Education and Science

Original Article

Vol 48 (2023) No 213 113-142

The Effect of Orienteering on the Sixth-Grade Students' Academic Achievement and Map Literacy *

Murat Ayuldeş [1], Yavuz Akbaş [2]

Abstract

This study aimed to examine the effects of orienteering practices on the sixth-grade students' academic achievement and map literacy in social studies. As one of the mixed-method designs, this study adopted an experimental (intervention) design, which provides a means of integrating the qualitative approach into an experimental process. Fifty-three sixth-grade students from a secondary school in the eastern region of Turkey comprised the study sample. The study included an experimental group (n= 26) and a control group (n= 27). In the experimental group, the "People, Places, and Environments" unit was taught using orienteering techniques, whereas, in the control group, standard curriculum-based instruction was conveyed. The quantitative data were collected through the Academic Achievement Test (AAT) and Map Literacy Test (MLT), while a semi-structured interview protocol was used to gather the qualitative data. The experimental and control groups were administered the AAT and MLT as pre- and post-tests, and the SPSS 22.0 program was used for the analysis. The students' opinions in the experimental group regarding the orienteering practices were taken through a semi-structured interview protocol. The data obtained from these interviews were subjected to content analysis. The results show no statistically significant difference between the experimental and control groups on the pre-test regarding academic achievement and map literacy levels; however, there was a substantial difference in favor of the experimental group on the post-test. Additionally, the analysis of qualitative data showed that all of the students formed favorable attitudes toward orienteering activities.

Keywords

Social studies
Map
Map literacy
Orienteering

Article Info

Received: 01.04.2022
Accepted: 09.28.2022
Online Published: 01.18.2023

DOI: 10.15390/EB.2023.11528

* This article is derived from Murat Ayuldeş's Master's thesis entitled "The effect of the application of orienteering practices in primary education 6th grade social studies education on students' academic achievement and map literacy levels", conducted under the supervision of Yavuz Akbaş.

[1] Ministry of National Education, Turkey, murat_ayuldes@hotmail.com
[2] Trabzon University, Fatih Faculty of Education, Department of Turkish and Social Sciences Education, Turkey, yavuzakbas52@gmail.com

Introduction

Social studies aim to equip students with the knowledge, skills, and values necessary to become engaged citizens, which is crucial in democratic societies. Students' use of knowledge and skills acquired through this lesson on solving the problems such as social, economic, cultural, political, and environmental provides the lesson objectives to be achieved (Çelikkaya & Yakar, 2020; National Council for the Social Studies [NCSS], 2021). Indeed, for the skills this is more evident. Skills described as the ability and capacity of individuals to carry out tasks and to use knowledge in a responsible manner to achieve a goal (Organization for Economic Co-operation and Development [OECD], 2019), are not an additional or extra component of social studies, but rather a fundamental and indispensable one (Naylor & Diem, 1987). With the 2005 Social Studies Curriculum, an important milestone regarding the teaching of skills in Turkey, the mentality of focusing on knowledge, skills, and values together during the teaching and planning of the lesson was adopted. A similar approach has also been employed in the recent curriculum that was first initiated in 2018. Instead of simply transmitting knowledge, the current educational activities emphasize teaching students with practical skills that they can use to make their lives easier, identify local, regional, and global problems, and come up with solutions. The rapid development and change in information and technology in the 21st century have required individuals to adapt to the era in which they live through having skills such as entrepreneurship, cooperation, using digital technologies, mastering innovation, critical thinking, problem-solving, and questioning. Also, they have made it imperative that educational activities equip individuals with these skills in the first place (Bozkurt, 2021; Ministry of National Education [MoNE], 2018). Moreover, specific skills unique to the 21st century are directly related to students' efforts to transform information into real-world experiences and make it compatible (Bozkurt, 2021).

In social studies, map literacy is one of the basic skills required for students to understand the world in which they live (Gökçe, 2015; Sönmez & Aksoy, 2013). Map literacy includes reading and understanding graphic materials such as tables, signs, charts, labels, plans, and maps. It also includes skills such as accurately calculating lengths, areas, weights, or volumes using appropriate tools (rulers, calculators, etc.) (Bayram & Ramadan, 2005; Clarke, 2003). Therefore, map literacy can be considered an umbrella term encompassing map and map reading skills. Related literature also shows that in addition to reading, interpreting, and drawing maps, map literacy involves skills such as using and creating symbols, positioning, finding directions, transferring information to the map, calculating length and area, using scales, creating a draft map, and profiling (Bayram & Ramadan, 2005; Havelková & Hanus, 2019; Maxim, 1997; MoNE, 2005). One of the basic components of map literacy, map reading, is the skill of interpreting scaled-down two- or three-dimensional maps to determine an area's actual dimensions or features based on the available spatial information. This skill helps individuals to understand that the symbols on the map represent objects/features in the real world and that the map is a projection or superimposition of a place (Bluestein & Acredolo, 1979). On the other hand, multiple factors can influence map reading skills, including the physical (morphological) characteristics of the area being studied, environmental experience, travel experience, developmental characteristics, prior knowledge of the students, and family map use (Apostolopoulou & Klonar, 2011; Clarke, 2003; MoNE, 2005). In this respect, it is believed that students can learn lifelong skills through early map education taught in schools. Maps are practical tools for perceiving, comprehending, and investigating a space when performing daily activities and conducting business in numerous fields (Maxim, 1997). Therefore, the widespread and popular use of maps has increased the need for students to develop their map reading skills (Havelková & Hanus, 2019; Ooms et al., 2016).

Students at all educational levels should practice and gain experience on how the information on maps is obtained and displayed, as well as understand what maps are and what they represent. In addition, students should be taught "how maps, ranging from hand-drawn sketch maps to complicated maps, are created using technology," along with the ability to read and understand maps (Geography Education National Implementation Project [GENIP], 2012, pp. 21). The efforts of students to understand the world through spatial thinking will enable them to recognize and analyze the formation

and distribution of natural and manufactured events occurring in the world, as well as the patterns and designs these events produce. On this account, one of the basic components of spatial thinking is using and creating tools to present spatial data/features such as maps and graphics (GENIP, 2012; National Research Council [NRC], 2006). Using maps in the classroom helps students learn the basic concepts and their interrelations, rationalize the solution to many classroom and real-world problems, and to strengthen their spatial thinking skills (Bednarz, Acheson, & Bednarz, 2006). Map skills are required for almost all disciplines that constitute the content of social studies lessons (Bednarz et al., 2006; MoNE, 2005). The more children have this skill, the better they can perceive the world and the spatial information and relationships inside it (Aladağ, Arıkan, & Özenoğlu, 2021; Gökçe, 2015; Hanus & Havelková, 2019; Havelková & Hanus, 2019). Therefore, map skills are taught to students from an early age, particularly in lessons such as social studies and geography in many countries (Akkuş & Kuzey, 2018; Gökçe, 2015; Hanus & Havelková, 2019; MoNE, 2005; Muir & Cheek, 1991). Even while instructional activities for map skills are extensively included in schools (Muir & Cheek, 1991), it is essential to determine the level of students' map skills and whether the intended skills are gained as a result of these practices (Erol, 2017). Instead of fostering higher-level thinking skills like spatial thinking, problem-solving, and spatial reasoning, teachers use maps in their lessons for objectives such as discovering and showing the location and distribution of geographical features (Bednarz et al., 2006; Hanus & Havelková, 2019), which ultimately undermine the effectiveness of teaching this skill.

Map skill requires complex cognitive competencies. Students need to gain sufficient experience and understanding in this regard (Bednarz et al., 2006; Maxim, 1997). There are many studies carried out to determine the map skill levels of students and pre-service teachers (map reading, drawing, and interpretation, etc.) (Balcı, 2015; Erol, 2017; Öncü, 2019; Özcan, 2015; Sönmez & Aksoy, 2012). At that point, Şenol (2018) claimed that when students are not provided with proper education on map literacy, they even lose the most fundamental skills, such as locating and finding direction, and the expected progress for the skills of their developmental stages do not happen. Some studies suggest that the map skills of students in secondary (Ertuğrul, 2008) and high school (Öncü, 2019) are at a medium level, supporting the claim mentioned earlier. In addition, other studies found that students' map skill levels at the undergraduate level are low (Özcan, 2015) or at a medium level (Koç & Karatekin, 2016). In their study with social studies pre-service teachers, Kuzey and Değirmenci (2019) suggested that students' comprehension of the subject was low regarding skills related to the map concepts and direction. The limitations revealed in the map literacy levels of students at different grade levels, from kindergarten to college, increase the importance of research concentrating on challenges and solutions related to the instruction of this skill. In this context, it has been emphasized that it is more effective to include activity-based and spatial technologies in lessons to gain map skills at different grade levels (Gökçe, 2015; MoNE, 2005; Shin, 2006). However, in their studies conducted with social studies teachers, Cendek (2015) and Ay-Selanik and Yavuz (2016) stated that the instruction about the basic principles of map literacy was based on theoretical knowledge and inadequate amount of in-class and out-of-class activities was offered to students in order to increase learning and retention. Multiple studies highlight that pedagogical practices in developing map literacy skills are limited (Aladağ et al., 2021; Hanus & Havelková, 2019). Therefore, the existing status of map literacy and its instruction can be enhanced by incorporating map reading activities that encourage students' engagement (Üzümcü, 2007). In this respect, spatial technologies such as Google Earth and Geographic Information Systems can also be used to design such activities (Ünlü & Yıldırım, 2017). The most effective strategy to teach students about maps and grab their interest is to allow them to use maps outside of the classroom that will aid them in navigating, plotting routes, and visualizing their immediate surroundings (Blades & Spencer, 1989). In this regard, orienteering is one of the active learning strategies that can be implemented to develop map literacy skills (Avcı, 2013). Adams (1972) suggested that orienteering provides a significant advantage in teaching map skills. This is because orienteering requires problem-solving skills based on map reading and interpretation (Barrell & Cooper, 1986).

Orienteering is a sport that requires cognitive skills such as problem-solving, decision-making, spatial thinking, and map reading, in addition to physical endurance. It is also based on the fulfillment of the assigned tasks quickly in a short time by determining the route, location, and directions in the environment (Bao, Liu, & Liu, 2022; Di Tore, 2016; Johansson, 1986; Ottosson, 1986; Seiler, 1985). In other words, it is like playing chess while running a marathon (Bao et al., 2022). Therefore, it can be very useful in improving map literacy skills desired to be taught at an early age (Orienteering Canada, 2012). With this sport, which requires quickly reaching the checkpoints/targets established in a particular environment using a compass and a map (Mottet, Eccles, & Saury, 2016), children in preschool and primary school can learn directions via compass and improve their map skills. In addition, these learned skills are highly permanent (Güler, 2009). It is understood that studies on orienteering focus on athletes who are particularly interested in this sport (Barrell & Cooper, 1986; Erdoğan, 2019; Mottet et al., 2016; Özdemir, Güreş, & Güneş, 2012; Seiler, 1985).

It is seen that studies on this subject regarding education are primarily conducted in the field of physical education (Acar, 2021; Şengör, 2018). There are also studies on the effects and applicability of orienteering practices in different curricula (F. Karaca, 2008; Kaya, 2020; İmamoğlu & İmamoğlu, 2018; Yılmaz & Dellal, 2020). It can be said that the studies on the adaption of orienteering in the field of education have focused chiefly on mathematics and geography. In mathematics, for instance, research has been conducted on the primary school students' development of mathematical problem-solving skills (Uzuner, 2019), its effects on their social-individual behaviors, and their mathematical-logical intelligence development (Özcan, 2007). There are a variety of research topics on orienteering in geography education, such as using orienteering as a method in geography lessons (Candan, 2019; Tanrıkulu, 2011), revealing students' ideas about orienteering activities used in geography lessons (Avcı, 2013), the effects of orienteering course on the map literacy skills of students in Physical Education and Sports School (Arıkan & Aladağ, 2019) and the effects of orienteering practices on geography teacher candidates' self-efficacy perceptions (Tuna & Balcı, 2013). In social studies education, Yiğit's (2020) study also examines the effect of orienteering practices on students' spatial thinking skills.

It has been emphasized in the literature that orienteering should be utilized as a teaching approach in geography-related lessons (Candan, 2019; Orienteering New Zealand, 2014; Tanrıkulu, 2011; Yılmaz & Dellal, 2020). However, experimental, or practical research on the topic is limited due to a lack of teaching materials and inadequate time for preparation (Andersson, n.d.), the need for teachers with the necessary equipment (Candan, 2019), and the fact that it is practiced out-of-school settings (Di Tore, 2016). Within this framework, it is believed that the present study will contribute to the research on the effectiveness of orienteering-based activities in the teaching of map literacy skills, fill a gap in the relevant literature, and improve the limited teaching practices (Çomak, 2021; Sönmez, 2010; Tanrıkulu, 2011). In addition, this study may also be a guide for researchers who want to use orienteering in their studies and teachers who wish to incorporate orienteering into their social studies lesson.

This study aims to determine the effect of orienteering-based activities on academic achievement and map literacy levels when teaching the People, Places, and Environments (PPE) unit in the sixth-grade social studies curriculum. In addition, the research aimed to address the following sub-problems.

1. What is the effect of teaching with orienteering in social studies lessons on students' academic achievement?
2. What is the effect of teaching with orienteering in social studies lessons on students' map literacy skills?
3. What are the students' views on using orienteering in social studies lesson?

Method

Research Design

In this study, mixed-methods research, which employs both qualitative and quantitative research practices, was utilized to determine the impact of a sixth-grade social studies lesson incorporating orienteering activities on students' academic achievement and map literacy levels. Mixed-methods research is a methodology in which the researcher gathers and analyzes both qualitative and quantitative data, examines the outcomes of both data sets together, and organizes them in a research design to answer the research problem or hypothesis more precisely and in more depth (Creswell, 2017; Creswell & Plano Clark, 2018). Assuming that qualitative and quantitative data have their strengths and weaknesses, combining these two provides significant advantages in terms of eliminating the limitations of the datasets, understanding the research problem comprehensively, and interpreting the research results (Creswell & Plano Clark, 2018; Fraenkel & Wallen, 2009; Gökçe, 2019). This study used an experimental (intervention) design, one of the mixed-methods research designs. In this design, the priority is on the quantitative data obtained from the experimental study. The researcher adds qualitative data to supply and enrich the quantitative data before, during, and after the experimental procedure. The qualitative processes are involved in the research to develop the overall design (Creswell & Plano Clark, 2018; Gökçe, 2019). This design was adopted because the qualitative data regarding the students' perspectives were incorporated into the study after the intervention. The qualitative data gathered after the experiment enables researchers to analyze the results of the intervention in the classroom environment in greater detail and to explain why the intervention is efficacious or ineffective (Creswell, 2017; Creswell & Plano Clark, 2018). The primary section of the study, the experimental dimension, comprised a non-randomized control group design with pre- and post-tests. The quasi-experimental procedure is an experimental research methodology in which study groups are not allocated randomly (Robson, 1993; Şimşek, 2014) and is commonly employed in studies conducted outside the laboratory (Robson, 1993; Şimşek, 2014). The study's independent variable is orienteering, while the dependent variables are academic achievement and map literacy skills. Table 1 below shows the experimental design.

Table 1. The Experimental Design

Groups		**Pre-test**	**Post-test**
Experimental Group	AAT – MLT	Orienteering Practices	AAT – MLT
Control Group	AAT – MLT	Curriculum-Based Teaching	AAT – MLT

After the experimental procedure, semi-structured interviews were conducted to collect data based on the qualitative approach to reveal the students' views on the intervention process. At the end of the study, quantitative and qualitative data were interpreted together.

Research Sample

The research sample consists of 53 students from 6/A and 6/B classes studying in a secondary school in the eastern region of Turkey. The convenience sampling method was used in selecting the sample. The convenient sampling was chosen since it is based on entirely available, quick- and easy-to-reach subjects (Aziz, 2008; Yıldırım & Şimşek, 2011). The study was carried out in the fall semester of the 2019-2020 academic year. The main reason for carrying out the study in this particular school was that it was the closest school to the indoor sports hall in the district. Before determining the groups, the school administration and teachers were interviewed and asked whether the students had any health problems that would prevent them from doing orienteering practices. Due to the physical nature of the workouts, efforts were made to protect students with heart illness, shortness of breath, etc., from experiencing difficulties. In general, the numbers of students in the experimental and control groups were similar in terms of age, gender distribution, and primary school GPA. One of the classes was the experimental group [EG] (n= 26), in which orienteering practices were used; the other group was randomly selected as the control group [CG] (n= 27), in which the standard curriculum-based teaching was delivered. The maximum variation sampling method, one of the purposive sampling methods, was used in determining the students to be interviewed in the qualitative part of the study (Yıldırım & Şimşek, 2011). In this context, the research sample regarding the experimental group consists of 12 students selected on the basis of voluntarism and having different academic achievement levels (low, medium, and high) according to the results of AAT and MLT.

Data Collection Tools

Quantitative data in the study were collected through the "Academic Achievement Test (AAT)" developed by the researchers and the "Map Literacy Test (MLT)" developed by Sönmez (2010), and the qualitative data were collected through the Semi-Structured Interview protocol prepared by the researchers.

Academic Achievement Test

AAT was prepared within the framework of the standards for the 6th grade "People, Places, and Environments (PPE)" unit in the 2018 Social Studies Curriculum (SSC) (MoNE, 2018). A draft test consisting of 33 questions was developed by benefiting from the textbooks, the achievement tests published by the MoNE, and the test books prepared by different publishing houses. After developing test questions, each item must be examined individually. In particular, it should be evaluated in a variety of ways, including whether it assesses the to-be-examined skill, is suitable for scientific accuracy or scientific ethics, and contains any linguistic or grammatical errors (E. Karaca, 2008). Given this, after developing the test items, the questions were examined by three experts in social studies, geography education, and linguistics, and necessary editing was done in line with the feedback received. A pilot study was conducted by administering the draft form to 50 seventh-grade students in four separate schools in the eastern region of Turkey to avoid a missing or incomprehensible part prior to the intervention and establish the test's reliability and validity.

The questions in the AAT have four options. The data obtained after the implementation was calculated by giving a "1" point for the correct answers, a "0" point for the incorrect and blank answers, and when multiple options were selected. Each student's test score was calculated after scoring. Then, item analysis, one of the methods for analyzing item validity (Erkuş, 2014), was conducted with the TestAn software using the scores of the lower and upper groups, item difficulty, and item discrimination index. The item difficulty and item discrimination index values obtained from the pilot application of the 33-item test in the first version of the AAT are provided in Table 2 below.

Table 2. Item Difficulty and Discrimination Values of AAT Pilot Test

Item Number	Difficulty Index	Discrimination Index	Interpretation
1	0,607	0,357	Excellent
2	0,464	0,357	Excellent
3	0,607	0,643	Good
4	0,536	0,643	Good
5	0,429	0,571	Good
6	0,571	0,429	Good
8	0,643	0,571	Good
9	0,286	0,429	Good
10	0,500	0,286	Be improved
12	0,571	0,714	Good
13	0,429	0,714	Good
14	0,357	0,429	Good
15	0,571	0,571	Good
16	0,607	0,643	Good
18	0,821	0,357	Excellent
20	0,643	0,571	Good
21	0,357	0,243	Be improved
22	0,500	0,857	Good
24	0,577	0,846	Good
25	0,464	0,643	Good
26	0,393	0,357	Excellent
27	0,250	0,214	Be improved
28	0,500	0,571	Good
30	0,536	0,500	Good
32	0,500	0,714	Good
33	0,464	0,357	Excellent
Average	0,507	0,519	Good

As can be seen in Table 2, it was determined that the item discrimination index of questions 7, 11, 17, 19, 23, 29, and 31 were below the value of 0.19 according to the results of the analysis. Therefore, those were directly excluded from the test, as items with a value of 0.19 or less must be excluded (Çelik, 2000). In addition, the stems, and distractors of questions 10, 21, and 27 were strengthened, and necessary corrections were made accordingly. Since the other items' discrimination index was high, no action was taken. Table 2 shows that the item difficulty coefficients in the final test ranged from 0.25 to 0.82, and the item discrimination coefficients ranged from 0.21 to 0.85. The item discrimination coefficient takes values between (-1) and (+1). The (+)-signed values of this coefficient indicate that the item's measured quality is compatible with the overall test's measured quality, whereas values near 0 suggest this is not the case (Turgut & Baykul, 2010).

After the AAT pilot application and item analysis, the number of questions in the achievement test was reduced from 33 to 26. Considering the general results of the item analysis, the arithmetic mean of the test was =12,800. Mean of the test difficulty was 0.503, and discrimination coefficient was 0.519. Therefore, the values showed that the test had medium difficulty and high distinctiveness (Turgut & Baykul, 2010). The highest score on the test was 24, and the lowest score was 4. The range value was also 20. The standard deviation was 5,425. Reliability can be estimated using the formula known as Kuder-Richardson (KR- 20) in multiple-choice and true-false tests. The KR-20 measures the internal consistency of a test (Baştürk, 2018, pp. 42). The KR-20 reliability coefficient was 0.794 in the completed test. Considering this value, it was concluded that the test's reliability was high.

Map Literacy Test (MLT)

The map literacy test developed by Sönmez (2010) consists of 25 questions. The questions are organized according to the following skills: using scales, determining location and coordinates, finding directions, measuring distances, understanding and interpreting symbols, and reading and interpreting maps. The content validity study evaluates whether the items adequately represent the subject or behavioral domain of particular interest. This representation is considered both in terms of target behaviors and subject (Tekindal, 2009). Therefore, the content validity of MLT was analyzed. As a result, "distance measurement skill" was removed from the 2018 curriculum despite being included in the 2005 sixth-grade SSC. Therefore, the questions related to this skill were excluded from the MLT, and the number of questions was reduced to 20. Due to this change, item analyses were carried out again. The MLT item analyses are shown in Table 3 below.

Table 3. Item Difficulty and Discrimination Values of MLT Pilot Test

Item Number	Difficulty Index	Discrimination Index	Interpretation
1	0,731	0,538	Good
2	0,538	0,615	Good
3	0,769	0,462	Good
4	0,462	0,462	Good
5	0,385	0,308	Excellent
6	0,308	0,615	Good
7	0,577	0,692	Good
8	0,538	0,923	Good
9	0,615	0,615	Good
10	0,577	0,538	Good
11	0,538	0,769	Good
12	0,423	0,385	Excellent
13	0,500	0,538	Good
14	0,500	0,538	Good
15	0,577	0,538	Good
16	0,577	0,692	Good
17	0,423	0,538	Good
18	0,577	0,538	Good
19	0,769	0,462	Good
20	0,500	0,538	Good
Average	0,544	0,565	Good

As can be seen in Table 3, questions 5 and 12 were excellent, while all other questions were good. Considering the overall item analysis results, the test's arithmetic mean was $\overline{X}$=10.521. The highest score was 18, and the lowest score was 3. The range value was 15. The standard deviation was 4,552. Considering the KR-20 reliability coefficient in the completed test and the value of 0.770, it was determined that the test's reliability level was high. The average difficulty of a test is obtained by dividing the arithmetic mean of the test by the number of items or by dividing the sum of the item difficulties by the number of items. Mean of test difficulty indicates the level of student achievement, the effectiveness of instruction, and the attainability of the desired behaviors (Uyar, 2019). Mean of test difficulty for the MLT was 0.526, and the discrimination coefficient was 0.565. This result indicated that the test was in an ideal range (Çelik, 2000).

Semi-Structured Interview Protocol

The purpose of the semi-structured interview protocol developed by the researchers was to get the student's views on the orienteering activities. In particular, the students were asked to express the points they had difficulty, liked, or disliked while doing these activities. Initially, there were eight questions in the protocol, which were evaluated by two social studies and geography specialists.

Accordingly, based on their comments, the questions were simplified, and the number of questions on the form was reduced to 7. A pilot application was conducted to test whether the students understood the finalized version of the interview protocol. The interview protocol was applied to 13 sixth-grade students in a secondary school in the Eastern region of Turkey, and no problems were encountered.

Preparing Orienteering-Based Teaching Activities/Materials

The scope of the materials used in the study was developed in accordance with the objectives of the topics of "Where am I in the World," "The Beauties of Our Country is on the Map," "The Wealth of Our Country is on the Map" and "Who Lives Around Us" in the 6th-grade PPE unit. When PPE is examined, the third unit of the social studies textbook (Yılmaz, Bayraktar, Özden, Akpınar, & Evin, 2018) taught in the 2019-2020 academic year, and it is seen that there are 26 maps in total, including 1 sketch, 6 World Maps, and 19 Turkey Maps. Thus, orienteering maps were created using textbook maps as a guide.

The ability to find and describe a direction, considered the foundation of reading directions from maps, is a skill that facilitates individuals' daily lives. Consequently, it is a skill people frequently use in everyday life (Akkuş & Kuzey, 2018). Thus, before starting to cover the topics, an orienteering practice was carried out with the students regarding the concepts of place and direction. In this practice, known as grid orienteering, training bowls (funnel-pile) are placed at certain distances. It is one of the activities designed to provide the individual with the knowledge of placing the map in the correct direction (Bektaş et al., 2019).

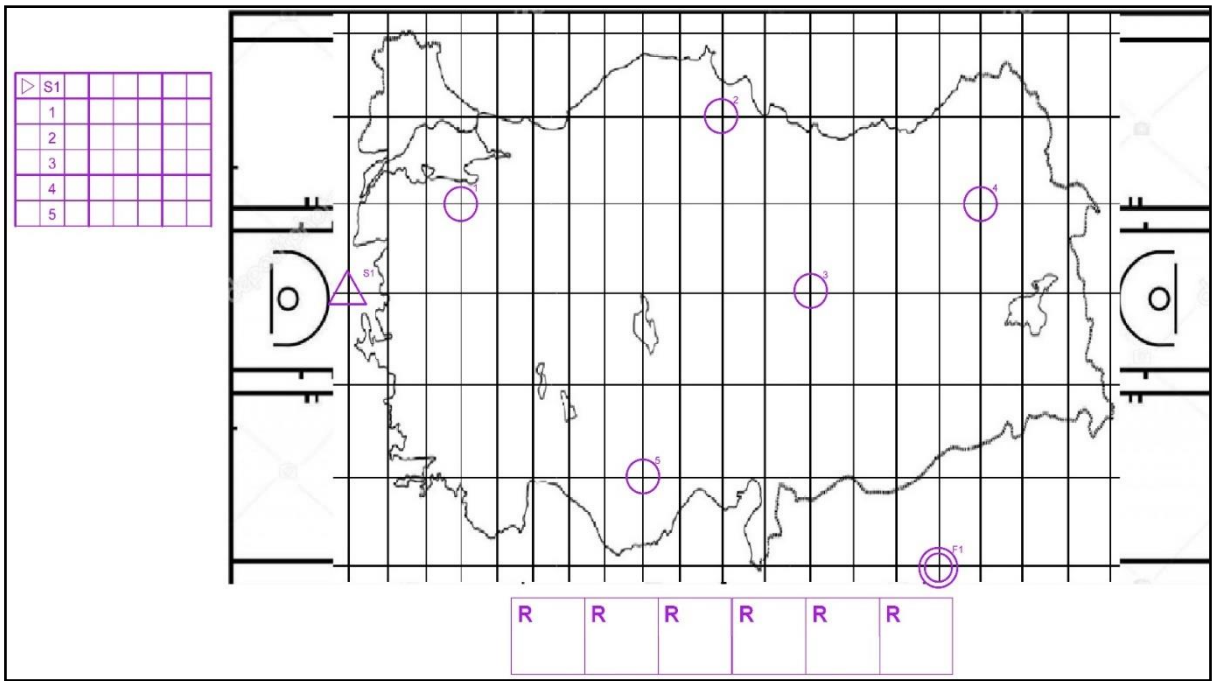
The materials within "Where Am I in the World" (Geographical Location Orienteering Map, Continents and Oceans Orienteering Map, and Turkey Geographical Location Orienteering Map) were prepared with the 'OCAD 10' software, using the maps in the textbook and the World and Turkey maps available on the internet. These maps were created using the OCAD-10 software and printed on A-4 paper.

The materials prepared within the scope of topics "The Beauties of Our Country on the Map" (Turkey's Landforms Orienteering Map, Turkey's Climate and Vegetation Map), "Our Country's Wealth on the Map" (Turkey Economic Activity Orienteering Map, Turkey Mineral Orienteering Map), "Who Lives Around Us?" (World Climate Types Orienteering Map and Matching Memory Games) were also prepared with the OCAD-10 software and printed onto A-4 paper. Necessary corrections and additions were made to these drafts by taking expert opinions. After the corrections, finish lines were added to the maps. An example is given below.

Activity Example 1. Find Your Geographical Location

Lesson / Grade Level	Social Studies / 6th Grade
Learning Area / Topic	People, Places and Environments / Where Am I in the World
Acquisitions and Explanations	6.3.1. Defines the geographical position of continents, oceans, and our country by using the concepts related to location.
Duration	40 Minutes
Material / Tools	Orienteering Map, Orienteering Target
Activity Name	Find Your Geographical Location
Objectives of the Activity	They are asked to find the geographical locations of the provinces in Turkey with the directional concepts in the social studies lesson. To do so, orienteering techniques are used during the lesson. The primary purpose of the activity is to ask the students to correctly find the target points with the coordinate system given in the information box and write them in the right order in the 'control box' after finding them. In this activity, children play games while visiting orienteering targets in order to familiarize themselves with the sport and have fun doing it. Thus, three objectives are gained at the same time.
Application	A sketch of the gym in the school is drawn. Then a map of Turkey is placed on this sketch. Direction concepts on the drawn sketch related to 5 different target points, which have been determined before, are written on the information card. The orienteering track is prepared and multiplied as much as the number of students. Students are asked to go to the targets according to the direction concepts in the information card. Then, they are asked to write the coordinates of the destinations in the control box. Finally, students are asked to show which provinces the numbers in the control box belong to on the 'Political Map of Turkey'. 1- G2° D8° (Mersin) 2- K3° 5° (Bursa) 3- K1° D7° (Samsun) 4- G1° D6° (Erzurum) 5- G1° B4° (Malatya)
Activity Application Field	Gym

Activity Example 2. Find Turkey Geographical Location Orienteering Map



Orienteering Activities Images 1.

Orienteering maps contain information cards, targets, and control boxes above or below these targets to write the information. The pupils first check the information cards on the map and then proceed to the destination based on the information available. They then write the information under the target into the control box. In this way, students complete the practice by reaching all the targets. Orienteering maps are prepared for students to learn the skills taught in the course by living and experiencing. When the students hold the A-4 sheet of paper in their hands, they first determine their location and direction and then try to reach the destination using the map's information. A pilot study was conducted in a different secondary school for the activities prepared before implementation. The students' opinions about the activities were gathered, and they reported initial difficulty but acclimatization with experience. Accordingly, it was determined that warm-up activities would precede the actual implementation.

Experimental Procedure

After necessary permissions were obtained from Trabzon University Social and Human Sciences Scientific Research and Publication Ethics Committee and Erzurum Provincial Directorate of National Education, the implementation was initiated. First, one of the researchers taught the experimental and control groups. Then, before applying orienteering activities in the experimental group, students were informed about the orienteering sport and maps. The teaching consisted of two stages. In the first of the three class hours allotted for the sixth-grade social studies lesson, students were taught theoretical information about the topics' content. Then, in the remaining two class hours, they used orienteering activities to turn the theoretical information they had learned into a skill. Table 4 below shows the weekly lesson schedule.

Table 4. Weekly Lesson Schedule

WEEK 1	
Lesson 1 (Theoretical)	Parallels and Meridians, Continents and Oceans are studied.
Lesson 2 and 3 (Practice)	1-Grid Orienteering 2-Where in the World am I application 3-Find Continents and Oceans application (*Classic course*) 4-Find Continents and Oceans application (*Score course*)
WEEK 2	
Lesson 1 (Theoretical)	Geographical location, Relative and Absolute location of Turkey are examined.
Lesson 2 and 3 (Practice)	1-Find the geographical location of Turkey.
WEEK 3	
Lesson 1 (Theoretical)	Turkey's landforms are examined.
Lesson 2 and 3 (Practice)	1-Find the landforms of Turkey (*Classic course*) application is carried out. 2-Find the landforms of Turkey (*Score course*) application is carried out.
WEEK 4	
Lesson 1 (Theoretical)	The climate and vegetation of Turkey are examined.
Lesson 2 and 3 (Practice)	1-Find the climate and vegetation of Turkey (*Butterfly loop*) application is carried out. 2-Find the climate and vegetation of Turkey (*Classic course*) application is carried out.
WEEK 5	
Lesson 1 (Theoretical)	Turkey's economic activities and mines are examined.
Lesson 2 and 3 (Practice)	1-Find Turkey's economic activities application is carried out. 2-Find the mines of Turkey (*Classic course*) application is carried out. 3-Find Turkey's mines (*Score course*) application is carried out.
WEEK 6	
Lesson 1 (Theoretical)	Different climate types and characteristics of the world are examined.
Lesson 2 and 3 (Practice)	1-Find World Climate Types (*Classic course*) application is carried out. 2-Find the World Climate Types (*Memory Games Matching*) application is carried out.

The activities mentioned above were designed in accordance with the standards of SSC. The order of the activities was also determined according to the learning outcomes in the curriculum. The sixth-grade PPE unit was covered in a total of six weeks. During this time, fourteen activities were carried out in the lessons.

In the control group, the lessons were taught through regular curriculum-based instruction. In the lessons with the control group, for instance, topics and concepts were presented in three class hours, and the activities based on the comprehension questions and exercises in the textbook were carried out related to the topic of 'Where Am I in the World', which was covered in the first week. At the end of the lesson, open-ended, multiple-choice, true-false, and fill-in-the-blank questions were administered using the smart board for general evaluation. In the control group, the other three topics were taught in a similar way for five weeks.

Data Analysis

SPSS 22.0 software was used to analyze the data received from the academic achievement test and the map literacy test. Initially, the data with missing values were examined during the data analysis, and no data loss was detected. Then, it was examined whether the pre-test and post-test scores of the students in the experimental and control groups obtained from both measurement tools showed a normal distribution. Levene test was used to test the assumption of homogeneity. Since the number of

students in each study group was 26 and 27, the Kolmogorov-Smirnov test was used for normality analysis, and the kurtosis and skewness values of the data were checked. As a result of the normality analysis, it was decided to use parametric tests since the data showed a normal distribution ($p>0.05$; skewness and kurtosis= ±2.00) (Can, 2017). In this context, independent samples t-test among parametric tests was used to determine the significance of the difference between pre-test and post-test scores obtained from academic achievement and map literacy tests. Finally, Cohen's d formula was used to determine the effect size of the experimental procedure as a result of analyses. *Cohen's d* formula is widely used in calculating the effect size for statistical methods in which the difference between the mean of two groups is calculated (one-sample t-test, t-test for paired samples, t-test with unpaired samples, etc.) (Cohen, 1988; Özsoy & Özsoy, 2013). In interpreting the effect size, d= .20- small, d=.50- medium, d= .80, and above as large for d value (Cohen, 1988, pp. 20).

Before conducting the semi-structured interviews for the qualitative part of the study, the students were informed that their responses would be used for academic research. Then, they were asked to answer the questions accurately and sincerely. Next, one of the researchers conducted in-person and voice-recorded interviews. The interviews took approximately 30-40 minutes. The audio recordings were then typed and transcribed. Finally, content analysis was used in the analysis of the qualitative data. Since the common themes voiced by the students in the interviews had been identified, codes and categories were developed, and the researchers explained them within a context (Yıldırım & Şimşek, 2011). "Coding the data (reducing the data to meaningful parts and giving names to the parts), combining the codes under broad categories or themes and presenting them with graphs, tables, and charts, and making comparisons between them are the basic elements of qualitative data analysis" (Creswell, 2007, pp. 148). The analysis was carried out following the stages specified by Miles and Huberman (1994). Before coding, therefore, first, all interview data were read and examined, and preliminary preparations were undertaken. Then, comparable views and expressions were identified, codes were determined, and a code list was compiled. Finally, two researchers independently analyzed the data in accordance with the predetermined codes. In this procedure, a consensus was reached during the analysis process, which was conducted by consulting at regular intervals. Then, the codes forming a meaningful whole were brought together, and categories were formed. Inter-rater reliability is one of the methods to ensure data reliability in qualitative research (Cohen, Manion, & Morrison, 2000). The reliability formula (Reliability = Number of Consensus/ [Number of Consensus+ Number of Disagreement] x100) suggested by Miles and Huberman (1994, pp. 64) was used to determine the agreement between coders, and the percent of agreement among the coders was found to be approximately 89%.

Results

This section presents the findings from the data collection tools based on the research problems.

Results Regarding the Academic Achievement Test (AAT)

Students in the experimental and control groups were administered the AAT (Academic Achievement Test) as a pre- and post-test. The scores of the students in the experimental and control groups before the application were compared with the independent samples t-test by checking the scores they got from the pre-test. The results are shown in Table 5 below.

Table 5. T-Test Results of the Experimental and Control Group's AAT Pre-test Scores

Groups	N	$\overline{X}$	Sd	t	Df	p
Experimental Group	26	9,30	4,82	.525	51	.602*
Control Group	27	8,70	3,47			

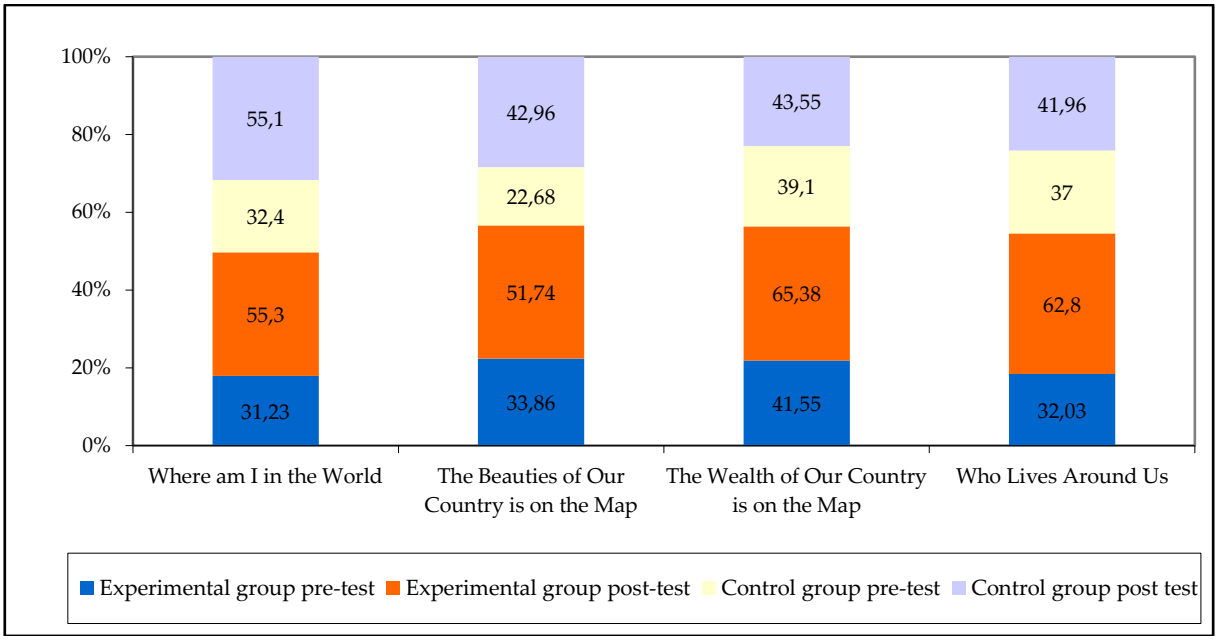
When the pre-test results of the experimental and control groups were compared, there was no significant difference between the achievement scores of the groups before the implementation according to the t-test results ($t_{(51)}$ =-.525: *p>0.05). The experimental and control groups were close to each other in terms of academic achievement levels before the experiment (see in Table 5). However, when the average scores of both groups were examined, it was seen that the experimental group $\overline{X}_{(Experimental)}$=9.30 and the students of the control group $\overline{X}_{(Control)}$=8.70 were very close to each other. After comparing the post-test scores of students in the experimental and control groups using the independent samples t-test, the results are presented in Table 6.

Table 6. T-Test Results of Experimental and Control Groups' AAT Post-test Scores

Groups	N	$\overline{X}$	Sd	t	Df	p
Experimental Group	26	15,42	4,92	2,689	51	.010*
Control Group	27	12,14	3,89			

Comparing the post-test results, it was determined that there was a significant difference between the achievement scores of the groups after the implementation and that the effect size of the difference was at a moderate level according to the t-test results, ($t_{(51)}$ =-2,689: p=0.10, <0.05; Cohen's d= 0.739). The academic achievement level of the experimental group increased compared to the control group after the experiment (see in Table 6). Considering the average scores of both groups, the experimental group $\overline{X}_{(Experimental)}$=15.42, and the control group $\overline{X}_{(Control)}$ =12.14, it is seen that the experimental group increased the average success rate more (3.28%) than the control group.

The topics in the AAT and the correct answer rates for each topic are given in Graph 1 below to present the success variations between the experimental group and the control group.



Graphic 1. Correct Answer Rate of AAT Questions by Experimental and Control Group Students

AAT was prepared under four different topics. As seen in Graphic 1, the experimental group understood the topics better than the control group, and their success rates were higher. As can be seen in the graph, "Who Lives Around Us" was the topic where students' success rates increased the most in the experimental group, while "Maps are the Beauties of Our Country" saw the maximum increase in the control group.

Results Regarding the Map Literacy Test (MLT)

Students in the experimental and control groups were administered MLT as a pre-test and post-test to examine the influence of orienteering activities on map literacy skills. Then, the independent sample t-test was used to compare the post-test scores of students in the experimental and control groups following the application, and the results are shown in Table 7 below.

Table 7. T-Test Results of MLT Pre-test Scores of Experimental and Control Groups

Groups	N	$\bar{X}$	Sd	t	Df	p
Experimental Group	26	6,61	2,53	.459	51	.648*
Control Group	27	6,29	2,52			

When the post-test results of the experimental and control groups are compared, the results of the t-test indicate that there is a significant difference in the groups' achievement scores after the implementation and that the effect size of this difference is high ($t_{(51)}$ =-.459: *p>0.05). According to these findings, it is seen that the experimental and control groups were close to each other in terms of map literacy levels before the experiment was carried out. Considering the average scores of both groups, the experimental group $\bar{X}_{(Experimental)}$= 6.61, and the control group $\bar{X}_{(Control)}$= 6.29, it is seen that the average scores of the experimental and control groups are close to each other.

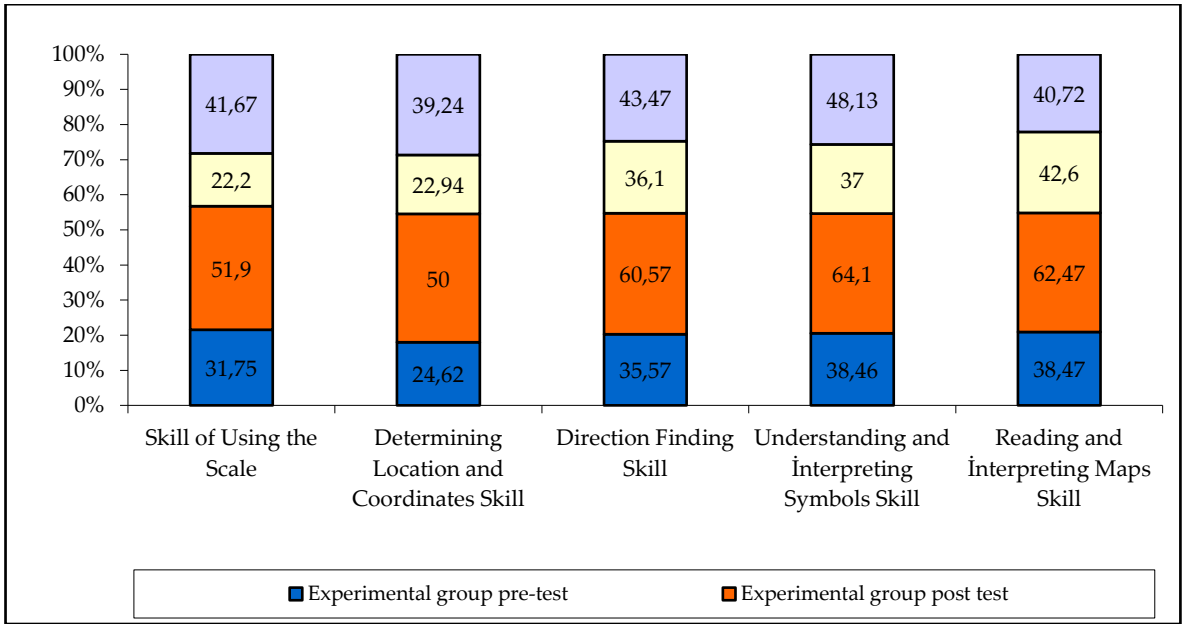
The post-test scores of students in the experimental and control groups were compared with the independent samples t-test after the implementation of the intervention, and the results are shown in Table 8 below.

Table 8. T-Test Results of the Experimental and Control Groups on the Map Literacy Test Post-test Scores

Groups	N	$\bar{X}$	Sd	t	Df	p
Experimental Group	26	11,42	3,77	3,349	51	.002*
Control Group	27	8,48	2,51			

When the post-test results of the experimental and control groups were compared, the t-test revealed that there was a significant difference in the groups' scores after the implementation, with a large effect size ($t_{(51)}$ =-3,349: $p<0.05$; Cohen's d= 0.918). These findings suggest that the map literacy achievement levels of the experimental group were increased compared to the control group after the experiment. When the average scores of both groups were examined, the experimental group $\bar{X}_{(Experimental)}$ = 11.42, and the control group $\bar{X}_{(Control)}$ = 8.48, it is seen that the experimental group increased the average success more compared to the control group (2.62%).

The MLT skills and the overall average values of the answers within these skills are shown in Graphic 2 below to illustrate the skills in which the experimental and control groups differed in success.



Graphic 2. Correct Answer Rate of MLT Questions by Experimental and Control Group Students

It is seen that the students in the experimental group increased their success rates more than the control group, except for the questions about the scale-use skill. On the post-test, students in the experimental group correctly answered questions about understanding and interpreting the symbols, while students in the control group improved their proficiency in using scales.

Results Regarding the Interviews

Regarding the orienteering practices implemented in the social studies lesson, the views of 12 students from the experimental group were gathered through semi-structured interviews. The students were asked questions about orienteering practices and their experiences regarding these practices in the social studies lesson. The results of the qualitative analysis are presented in Table 9.

Table 9. The Views of Experimental Group Students on Orienteering Practice

Category	Code	Description and Students	Sample Answers	f
The Contribution of Orienteering to Learning	Better understanding and detailed learning	The students stated that orienteering practices provided more meaningful and permanent learning by emphasizing the active and experience-based learning environment. S1, S2, S4, S5, S6, S7, S8, S9, S10	*Doing it practically in the social studies lesson makes it more permanent in one's mind. We are both having fun and learning, which is a very good thing (S10).*	9
	Learning with fun	The students emphasized that they enjoyed the orienteering-based activities. S1, S3, S7, S8, S9, S11, S12	*The positive aspects are that we learn very well, and it is very fun (S9).*	7
	Increasing class participation	The students stated that the activities took the lesson out of its routine and motivated them to participate in the lesson. S1, S6, S7, S11	*I think it made a lot of changes. For example, we had a great time. Of course, since we are children, we love to have fun. Class participation increased. We can't wait for the social studies class to come (S7).*	4
Favorite Activities	Memory Matching Games	The first activity that the students enjoyed the most: they evaluated the activity as enjoyable, effective, and understandable. S3, S4, S5, S8, S10	*It was the last one because it was so good and fun (S8).*	5
	Find Continents and Oceans	Students evaluated the activity of locating the continents and oceans as fun and understandable. S1, S5, S6, S9	*It was to find the continents on the map. It was very good; I understood the lesson (S6).*	4
	Find Your location	The students evaluated the Find Your Geolocation activity as understandable. S5, S7, S12	*Each activity was better than the other, but finding your geolocation was the best (S12).*	3
	Grid Orienteering	Students liked the grid-orienteering activity the least. S2, S5, S11	*I liked the first activity more. But they were all good, we did different things, and it had a positive impact (S11).*	3

Table 9. Continued

Category	Code	Description and Students	Sample Answers	f
Challenges Experienced in the Activities	Individual challenges	It was emphasized that group work was more efficient. S2	*As I said above, I did not understand much from the work we did alone. And it was hard (S2).*	1
	Lack of knowledge	It was stated that they experienced faultily due to a lack of positional information related to continents and oceans. S5	*I had a little difficulty memorizing the continents. There is no activity that I dislike (S5).*	1
	Similarity of targets	It was deemed problematic that the mine-related targets on the track were close to one another. S7	*The reason why I had difficulty in the section of underground resources was that the location of each underground resource was similar to each other (S7).*	1
Recommendations Regarding the Implementation	Doing different activities and in different venues	Students desired that implementation be conducted outdoors rather than indoors. S2, S4	*For instance, we could go to other places and practice there. Or it would be better if we did it outside. Of course, when the weather is hot (S2).*	2
	Different competitive activities	Since the last activity involved competition, the students had more fun and wanted to compete in other activities. S3, S7	*Yes, for example, it could be a game like a maze. Or it could be a game similar to the latest game (S3).*	2
	Giving a hint	Students ask for help when they can't find the targets. S5	*Yes. It can be carried out in the form of hide and seek. It can be carried out in the form of hot or cold (S5).*	1
	Displaying the map with different materials	They suggested that the world and Turkey maps should be drawn differently on the ground. S12	*I have suggestions. I think it could be the map of Turkey, not with the ropes. But it was fun with the ropes as well (S12).*	1

Table 9 demonstrates that the majority of students had favorable perceptions regarding the use of orienteering activities during the teaching process. Most of the students stated that teaching through orienteering provided more meaningful and permanent learning (f=9), learning with fun (f=7), and increased class participation (f=3). Among the orienteering activities that the students liked the most were memory matching games (f=5), finding continents and oceans (f=4), finding location (f=3), and grid orienteering (f=3). Some students stated that they lacked subject knowledge and experienced difficulties carrying out activities, performing individual tasks, and positioning close targets. In addition, it was observed that the students had suggestions for the teaching process, including "creating different activities in different places and showing the map with various materials," as well as "more competitive activities" and "providing clues during the activities."

Discussion and Conclusion

With the activities employed in this study, an attempt was made to create a setting in which students can, on the one hand, engage in orienteering and, on the other hand, gain knowledge of the subject matter. In this context, the experimental group students improved their performance on the AAT post-test outcomes, on average, more than the control group students. This was observed more clearly in the subject (Where am I in the World?), which includes the concepts of place, direction, latitudes and longitudes, continents, and oceans. At this point, the 'Grid Orienteering' activity (Activity 1) related to direction finding was effective. Direction finding is one of the basic components of orienteering (Deniz et al., 2012; Mottet et al., 2016). This activity, which requires determining the direction in a short time and while in motion in unpredictable and complex settings, presents an essential study area for evaluating and enhancing people's navigating skills (Mottet et al., 2016). Therefore, this skill was also included in most of the other activities. Students' success was expected to increase as their orientation skills grew. It has been suggested in different studies that orienteering improves navigation skills (Adams, 1972; Avcı, 2013; Kara, 2020; Orienteering New Zealand, 2014; Sezgin, 2020; Tuna & Balcı, 2013). In one of the activities related to this subject (Activity 5), a sketch of the school gym was drawn, and then the "Map of Turkey" was placed on this sketch. The directions were given on the sketch information card, which required reaching five previously specified destinations. The number of prepared sketches was multiplied by the number of students, and the students were instructed to follow the directions on the information card to reach the designated locations. Then, they were instructed to write the coordinates of the destinations in the control boxes and, at the final part of the activity, to indicate on the 'Political Map of Turkey' which provinces the coordinates they wrote in the control boxes correspond to. This activity aimed at developing students' direction-finding skills. However, during the implementation, it was observed that some students had difficulty finding the given target points. This may be because students did orienteering activities for the first time. The students' recommendation for providing clues during the orienteering course confirms this perspective (Table 9). Uzuner (2019) also emphasized that as students' orienteering experience increases, they find their target points more precisely.

The implementation of orienteering activities with the giant maps of Turkey and the World drawn on the floor of the indoor sports hall effectively improves students' understanding of the concepts. Experimental group students tried to learn the subjects of "The Beauties of Our Country on the Map," "The Wealth of Our Country on the Map," and "Who Lives Around Us" on maps, according to the instructions given to them. In this process, students could think and understand verbal and spatial knowledge and skills simultaneously and create mental structures accordingly. For instance, within the *'Find Turkey's Mines (Classical Course)*' activity (Activity 11), the places where the mines are processed were shown on the Turkey map drawn on the gym floor. During the activity, students were required to complete the "find the mines" task, reach the targets on the map, and examine the information beneath them. Thus, it was ensured that the information about the mines and the places where the mines were in Turkey were matched and reconstructed in their minds as a whole. This was followed by the *'Find Turkey's Mines (Score course)*' activity (Activity 12). Unlike the previous

application, it was necessary to know the mine and its functions on the information card and reach the destinations on the map to figure out the correct route. This way, it was ensured that students learned the subject by understanding their spatial distribution and connections. In this regard, Anthamatten, Bryant, Ferrucci, Jennings, and Theobald (2018) also stated that using giant maps in lessons can improve spatial thinking and map reading skills.

In the study, the activity on climate and vegetation (Activity 8) was conducted on a Turkey map drawn on the ground. On the map, the places where the three primary climates that are effective in Turkey are surrounded by ropes of different colors. Within the framework of the butterfly orienteering rules, after the students visited the targets in each climate zone, they came to the center and associated the characteristics of the climate and vegetation in the other targets with the climate type in the center. Afterward, the "Find the Climate and Vegetation of Turkey (classic track) activity" (Activity 9) was conducted to reinforce the newly acquired knowledge. On the ground was drawn a map of Turkey's latitude and longitude. Eight different targets were marked on the map. Students were instructed to write each target's coordinates in the maps' control boxes. It was emphasized that they should indicate to which cities these coordinates belong and the climate and vegetation prevalent in these cities using the 'Political Map of Turkey.' These exercises, consisting of map-based activities integrated into the orienteering course, enhanced the experimental group's students' understanding of the subject material. In their research, Nurses (2014) stated that students' success increased more in social studies lessons taught by using visual materials on subjects including climate and its characteristics.

Another factor affecting the experimental group's success in AAT is that orienteering practices appeal to different intelligence types and skills. Considering this, Özdemir et al. (2012) stated that orienteering plays an active role in increasing students' mental, emotional, and physical skills. In this respect, the activity of *"Find World Climate Types - Matching Memory Games*" (Activity 14) can be shown as an example. This activity was designed to teach the characteristics of the four climate types with the greatest global impact. For the implementation of the activity, images of shelter, clothing, transportation, and precipitation graphs belonging to four climate types were placed in different corners of the sports hall. In one of the images placed opposite each other, visuals of the climate were paired, while the visuals on the opposite side were in a complex form. That students run to the opposite side after looking at these paired visuals can be an example of physical/psychomotor acquisitions. Furthermore, after reaching the visuals, keeping them in mind and matching them with the ones in the other corner can be an example of the acquisitions at the cognitive level; and the interest and motivation demonstrated during the activities -as can be understood from the student comments in the interviews- can be an example of the acquisitions in the affective dimension.

Although there are few studies examining the effect of orienteering on academic achievement levels in social studies lessons, it has been emphasized in numerous studies that, due to its characteristics as a sport that not only develops the body but also trains the mind and requires physical competence and intelligence, orienteering produces successful results in the education of different skills (Deniz et al., 2012; Ottosson, 1986; Seiler, 1985). On this point, Baytaş (2021) found that orienteering practices positively contributed to developing mental and psychomotor skills in deaf and hard-of-hearing students at the secondary school level. In addition, it was emphasized that it enhanced problem-solving skills and the ability to make correct and prompt decisions (Bektaş et al., 2019; Orienteering New Zealand, 2014; Seiler, 1985). Furthermore, in their study involving students with attention deficit and hyperactivity disorder, Uzuner (2020) stated that students' problem-solving skills increased positively with orienteering activities. Parallel to the present study's findings, other studies have demonstrated that orienteering facilitates the transfer and development of geographical subjects (Aksın, 2008; Avcı, 2013; Candan, 2019; İmamoğlu & İmamoğlu, 2018; Tuna & Balcı, 2013). On this basis, Tanrıkulu (2011) suggested that orienteering could be used to teach social studies in primary education, geography in secondary education, and geographical subjects at the undergraduate level.

When the experimental and control group students' MLT post-test scores were compared, it was seen that the results were in favor of the experimental group and that the development of the map literacy skills of the students in this group was higher. It is believed that out-of-class activities and orienteering maps contributed to the success difference between the experimental group and the control group, which favored the experimental group. Similarly, other studies show that students' map skills improved more when assisted with maps in the classroom (Avşar, 2010; Buğdaycı & Selvi, 2021; Demiralp, 2007; Ooms et al., 2016). In addition, out-of-class activities can be shown as another factor affecting the difference in success between both groups. In this sense, Sönmez and Aksoy (2012) emphasized that out-of-class activities should be used in the context of teaching geography. In this study, two-thirds of the lessons were taught outside the classroom, and the interviews with students revealed that teaching lessons outside the classroom improved student participation and motivation. Similarly, other studies concluded that the use of out-of-class activities increases students' motivation and academic success (Aladağ et al., 2021; Üzümcü, 2007).

Considering the use of scales by the students, the control group's success level increased more than that of the experimental group. Relevant literature shows that orienteering has a positive effect on the ability to use scales (Avcı, 2013; F. Karaca, 2008; İmamoğlu & İmamoğlu, 2018; Tuna & Balcı, 2013). However, the present study's findings are inconsistent with the literature. This is because the field (gym) where all the activities take place was the same; hence the orienteering maps prepared for the activities were all designed to the same scale.

Reviewing the related literature, it can be seen that orienteering has a positive effect on navigation and map reading skills (Avcı, 2013; Barrell & Cooper, 1986; Bektaş et al., 2019; Candan, 2019; Çomak, 2021; F. Karaca, 2008; İmamoğlu & İmamoğlu, 2018; Ottosson, 1986; Özcan, 2007; Seiler, 1985; Tuna & Balcı, 2013). In addition, having spent a great deal of time with maps while orienteering, students are better able to understand maps created for a variety of objectives (Aksın, 2008; Barrell & Cooper, 1986). However, studies are limited in terms of providing data on this subject. In their research, Arıkan and Aladağ (2019) found that orienteering practices improved the map literacy skills of undergraduate students in the School of Physical Education and Sports at a moderate level. However, according to the findings of this study, orienteering had a positive impact on the map literacy skills of students. Therefore, it can be stated that it would be beneficial to incorporate orienteering as a teaching method for improving map literacy and other geographical skills in social studies classes. However, an examination of the relevant literature reveals that the map-reading skills of students in primary and secondary schools are inadequate (Erol, 2017), and it is recommended that these deficiencies be addressed through the use of supplementary resources (Maxim, 1997) and active learning methods (Üzümcü, 2007).

During the interviews with the students in the experimental group, they were asked about the lessons taught through orienteering practices. According to their responses, phrases such as "understand and learn better," "improve engagement in the course," and "it is lasting and enjoyable" are prevalent. Most responses indicate that incorporating orienteering into social studies promotes student participation and interest. It is noted that similar results were obtained in other studies as well (F. Karaca, 2008; Tuna & Balcı, 2013). For instance, Bektaş et al. (2019) argued that orienteering plays a crucial function in the development of cognitive skills, similar to a code revealed in this study, 'understands and learns better. Encouraging self-confidence and decision-making ability (Adams, 1972) can also be assumed as a factor that increases students' interest and participation in the lessons. In addition, the students underlined in interviews and practices that the primary appeal of orienteering is its enjoyment, which is also emphasized strongly by Ferguson and Turbyfill (2013) in their research. In a similar vein, Sezgin (2020) concludes, based on interviews with students regarding orienteering practices, that all students enjoyed and appreciated the orienteering activities.

In the interviews, it was observed that every student had a positive attitude toward the practices. The positive impact of orienteering on individuals is supported by other studies (Alkan, 2021; Avcı, 2013; Özcan, 2007; Tuna & Balcı, 2013; Uzuner, 2019; Yılmaz & Dellal, 2020). However, three of the experimental group's students who were interviewed reported having difficulty with the tasks. One of the students, for instance, reported having difficulties understanding particular tasks. This situation could result from the student's lack of peer support in individual activities. According to the literature on orienteering, it has positive effects on health, intelligence, enjoyment, and social interaction (Li, 2021). In addition, it provides a foundation for students to overcome obstacles more readily by working together (Alkan, 2021). Another problem indicated as difficulty during implementation is the lack of knowledge about the continents' locations due to the inability to match the names of the continents with their specific locations. *Orienteering* is a sport that effectively employs cognitive processes, strategies, and spatial memory (Bao et al., 2022; Di Tore, 2016). In this regard, it is expected that a student who is confused about the continents will have difficulty formulating a strategy and determining where to go during the activities. Another student explained that s/he had difficulty during the practices because "*the targets look the same*". "Find Turkey's Mines" is the title of the implementation in which the student mentioned similar targets. At this point, it can be argued that individual differences in spatial thinking skills and cognitive learning processes are effective in terms of the student's experiences of difficulty with particular tasks. In addition, the proximity of the mines' extraction areas is considered a contributing factor to this problem. Moreover, it is important to state that when the experimental group's students' responses to the AAT questions concerning mine were compared to those of the control group, the experimental group had a higher percentage of correct responses.

Considering the implementation, 'Different places' and 'different activities are the most general keywords in the students' recommendations. Another major concern among the students was that the operations should be done on a competitive basis. Literature suggests that orienteering enhances feelings of competition and excitement (Aksın, 2008; Bektaş et al., 2019; Deniz et al., 2012). Furthermore, Güler (2009) asserted that well-adjusted competition in orienteering activities is an important stimulus in the learning process. However, it was also underlined that a highly competitive environment would have the opposite effect on student growth. Consequently, the present study's findings show that using orienteering as a strategy in social studies classes enhanced student participation and interest.

Suggestions

The implications derived from the research findings and the implementation experiences collected by the researchers are presented below.

- This study was conducted exclusively with sixth-grade students. However, orienteering can also be practiced with students in the fourth, fifth, and seventh grades who are also taught the social studies course. Additionally, it is believed that incorporating orienteering activities into the instruction of other subjects within the social studies course would be advantageous.
- Future research is needed to examine the impact of orienteering practices on the development of skills such as decision-making, location analysis, collaboration, spatial thinking, and problem-solving.
- Including warm-up activities such as grid orienteering before orienteering-based instruction may help students adjust to the process more quickly.
- For orienteering activities, it can be helpful to create maps on the ground with paint or chalk to prevent the risk of boundary lines shifting during implementation.
- The PPE learning area corresponds to the wintertime. Therefore, altering the social studies curriculum and choosing days with better weather can be advantageous for orienteering.
- It should be noted that the maps used in the orienteering activities have varying scales. Thus, a more significant contribution can be made to the student's understanding of the concept of scale, which is the main component of the map, and to the development of their map literacy skills.
- It is necessary to provide the required materials for teachers to integrate orienteering successfully in their classrooms. Therefore, cooperation between the Ministry of National Education and the Turkish Orienteering Federation makes it possible to obtain the necessary orientation tools and types of equipment. Furthermore, it is thought that this cooperation will also benefit the in-service training of social studies teachers.

References

Acar, E. N. (2021). *Kısa ve uzun interval antrenmanlarla ısınmanın oryantiring sürat parkurunda performans parametrelerine akut etkisi* (Unpublished doctoral dissertation). Mersin University, Mersin.

Adams W. P. (1972). Geography and orienteering. *Journal of Geography*, *71*(8), 473-480. doi:10.1080/00221347208985332

Akkuş, Z., & Kuzey, M. (2018). Ortaokul öğrencilerinin harita ve yön becerilerine sahip olma ve bu becerileri yaşama aktarabilme durumları üzerine bir değerlendirme. *Milli Eğitim Dergisi*, *47*(218), 201-234. Retrieved from https://dergipark.org.tr/en/pub/milliegitim/issue/39856/472058

Aksın, K. (2008). *Oryantiring sporunda kent içi organizasyonlar üzerine bir inceleme* (Unpublished master's thesis). Trabzon University, Trabzon.

Aladağ, E., Arıkan, A., & Özenoğlu, H. (2021). Nature education: Outdoor learning of map literacy skills and reflective thinking skills towards problem-solving. *Thinking Skills and Creativity, 40*, 1-12. doi:10.1016/j.tsc.2021.100815

Alkan, H. (2021). *Fen lisesi öğrencilerinin oryantiring parkur sonucuna göre takım çalışması etkinliği hakkındaki düşüncelerinin incelenmesi* (Unpublished master's thesis). Trabzon University, Trabzon.

Andersson, G. (n.d.). *Okullarda oryantiring 6-12 yaş* (Z. Abalı, Trans.). Retrieved from https://www.iog.org.tr/archive/egitim/kitap/okullarda_oryantiring.pdf

Anthamatten, P., Bryant, L. M. P., Ferrucci, B. J., Jennings, S., & Theobald, R. (2018). Giant maps as pedagogical tools for teaching geography and mathematics. *Journal of Geography, 117*(5), 183-192. doi:10.1080/00221341.2017.1413413

Apostolopoulou, E. P., & Klonarı, A. (2011). Children's map reading abilities in relation to distance perception, travel time and landscape. *European Journal of Geography, 2*(2), 35-47. Retrieved from https://ojs.eurogeojournal.eu/index.php/egj/article/view/74

Arıkan, A., & Aladağ, E. (2019). Oryantiring dersinin beden eğitimi ve spor yüksekokulu öğrencilerinin harita okuryazarlık becerilerine etkisi. *International Journal of Geography and Geography Education, 24*(40), 124-138. Retrieved from https://search.trdizin.gov.tr/yayin/detay/331234/

Avcı, M. (2013). *Coğrafya dersinde oryantiring uygulamasına yönelik öğrenci görüşleri* (Unpublished master's thesis). Gazi University, Ankara.

Avşar, S. (2010). *İlköğretim ikinci kademe sosyal bilgiler derslerinde coğrafya konularının öğretiminde materyal kullanımının öğrenci başarısına etkisi* (Unpublished master's thesis). Selçuk University, Konya.

Ay-Selanik, T., & Yavuz, Ü. (2016). Sınıf öğretmenlerinin sosyal bilgiler dersinde okuryazarlık becerilerini kazandırmaya yönelik gerçekleştirdikleri uygulamalar. *Anadolu Journal of Educational Sciences International, 6*(2), 31-63. doi:10.18039/ajesi.17370

Aziz, A. (2008). *Sosyal bilimlerde araştırma yöntemleri ve teknikleri*. Ankara: Nobel Yayınları.

Balcı, A. (2015). Coğrafya öğretmen adaylarının coğrafi arazi uygulamalarındaki harita okuryazarlıklarını tespite yönelik bir araştırma. *Akademik Sosyal Araştırmalar Dergisi, 3*(10), 16-35. Retrieved from https://asosjournal.com/index.jsp?mod=tammetin&makaleadi=&makaleurl=1067031700_566%20Ali%20BALCI.pdf&key=33127

Bao, S., Liu, J., & Liu, Y. (2022). Shedding light on the effects of orienteering exercise on spatial memory performance in college students of different genders: An fNIRS study. *Brain Sciences, 12*(7), 852. doi:10.3390/ brainsci12070852

Barrell, G. V., & Cooper, P. J. (1986). Cognitive process in orienteering: The interpretation of contours and responses to the map as a whole. *Scientific Journal of Orienteering, 2*(1), 25-46. Retrieved from https://orienteering.sport/iof/communication/publications/scientific-journal-of-orienteering/

Baştürk, S. (2018). Ölçme araçlarının taşıması gereken nitelikler. In S. Baştürk (Ed.), *Eğitimde ölçme ve değerlendirme* (pp. 23-53). Ankara: Nobel Yayıncılık.

Bayram, S., & Ramadan, İ. (2005). Digital map literacy bounded with culture under geographical information systems perspective. *Journal of Visual Literacy, 25*(2), 167-176. doi:10.1080/23796529.2005.11674623

Baytaş, M. (2021). *Ortaöğretim düzeyi işitme engelli öğrencilerde oryantiring eğitiminin bilişsel ve motor beceriler üzerine etkisinin incelenmesi* (Unpublished master's thesis). Van Yüzüncü Yıl University, Van.

Bednarz, S. W., Acheson, G., & Bednarz, R. S. (2006). Maps and map learning in social studies. *Social Education, 70*(7), 398-432. Retrieved from https://www.socialstudies.org/system/files/publications/articles/se_700706398.pdf

Bektaş, F., Karademir, E., Kaya, S., Kalın, C., Şeker, T., Kurtoğlu, E., … Oymak, Ö. (2019). *Oryantiring eğitimi*. Ankara: Millî Eğitim Bakanlığı Genel Yayını.

Blades, M., & Spencer, C. (1989). Children's wayfinding and map using abilities. *Scientific Journal of Orienteering, 5*(1), 48-64. Retrieved from https://orienteering.sport/iof/communication/publications/scientific-journal-of-orienteering/

Bluestein, N., & Acredolo, L. (1979). Developmental changes in map-reading skills. *Child Development, 50*(3), 691-69. doi:10.2307/1128934

Bozkurt, F. (2021). 21. Yüzyıl becerileri açısından sosyal bilgiler öğretmenliği lisans programının değerlendirilmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi,* 51, 34-64. doi:10.9779/pauefd.688622

Buğdaycı, İ., & Selvi, Z. H. (2021). Do maps contribute to pupils' learning skills in primary schools?. *The Cartographic Journal, 58*(2), 135-149. doi:10.1080/00087041.2020.1760625

Can, A. (2017). *SPPS ile bilimsel araştırma sürecinde nicel veri analizi* (5th ed.). Ankara: Pegem Akademi.

Candan, G. (2019). Coğrafya eğitiminde oryantiring etkinliklerinin kullanılması. *Coğrafya Eğitim Derneği, 2*, 19-26. Retrieved from http://www.geoced.org/cografya-egitiminde-oryantiring-etkinliklerinin-kullanimi/

Cendek, E. M. (2015). *Öğrencilerde harita okuryazarlığının geliştirilmesine ilişkin sosyal bilgiler öğretmenlerinin görüşleri* (Unpublished master's thesis). Marmara University, İstanbul.

Clarke, D. (2003, August). Are you functionally map literate?. In *Proceedings of the 21st International Cartographic Conference (ICC)* (pp. 713-719). Retrieved from http://lazarus.inf.elte.hu/cet/publications/088.pdf

Cohen J. (1988). *The analysis of variance. In statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey: Lawrence Erlbaum Associates.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th ed.). London: Routledge.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

Creswell, J. W. (2017). *Karma yöntem araştırmalarına giriş* (M. Sözbilir, Ed. & Trans.). Ankara: Pegem Akademi.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: SAGE.

Çelik, D. (2000). *Okullarda ölçme ve değerlendirme nasıl olmalı?.* İstanbul: Mili Eğitim Yayınları.

Çelikkaya, T., & Yakar, H. (2020). Alana özgü beceriler. In T. Çelikkaya & T. Yakar (Ed.), *Konu ve beceri temelli sosyal Bilgiler Eğitimi-I* (pp. 1-5). Ankara: Pegem Akademi.

Çomak, N. (2021). Investigation of the graduate theses on orienteering in Turkey (2005-2021). *International Journal of Geography and Geography Education (IGGE),* 44, 413-427. doi:10.32003/igge.933262

Demiralp, N. (2007). Coğrafya eğitiminde malzeme ve 2005 coğrafya dersi öğretim programı. *Kastamonu Eğitim Dergisi, 15*(1), 373-384. Retrieved from https://dergipark.org.tr/en/pub/kefdergi/issue/49108/626741

Deniz, E., Karaman, G., Bektaş, F., Yoncalık, O., Güler, V., Kılınç, A., & Ateş, A. (2012). *Çocuklara oryantiring eğitimi*. Ankara: Kültür Ajans Yayınları.

Di Tore, P. A. (2016). Spatial navigation cognitive strategies, perspective taking and special educational needs: Re-thinking orienteering sport in complexity. *Journal of Physical Education and Sport*, *16*(2), 476-480. doi:10.7752/jpes.2016.02073

Erdoğan, M. (2019). *Elit oryantiring sporcularında farklı rotaların performansa etkisi* (Unpublished master's thesis). Selçuk University, Konya.

Erkuş, A. (2014). *Psikolojide ölçme ve ölçek geliştirme-I temel kavramlar ve işlemler* (2nd ed.). Ankara: Pegem Akademi.

Erol, H. (2017). Ortaokul öğrencilerinin harita okuryazarlık becerilerine ilişkin bir değerlendirme. *Anadolu Journal of Educational Sciences International, 7*(3), 425-457. Retrieved from https://hdl.handle.net/11421/24250

Ertuğrul, Z. (2008). *İlköğretim 6. sınıf öğrencilerin harita ve küre kullanım becerilerinin tespiti* (Unpublished master's thesis). Gazi University, Ankara.

Ferguson, C., & Turbyfill, R. (2013). *Discovering orienteering: Skills, techniques, and activities*. United States of America: Human Kinetics.

Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). New York: Mc Graw Hill.

Geography Education National Implementation Project. (2012). *Geography for life: National geography standards* (2nd ed.). Washington DC: National Council for Geographic Education.

Gökçe, N. (2015). Social studies in improving students' map skills: Teachers' opinions. *Educational Sciences: Theory & Practice*, *15*(5), 1345-1362. Retrieved from https://hdl.handle.net/11421/15215

Gökçe, T. (2019). Karma araştırma yöntemi. In H. Özmen ve O. Karamustafaoğlu (Ed.), *Eğitimde araştırma yöntemleri* (pp. 391-432). Ankara: Pegem Akademi.

Güler, V. (2009). *Oryantiring ve çocuklar için oryantiring eğitimi*. Ankara: T.C. Başbakanlık Gençlik ve Spor Genel Müdürlüğü Türkiye Dağcılık Federasyonu Yayınları.

Hanus, M., & Havelková, L. (2019). Teachers' concepts of map-skill development. *Journal of Geography, 118*(3), 101-116. doi:10.1080/00221341.2018.1528294

Havelková, L., & Hanus, M. (2019). Map skills in education: A systematic review of terminology, methodology, and influencing factors. *Review of International Geographical Education Online (RIGEO), 9*(2), 361-401. doi:10.33403/rigeo.591094

İmamoğlu, M., & İmamoğlu, A. (2018). Oryantiring sporunun ortaöğretim coğrafya ve beden eğitimi ve spor derslerinin kazanımlarına etkisi. *Kesit Akademi Dergisi, 4*(12), 198-207. Retrieved from https://dergipark.org.tr/en/pub/kesitakademi/issue/59824/863888

Johansson, C. (1986). Profiling an individually programed training in prevention of injuries in elite orienteers. *Scientific Journal of Orienteering, 2*(1), 19-25. Retrieved from https://orienteering.sport/iof/communication/publications/scientific-journal-of-orienteering/

Kara, B. (2020). *Oryantiring eğitiminin 60-71 aylık çocukların kavram gelişimine etkisi* (Unpublished master's thesis). Aydın Adnan Menderes University, Aydın.

Karaca, E. (2008). Test ve madde analizi. In S. Erkan ve M. Gömleksiz (Ed.), *Eğitimde ölçme ve değerlendirme* (pp. 241-300). Ankara: Nobel Yayıncılık.

Karaca, F. (2008). *Oryantiring uygulamalarının ilköğretim programlarındaki fonksiyonelliği* (Unpublished master's thesis). Gazi University, Ankara.

Kaya, S. (2020). *Eğitimde kullanılan oryantiring etkinliklerinin eğiticiler ve branş öğretmenleri tarafından farklı dersler kapsamında uygulanma sürecinin incelenmesi etkisi* (Unpublished master's thesis). Trabzon University, Trabzon.

Koç, H., & Karatekin, K. (2016). Sosyal bilgiler öğretmen adaylarının harita okuryazarlık düzeylerinin çeşitli değişkenler açısından incelenmesi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 16*(2), 441-461. Retrieved from https://search.trdizin.gov.tr/yayin/detay/238628/sosyal-bilgiler-ogretmen-adaylarinin-harita-okuryazarlik-duzeylerinin-cesitli-degiskenler-acisindan-incelenmesi

Kuzey, M., & Değirmenci, Y. (2019). Sosyal bilgiler öğretmen adaylarının harita ve yön okuryazarlığına ilişkin kavramları anlama düzeyleri ve kavram yanılgıları. *Milli Eğitim Dergisi, 48*(223), 207-230. Retrieved from https://dergipark.org.tr/en/pub/milliegitim/issue/48112/609097

Li, Y. (2021). Practical research on orienteering physical education in universities in northeast China. *Technology and Health Care, 29*(S1), 275-286. doi:10.3233/THC-218025

Maxim, G. W. (1997). Developmentally appropriate map skills instruction. *Childhood Education, 73*(4), 206-211. doi:10.1080/00094056.1997.10521094

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.

Ministry of National Education. (2005). *İlköğretim sosyal bilgiler dersi öğretim programı ve kılavuzu*. Ankara: Devlet Kitapları Müdürlüğü Basım Evi.

Ministry of National Education. (2018). *Sosyal bilgiler dersi öğretim programı (ilkokul ve ortaokul 4, 5, 6 ve 7. sınıflar)*. Retrieved from http://mufredat.meb.gov.tr/Dosyalar/20181210384768 6SOSYAL%20B%C4%B0LG%C4%B0LER%20%C3%96%C4%9ERET%C4%B0M%20PROGRAMI%20.pdf

Mottet, M., Eccles, D. W., & Saury, J. (2016). Navigation in outdoor environments as an embodied, social, cultural, and situated experience: An empirical study of orienteering. *Spatial Cognition & Computation, 16*(3), 220-243. doi:10.1080/13875868.2016.1166229

Muir, P. S., & Cheek, N. H. (1991). Assessing spatial development: Implications for map skill instruction. *National Council for The Social Studies, 55*(5), 316-319. Retrieved from https://files.eric.ed.gov/fulltext/ED417119.pdf#page=80

National Council for The Social Studies. (2021). *National curriculum standards for social studies: Introduction*. Retrieved from https://www.socialstudies.org/standards/national-curriculum-standards-social-studies-introduction

National Research Council. (2006). *Learning to think spatially: GIS as a support system in the K-12 curriculum*. Washington D.C.: National Academy.

Naylor, D. T., & Diem, R. A. (1987). *Elementary and middle school social studies*. New York: Random House.

Nurses, S. (2014). *6. sınıf sosyal bilgiler dersinde yer alan ''Türkiye'de iklim bölgeleri'' konusunun öğretiminde görsel materyalleri kullanmanın öğrenci başarısına etkileri* (Unpublished master's thesis). Atatürk University, Erzurum.

Ooms, K., De Maeyer, P., Dupont, L., Van der Veken, N., Van de Weghe, N., & Verplaetse, S. (2016). Education in cartography: What is the status of young people's map reading skills?. *Cartography and Geographic Information Science, 43*(2), 134-153. doi:10.1080/15230406.2015.1021713

Organization for Economic Co-operation and Development. (2019). *Future of education and skills 2030. Conceptual learning framework- learning compass 2030.* Retrieved from https://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass 2030/OECD_Learning_Compass_2030_Concept_Note_Series.pdf

Orienteering Canada. (2012). *Long term athlete development guide*. Retrieved from Http://www.Orienteering.Ca/Pdfs/Ltad_Orienteering_5mb.Pdf

Orienteering New Zealand. (2014). *Kiwi-O orienteering for schools.* Retrieved from https://www.orienteering.org.nz/wp-content/uploads/2014/07/Kiwi-O-Manual-2014-v2.pdf

Ottosson, T. (1986). Cognitive processes in orienteering: An outline of a theoretical frame of reference and some preliminary data. *Scientific-Journal-of-Orienteering, 2*(1), 47-54. Retrieved from https://orienteering.sport/iof/communication/publications/scientific-journal-of-orienteering/

Öncü, M. (2019). *Ortaöğretim öğrencilerinin harita becerileri düzeylerinin belirlenmesi üzerine bir araştırma: Şanlıurfa şehri örneği* (Unpublished master's thesis). Harran University, Şanlıurfa.

Özcan, F. (2007). *Oryantiring sporunun ilköğretim öğrencilerinin sosyal bireysel davranışları ile matematik mantıksal zekâ gelişimleri üzerindeki etkisinin incelenmesi* (Unpublished master's thesis). Dumlupınar University, Kütahya.

Özcan, F. (2015). *Sosyal bilgiler öğretmen adaylarının harita okuma özyeterlilik ve başarı düzeyleri* (Unpublished master's thesis). Aksaray University, Aksaray.

Özdemir, N., Güreş, A., & Güneş, Ş. (2012). Oryantiring sporcularının baskın zekâ alanları ile problem çözme becerileri arasındaki ilişki. *Uluslararası Hakemli Akademik Sosyal Bilimler Dergisi, 3*(2), 222-235. Retrieved from https://www.origo.gen.tr/kullaniciDosyalari/makaleler/oryantiring-sporcularinin-baskin-zeka-alanlari-ile-problem-cozme-becerileri-arasindaki-iliski201707.pdf

Özsoy, S., & Özsoy, G. (2013). Eğitim araştırmalarında etki büyüklüğü raporlanması. *Elementary Education Online, 12*(2), 334-346. Retrieved from https://dergipark.org.tr/en/pub/ilkonline/issue/8585/106644

Robson, C. (1993). *Real world research a resource for social scientists and practitioner researchers*. Oxford: Blackwell Publishers Inc.

Seiler, R. (1985). The psychological structure of information-seeking and decision-making in route-choice situations orienteering. *Scientific Journal of Orienteering, 1*, 24-34. Retrieved from https://orienteering.sport/iof/communication/publications/scientific-journal-of-orienteering/

Sezgin, S. H. (2020). *Yedinci sınıf öğrencilerinin uzamsal yönelim stratejilerinin gelişim sürecinin oryantiring oyunu ortamında incelenmesi* (Unpublished doctoral dissertation). Anadolu University, Eskişehir.

Shin E. K. (2006). Using geographic information system (gis) to improve fourth graders' geographic content knowledge and map skills. *Journal of Geography, 105*(3), 109-120. doi:10.1080/00221340608978672

Sönmez, F. Ö. (2010). *İlköğretim sosyal bilgiler öğretiminde harita becerileri* (Unpublished doctoral dissertation). Gazi University, Ankara.

Sönmez, F. Ö., & Aksoy, B. (2012). İlköğretim ikinci kademe öğrencilerinin harita beceri düzeylerinin belirlenmesi. *International Periodical for the Languages, Literature and History of Turkish or Turkic, 7*(1), 1905-1924. Retrieved from https://arastirmax.com/en/system/files/dergiler/79199/makaleler/7/1/arastirmax-ilkogretim-ikinci-kademe-ogrencilerinin-harita-beceri-duzeylerinin-belirlenmesi.pdf

Sönmez, F. Ö., & Aksoy, B. (2013). Cumhuriyetten günümüze ilköğretim programlarında harita becerileri. *Türkiye Sosyal Araştırmalar Dergisi, 171*(171), 269-288. Retrieved from https://dergipark.org.tr/en/pub/tsadergisi/issue/21497/230500

Şengör, Ç. (2018). *11- 13 Yaş grubu öğrencilerinde oryantiring eğitiminin uzamsal görselleştirme ve uzamsal kaygıya etkisinin incelenmesi* (Unpublished master's thesis). Muğla Sıtkı Koçman University, Muğla.

Şenol, İ. H. (2018). *Çocuklarda harita becerilerinin ölçülmesi ve değerlendirilmesi* (Unpublished master's thesis). Yıldız Teknik University, Istanbul.

Şimşek, A. (2014). Araştırma modelleri. In A. Şimşek (Ed.), *Sosyal bilimlerde araştırma yöntemleri* (pp. 80-106). Eskişehir: Anadolu Üniversitesi Yayınları.

Tanrıkulu, M. (2011). Harita ve pusulanın farklı bir kullanım alanı: Oryantiring. *Millî Eğitim Bakanlığı Eğitim ve Sosyal Bilimler Dergisi, 191*, 120-126. Retrieved from https://dergipark.org.tr/en/pub/milliegitim/issue/36191/406895

Tekindal, S. (2009). *Okullarda ölçme ve değerlendirme yöntemleri*. Ankara: Nobel Yayıncılık.

Tuna, F., & Balcı, A. (2013). Oryantiring uygulamalarının coğrafya öğretmen adaylarının özyeterlik algılarına etkisi. *Marmara Coğrafya Dergisi,* 27, 1-14. Retrieved from https://dergipark.org.tr/en/pub/marucog/issue/474/3890

Turgut, F. M., & Baykul, Y. (2010). *Eğitimde ölçme ve değerlendirme*. Ankara: Pegem Akademi.

Uyar, Ş. (2019). Madde puanları üzerinde istatiksel işlemler. In N. Doğan (Ed.), *Eğitimde ölçme ve değerlendirme* (pp. 378-412). Ankara: Pegem Akademi.

Uzuner, G. F. (2019). *İlkokul öğrencilerinin matematiksel problem çözme becerilerinin geliştirilmesinde oryantiringin etkisinin incelenmesi* (Unpublished doctoral dissertation). Trabzon University, Trabzon.

Uzuner, G. F. (2020). *DEHB tanılı ilkokul öğrencilerinin dikkat, üst bilişsel farkındalık ve problem çözme becerilerinin geliştirilmesinde oryantiringin etkisinin incelenmesi* (Unpublished master's thesis). Trabzon University, Trabzon.

Ünlü, M., & Yıldırım, S. (2017). Coğrafya dersi öğretim programına bir coğrafi beceri önerisi: Mekânsal düşünme becerisi. *Marmara Coğrafya Dergisi*, 35, 13-20. doi:10.14781/mcd.291018

Üzümcü, O. N. (2007). *İlköğretim 6. sınıf sosyal bilgiler dersinde harita okuma becerisinin aktif öğrenme yöntemiyle kazandırılması* (Unpublished master's thesis). Gazi University, Ankara.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (8th ed.). Ankara: Seçkin Yayınevi.

Yılmaz, D., & Dellal, S. (2020). Müzede oryantiring faaliyetinin müze eğitimine katkısının incelenmesi. *Uluslararası Müze Eğitimi Dergisi, 2*(1), 79-93. Retrieved from https://dergipark.org.tr/en/pub/jimuseumed/issue/54620/781549

Yılmaz, G. F., Bayraktar, H., Özden, K. M., Akpınar, M., & Evin, Ö. (2018). *Ortaokul ve imam hatip ortaokulu sosyal bilgiler ders kitabı 6*. Ankara: Millî Eğitim Bakanlığı Yayınları.

Yiğit, T. (2020). *Sosyal bilgiler dersinde öğrencilerin mekânsal düşünme becerilerine oryantiring uygulamalarının etkisi* (Unpublished master's thesis). Kastamonu University, Kastamonu.