development and early childhood education, two lecturers from the field of primary education social studies, and two preschool teachers. Pilot implementation of the training program was carried out in accordance with expert opinions. The pilot was carried out with 12 children studying in the five-year-old age group of a private preschool education institution. The five activities selected by lottery were implemented within the scope of pilot application for two weeks in order to determine the time to be allocated to activities with pilot application, to identify the difficulties that may be encountered during the application, and to obtain information about the use of educational materials and the interest of children in educational situations.

### ***Implementing Data Collection Tools and the Training Program***

Prior to the collection of the data, the necessary ethical approvals were obtained from the institutions. As a pre-test for experimental and control groups, children were given a "test to evaluate map and globe reading and

interpretation skills for children aged five.” As a result of statistical analysis of pre-test data, the score averages of the groups from the evaluation test were compared, and it was found that there was no significant difference between the score averages, and the map and globe reading and interpretation skill levels were similar. As a result of the pre-test findings, two classes (Experiment A and Experiment B groups) of the five-year-old children attending one of the preschool constituting the study group were determined as the experimental group and the five-year-old children attending the other two preschools as the control group.

The map and globe use training program was implemented by researchers for 10 weeks to the experimental group. Daily education programs were applied to the children in the control group by their teachers, and the education program on the use of maps and globe was not implemented. After the implementation of the map and globe use training program was completed, the “test to evaluate map and globe reading and interpretation skills for children aged five” was applied to the experimental and control groups as a final-test. Four weeks after the post-tests were applied to the experiment and control groups, the test was reapplied to the experimental group as a follow-up test to assess map and globe reading and interpretation skills for children aged five.

### Processing and Analysis of Data

Within the scope of the research, the scores obtained from the evaluation test applied to the experimental and control groups as pre-test, post-test, and follow-up test, and they were encoded in the SPSS 22.0 program with the appropriate statistical analyses. An independent sample t-test was used to determine success differences between experimental and control groups, and a dependent sample t-test was used to compare the average success score of experimental and control groups within themselves. In addition, in all analyses, the value of Cohen d was calculated as the size of the effect. Analysis results were handled at 95% confidence level and  $p < 0.05$  values were considered statistically significant.

## Findings

### Findings on the First Sub-Problem

In order to examine whether there is a significant difference between the experimental group’s map and globe reading and interpretation skills in pre-test/post-test mean scores, a dependent sample t-test was applied. The results are given in Table 2.

Table 2. Dependent t-Test Results on the Comparison of Experimental Group Pre-Test/Post-Test Scores

Group	Test	N	$\bar{X}$	Sd	t	p	Cohen d
Experimental	Pre-test	28	11.21	3.30	-20.03	0.00*	11.19
	Post-test	28	24.07	1.72			

\* $p < 0.05$

For the purpose of the study, the pre-test and post-test scores of the experimental group were compared with the dependent sample t-test (see Table 2). According to the findings, there is a significant difference between the

pre-test and post-test score averages of the experimental group ( $t=-20.03$ ;  $p<0.05$ ). In this case, the map and globe use training program contributed positively to the development of the map and globe reading and interpretation skills of the participants in the experimental group. It seems that the map and globe use training program has a wide impact on the ability to read and interpret maps and globes.

**Findings on the Second Sub-Problem**

In order to examine whether there is a significant difference between pre-test/post-test mean scores of the control group’s map and globe reading and interpretation skills, a dependent sample t-test was applied. The results are given in Table 3.

Table 3. Dependent t-Test Results Regarding the Comparison of Control Group Pre-Test/Post-Test Scores

Group	Test	N	$\bar{X}$	Sd	t	p	Cohen d
Control	Pre-test	28	12.57	2.70	-2.14	0.04*	0.6
	Post-test	28	14.07	3.46			

\* $p<0.05$

For the purposes of the study, the pre-test and post-test scores of the control group were compared with the dependent sample t-test (see Table 3). According to the findings, there is a significant difference between the pre-test and post-test score averages of the control group ( $t=-2.14$ ;  $p<0.05$ ). According the study, there was a significant difference in favor of the post-test between the pre-test mean score (12.57) and the post-test mean score (14.07) of the children in the control group for reading and interpreting map and globe skills (Table 3).

**Findings on the Third Sub-Problem**

In order to examine whether there is a significant difference between the experimental and control group children’s map and globe reading and interpretation skills post-test mean scores, an independent sample t-test was applied. The results are given in Table 4.

Table 4. Independent t-Test Results for Comparison of Experimental and Control Group Post-Test Scores

Test	Group	N	$\bar{X}$	Sd	t	p	Cohen d
Post-test	Experimental	28	24.07	1.72	13.68	0.00*	3.65
	Control	28	14.07	3.46			

\* $p<0.05$

In line with the purpose of the study, the post-test scores of the experimental and control groups were compared with the independent sample t-test (see Table 4). According to the findings, the post-test score averages differ significantly in favor of the experimental group ( $t=13.68$ ;  $p<0.05$ ). The map and globe use training program applied in the experimental group is seen to be effective in improving children’s ability to read and interpret maps and globes.

### Findings on the Fourth Sub-Problem

In order to examine whether there is a significant difference between the experimental group's map and globe reading and interpretation skills post-test and follow-up test mean scores, a dependent sample t-test was applied. The results are given in Table 5.

Table 5. Dependent t-Test Results of Comparison of Experimental Group Post-Test/Follow-up Test Scores

Group	Test	N	$\bar{X}$	Sd	t	p
Experimental	Post-test	28	24.07	1.72	0.82	0.42
	Follow-up test	28	23.79	1.93		

For the purpose of the study, the post-test and follow-up test scores of the experimental group were compared with the dependent sample t-test (see Table 5). According to the findings, there is no significant difference between the post-test and follow-up test score averages of the experimental group ( $t=0.82$ ;  $p>0.05$ ). It is observed that the training program on the use of maps and globes applied in the experimental group has a positive effect on the persistence of the ability to read and interpret maps and globes.

### Discussion

Map and globe skills have long been a research subject in many fields. It has gained even more importance with the advent of digital transformation in map making and their use in daily life. The mobile phones with many location-based applications and games have already become a part of our everyday life, including our children at early school age. Training with a proper content, methodology, and materials on map and globe skills given early in preschool education programs will be a positive contribution to children later in their life in utilizing maps and spatially intelligent technologies.

Research conducted in the 1960s and 1970s found that map skills in children appeared earlier than Piaget predicted (Blades, Sowden & Spencer, 1996; Blaut & Stea, 1974; Davies & Uttal, 2007; Marzolf & DeLoache, 1994; Newcombe & Huttenlocker, 2000) and revealed the necessity of starting the teaching of map and globe skills at an early age (Wilson, 1980). Many experimental studies to improve map and globe skills have revealed that when a systematic and planned education is given, map and globe skills can be developed at an early age (Anderson, 1987; White, 1995). The findings of this study reveal that map and globe reading and interpretation skills can be developed from an early age when children are given an education program suitable for their developmental characteristics, as shown in the literature (Adak Özdemir, 2011; Anderson, 1987; Atkins, 1981; Brooks, 2005; Davis & Hyun, 2005; Gorla & Papadopoulou, 2008; Hacısalihoğlu Karadeniz, 2014; Johnson, 1999; Manzella, 2007; Martin, 1977; Ögütveren, 2014; Petty & Rule, 2008; Sullivan, 2008; Tığcı, 2003; Tzurriel & Egozi, 2010).

Map and globe skills can be taught methodically through activities that are appropriate to the developmental level of children and enriched with various methods and materials. It is understood that map and globe

education programs increase interest in maps and globes among children, make learning fun, increase children's motivation, help them gain knowledge and skills related to maps and globes more effectively and permanently, offer concrete experiences where children can use maps and globes effectively in their real lives, support learning with rich stimuli, improve geographic language in the process of developing map and globe skills, and create positive attitudes and awareness toward maps and globes (Bridge, 2007; Catling 2004, 2020; Fromboluti & Seefeldt, 1999; Mackintosh, 2001; Rayner, 1999).

It is observed that the training program on the use of maps and globes applied in the experimental group has a positive effect on the persistence of the ability to read and interpret maps and globes. This result can be interpreted as the effect of the map and globe use training program on the ability of children in the experimental group to read and interpret maps and globes continuing after the program. This finding is also in line with research that reveals that the effects of the education programs applied to develop map and globe reading and interpretation skills continue after the program (Adak Özdemir, 2011; Atkins, 1981; Davis & Hyun, 2005; Harwood & Usher, 1999; Niffenegger, 1991).

Preschool education contributes to the cognitive, language, social-emotional, and motor development of the child and provides an environment supported by rich stimulants so that the child's mental capacity can be revealed and improved. Environmental stimuli are important because the brain development of children in the preschool period is fast (Akduman, 2010; Uyanik Aktulun & Keser, 2021). According to the findings, it was observed that the education carried out based on the current preschool education program in Turkey contributed positively to the development of map and globe reading and interpretation skills of children in the control group.

In the Turkish preschool education program, the acquisitions regarding location in space, recognition of symbols used in daily life, and reading visual materials are included. Under the acquisition of "S/he applies the instructions regarding the location in the place," the indicators are the children's telling the location of the object, placing the object in the right location in accordance with the instruction, positioning it in the place, and using the map and globe. In addition, the program also included concepts to be taught to children about direction and location in place. These concepts are front-back, up-down, back-forward, right-left, front-behind, bottom-upper-middle, under-middle-above, between, next, above-below, inside-outside, far-near, low-high, and right-left (MEB, 2013). Activities, play experiences and materials (such as blocks, puzzles, play carpets, model toys) applied in preschool education institutions can contribute to the development of children's map reading and interpretation and location skills. This difference between the map and globe reading and interpretation skills of children in the control group can be associated with their experiences in preschool education environments.

This contribution of preschool education in the control group to the development of map and globe reading and interpretation skills of children in the control group is not at the desired level. This result is in line with many studies that show that primary, secondary, high school, and university students in Turkey do not have sufficient levels of map literacy. There are studies stating that the map education given to children and the maps and materials used within the scope of social studies and geography courses in Turkey are inadequate and that children leave school without learning how to use maps effectively (Buğdaycı, 2012; Ertuğrul, 2008; Güneş,

2016; Kartal, 2016; Kuzey, 2016; Merç, 2011; Özkan Kılıç, Güleç, & Genç, 2014; Sönmez, 2010; Tuna, Demirci, & Gültekin, 2012; Yıldız, 2006). As a result, this study and other research results mentioned above reveal that children's success in reading and interpreting maps can be improved with their participation in a strong educational program on map skills. Based on this, it can be said that the implementation of the map and globe use training program in Turkey together with the existing preschool education program (MEB, 2013) is more effective on children's gaining map and globe reading and interpretation skills than in the case where the current preschool education program is applied alone.

## **Conclusions and Recommendations**

In this study, the map and globe reading and interpretation skills of the experimental group to which the map and globe use training program was applied were significantly higher than the post-test score averages of the control group children. The map and globe use training program implemented in the experimental group was found to be effective in improving children's ability to read and interpret maps and globes. In other words, children's ability to read and interpret maps and globes and the use of maps and globes increased through the educational program activities.

In addition, there were no significant differences between the average score of the post-test and the follow-up test of the reading and interpreting skills of the children of the experimental group in which the training program on the use of maps and globes was implemented. The map and globe use training program implemented in the experimental group had positive impact on the map and globe reading and interpretation skills being permanent. Both the results obtained from this study and other research aiming to improve map and globe reading and interpretation skills in the literature show that map and globe reading and interpretation skills can be developed in the preschool period with an effective education program. Considering the fact that there are a few studies in literature on the acquisition and development of map and globe reading and interpretation skills in the preschool period, it is of great importance to support the research results with similar studies.

The current preschool education program in Turkey is focused on the importance of planning activities related to children reading, interpreting, creating, and using maps and sketches. However, in the development of map and globe reading and interpretation skills, supporting them in a systematic and planned structure in which children are active and play is used as both a method and an activity will have a more positive impact on children's performance. Therefore, this study suggests that integrating the education programs prepared for the use of maps and globes with preschool education curriculum. Such a move is likely to make a significant contribution to raising children as map-literate individuals. In order for this integration to be successful, cartographers must work with preschool teachers and children, and map and globe training programs should be prepared with the collaboration of cartographers and experts on the designs of children's maps. Therefore, education ministries of countries can prepare sample training programs aimed at gaining map and globe skills in preschool and work to support these programs with maps suitable for the developmental level of children.

Computer software that improves map and globe reading and interpretation skills can be used in pre-school

education institutions. Activities for the development of map and globe skills can be spread throughout the academic year, and the use of maps and globes can be supported with concrete experiences. Preschool teachers can be given in-service trainings and seminars on geographic skills and map and globe skills. In this way, teachers can be guided on how to integrate map and globe skill development activities with preschool education program. Educational books, activity books, and illustrated children's books are needed for preschool children to gain map and globe skills. In the preparation of these books, an interdisciplinary approach can be adopted while collaborating with child development specialists, cartographers, geography and social studies educators, and preschool teachers.

## Notes

This study is produced from the first author's dissertation.

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