

STUDENT AND TEACHER VIEWS ON A SAMPLE SOCIAL STUDIES ACTIVITY WITH QR CODE APPLICATION¹

Samet Karakuř², Ayřegül Őeyihođlu³

ABSTRACT

The purpose of this study is to present an example social studies activity supported by QR code application and to determine the opinions of teachers and students on this experience. The study was conducted with the participation of 41 students and 2 teachers from two 4th grade classes in a primary school in Giresun, Turkey. The research was designed as a case study and the implementation lasted 2 weeks. In the study, semi-structured student interview form and unstructured teacher interview form developed by the researchers were used as data collection tools. Findings were obtained by analyzing the data using content analysis. The results revealed that social studies teaching supported by QR code application contributed to improvement of cognitive and affective behaviors of the learners. It was also found that the students did not often use QR code applications in the learning activities except for their use on the smartboard.

Keywords: teaching social studies, QR code application, saving water.

KAREKOD UYGULAMASI İLE DESTEKLENEN SOSYAL BİLGİLER ÖĐRETİMİNE ÖRNEK BİR UYGULAMAYA İLİŐKİN ÖĐRENCİ VE ÖĐRETMEN GÖRÜŐLERİ

ÖZ

Bu alıřmanın amacı, karekod uygulaması ile desteklenen sosyal bilgiler öđretimine uygulama örneđi sunmak ve bu uygulamaya iliřkin öđretmen ve öđrenci görüőlerini belirlemektir. Uygulama, Giresun ilinde bulunan bir ilkokulda 4. sınıf düzeyindeki 2 řubenin 41 öđrencisi ve 2 sınıf öđretmeninin katılımıyla gerekleřtirilmiřtir. Arařtırma durum alıřması yöntemine uygun olarak tasarlanmıř, 2 hafta boyunca uygulanmıřtır. Arařtırmada “su tasarrufu” konusunda karekod uygulanmıřtır. alıřmada veri toplama aracı olarak arařtırmacılar tarafından geliřtirilen yarı yapılandırılmıř öđrenci görüőme formu ve yapılandırılmamıř öđretmen görüőme formu kullanılmıřtır. Veriler içerik analizine tabi tutularak bulgular oluřturulmuřtur. Arařtırmada öđrenci ve öđretmen görüőlerinden elde edilen sonuçlar, karekod uygulaması ile desteklenen sosyal bilgiler öđretiminin biliřsel ve duyuřsal davranıřların geliřimine katkı sađladığına iřaret etmektedir. Öđrencilerin karekod uygulamasını sıklıkla kullanmadıkları, kullanım alanı olarak genellikle akıllı tahtayı ifade ettikleri ortaya ıkmıřtır. Sonuç olarak karekod uygulaması ile desteklenen etkinliklerin sosyal bilgiler dersinde farklı sınıf düzeyinde ve diđer konuların öđretiminde kullanılması önerilmektedir.

Anahtar kelimeler: sosyal bilgiler öđretimi, karekod uygulaması, su tasarrufu.

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²Doctoral Student, Trabzon University, Institute of Graduate Education, Social Studies Education, samet_karakus20@trabzon.edu.tr, ORCID: <https://orcid.org/0000-0003-4588-0163>

³Prof. Dr., Trabzon University, Fatih Faculty of Education, Geography Education, aysegulseyhoglu@gmail.com, ORCID: <https://orcid.org/0000-0001-8143-3753>

INTRODUCTION

With the development of technology in the current century, we live in a period in which affordances of computers, the Internet, and mobile devices are used in many areas from factories to banks, from hospitals to shopping centers and to schools. With the introduction of these technologies in educational environments, concepts such as online education, virtual classroom, synchronous and asynchronous learning, and mobile learning have been coined in the education literature (Bulun et al., 2004).

Mobile learning has emerged as a result of using mobile devices and technologies in educational settings. Mobile learning is described as an e-learning model (Yokuş, 2016). Özdamar-Keskin (2011) states that mobile learning entails accessing educational content without being tied to a specific location, benefiting from dynamically produced services, and communicating with others in order to increase productivity and work performance by instantly responding to the needs of the users. Therefore, mobile education has shown rapid development in recent years with the increase in demand for it. The fact that information-communication technologies have been widely used in daily life has also made them visible in educational environments. Introduction of mobile communication tools such as smart boards, mobile phones, computers, tablets, and projectors in classroom environments has facilitated the integration of technology in education. This reduces the attractiveness of traditional educational materials and paves the way for the blended use of mobile communication technologies and traditional materials. One of the mobile communication technologies is QR codes. QR code technology can be integrated with traditional education materials. With this feature, QR codes play an important role in implementing a more effective mobile education and in establishing a connection between students and teachers (Aktaş & Çaycı, 2013).

The QR code was first developed by the Japanese company Denso Wave in 1994. It was then used in the TOYOTA company's car manufacturing process. It was introduced to the whole world in 2010 (Çataloğlu & Ateşkan, 2014). QR codes are two-dimensional barcodes and contain horizontal and vertical information.

QR codes are capable of holding approximately 7089 numeric or 4296 alphanumeric data and 2,953 binary bytes. This feature distinguishes it from other 2D coded barcodes. With the QR codes, it is possible to quickly enter any web site, send a short message directly, or save a person's contact information in the address book easily (Lezhebokov et al., 2014).

It is known that in addition to these conveniences provided by the QR code, there are also some disadvantages. For example, if the image quality is low, there may be problems in reading the code and a limited amount of information can be stored. In addition, if the QR code reader device breaks down, education process may be interrupted. Internet support is required to read some of the QR codes. The fact that they cannot be used in environments where there is no internet is a drawback of QR codes. In addition to all these, small screens of QR code readers can reduce their efficiency in educational process (Büyükkol-Köse, 2019).

When the literature is examined, it is seen that there are studies on the use of QR codes in education in various fields. Researchers conducted applied studies in biology education (Büyükkol-Köse, 2019), computer and instructional technologies (Çelik, 2012; Güleç, 2019; Menzi-Çetin & Akkoyunlu, 2019), science education (Canbazoğlu-Bilici et al., 2016; Karahan & Canbazoğlu-Bilici, 2017; Yılmaz, 2017), and mathematics education (Güleç & Çoklar, 2021). On the other hand, Acartürk (2012), Aktaş and Çaycı (2013), and Morali (2019) conducted theoretical studies on this topic.

As an example of applied studies, Yılmaz (2017) used the activities that he developed with the QR code application in the teaching of astronomy concepts in a science course. The results revealed that QR codes contributed to the participants' comprehension of the subject and made the lessons more engaging and intriguing. Akın (2014) examined the effects of using QR code application in the "Information and Communication Technologies" course. The researcher who examined the effect of QR code material on access and permanence, found that the achievement and permanence mean scores of the students in the learning environment where the QR code application was used were higher. Similarly, Harshmann and Augustine

(2016), and Torun (2020) examined the effects of QR codes in social studies pre-service teacher education and reported positive results. In these studies, QR code was used as a supporting teaching material. In general, there is paucity of research on using QR codes in social studies education in primary and secondary schools. Ali et al. (2017) stated that there is a need for further research on using QR codes in educational settings. Thus, it is thought that the current study will contribute to the related literature.

QR code supported activities developed within the scope of the research were on the topic of "saving water". The activities aimed at facilitating the attainment of the fourth grade learning objective in the Social Studies Curriculum (2018). The learning performance objective states that "Students will be able to use environmental resources without wasting them." It can be argued that these activities are directly related to the concept of saving and environmental literacy skills in the curriculum. Therefore, the current study addresses the following research question:

- What are the opinions of students and teachers about the applicability of QR code assisted teaching in fourth-grade social studies lessons?

METHOD

The current study was designed in accordance with the case study research method. According to Yazan (2015), case study is one of the methods most frequently used by qualitative researchers. Case study allows to study a specific issue within the boundaries of a specific situation. It is a valuable method because it provides an opportunity to examine the issue holistically (Brown, 2008). For this reason, the case study method was preferred in the current research.

The study was carried out in a primary school affiliated to Gümüşhane Provincial Directorate of National Education in the spring semester of the 2020-2021 academic year. A total of 41 students (16 were female and 25 were male) attending the fourth grade, and two female teachers, the classroom teachers of these students, participated in the study. Thirty-six of the students participating in the activities did not have a mobile phone, and five of them had their own mobile phones.

The participating two classroom teachers were present during the research lessons to make observations. The activities were implemented without any problems. At the end of the activities, 41 students were interviewed to find out their thoughts about the activities. One-on-one interviews at the end of the activities lasted between 7-11 minutes for each student. In order to determine the opinions of the teachers, a questionnaire consisting of open-ended questions was filled in by the two classroom teachers.

While creating the "student interview form", the opinions of two experts in social studies education were taken. The interview form consists of demographic information and questions related to the research question. There are 10 questions in the semi-structured interview form created by the researchers (Appendix 1). In demographic information section, the participants' gender, mobile phone ownership, QR code application use and knowledge about its usage areas were questioned. There are two open-ended questions in the "teacher questionnaire" prepared to determine the opinions of teachers about the implementation (Appendix 2). The data with regard to the opinions of students and teachers were analyzed through content analysis. The students were given codes such as S1, S2, S3, S4, and the teachers were coded as Teacher 1 and Teacher 2. The views of the students were presented with direct quotations in the article to increase the validity of the study. Regarding the reliability, the data was read independently by the two researchers several times and coded. During the analysis process, the researchers paid particular attention to achieve coherence in the coding, and consensus was reached in cases of disagreement.

Ethics Committee approval dated 09.02.2021 and numbered E-8161-4018-000-108 was obtained from the Social and Human Sciences Research and Ethics Committee of Trabzon University. In addition, the activities were carried out after receiving permission from the Gümüşhane Provincial Directorate of National Education.

ACTIVITY IMPLEMENTATION

First of all, a lesson plan was developed within the scope of the study (Appendix 3). Four

activities supported by the QR code application on the topic of "saving water" were included in the lesson plan. An expert in Social Studies education examined the developed lesson plan and the activities included in it and gave feedback. A pilot implementation was carried out with five students independent from the research group, and weaknesses were determined. The plan was finalized according to the expert opinion and the results of the pilot implementation. Before proceeding to the actual implementation, one of the researchers gave the students a one-hour practical training in which the QR code application and its usage were introduced. The activities were implemented in two classes, the experience with class is detailed in the article. In this article, the implementation is described, focusing on the experience of a class of 10 students. Since the classes were divided into two sections and attended to the school on different days due to the epidemic, the treatment was scheduled according to the days these groups attended school. For example, half of the students in a class (about 10 students) attended school only on Mondays and Tuesdays, while the other half of the class attended school on Thursdays and Fridays. The activities were conducted on Monday for one group and on Thursday for the other group.

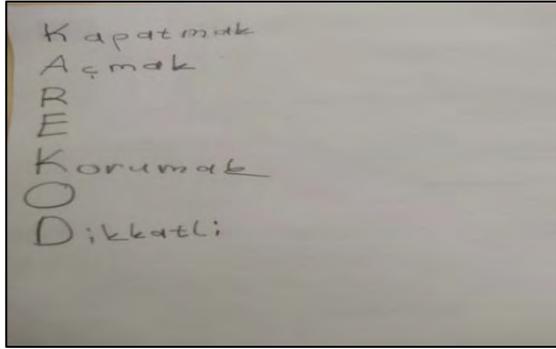
The students were asked to work in groups of five and choose their group leaders. Learners were assigned active roles during the whole teaching process. Since the group leaders were more active and guiding in the process, they changed their roles on a voluntary basis in each activity. The students determined the group names with their peers as it could increase their motivation and desire for the lesson. The group names were "Sun, Star, Princes and Princesses, Kings and Queens". Within the scope of the Covid-19 epidemic measures, small groups were created. During the implementation, a mobile phone with Internet connection and a QR code reader was given to the group leaders so that they could read the QR codes on the activity worksheets. The gymnasium of the school was chosen as the location to conduct the activities. Thus, it was ensured that the students could do the activities in a larger space and in a more comfortable way. In this respect, it can be claimed that the activities designed in this study support learning outside of the classroom. The activities were personally conducted by one of the researchers (the first author). The class

teachers joined the activities as observers. The conversations between the researcher and the students about the activities were noted by these observer teachers. Examples of activities are included in the Appendices. In the following sections, detailed information is given about each social studies activity that was supported by QR code application.

Word Formation Activity

The aim of this activity is to draw the attention of students to the subject of saving water. For this purpose, activity instructions (Appendix 4) were distributed to the groups and they were given 30 seconds to peruse the instructions. The students examined the instructions and exchanged ideas about what to do. Afterwards, intriguing questions such as "Do you know what an acrostic is, have you ever seen or written an acrostic before?" were asked by the researcher in order to increase the students' motivation to learn. The answers from the students were listened and then the activity started.

Group leaders were given a mobile phone and were told that they should manage the activity process and work in cooperation with the group members. Five minutes were given for the activity. In this activity, the students were asked to derive words related to saving water based on the initials of Turkish translation of the phrase "QR Code", which is "Kare Kod". They were told by the researcher that they would get 10 points for each related word they could derive. Except for reminding the remaining time, the researcher did not intervene during the activity. After the activity ended, the group responses were evaluated together with the students by awarding 10 points for correctly expressed words. How many points the groups got from the activity were read aloud. While evaluating the answers given by the groups for the acrostic titled "QR Code", the student groups were asked what each word meant. The responses were given by the spokesperson of each group and accurate answers were given 10 points by the researcher. An example answer related to the activity is presented in Photograph 1. Related to the group work given in the Photograph 1, the group members were asked what they meant by the word "Turn off". The leader of the group Star responded: "Turning off the tap that keeps running, teacher."



Photograph 1. Group Star's Work in the Word Formation Activity

The conversation with the group leader continued as follows:

Researcher: What happens if we don't turn it off?

Group leader: The water is wasted.

Researcher: And what did you mean by "turn on"?

Group leader: If we turn on the taps unnecessarily, we will be wasting water.

Researcher: What did you mean by the word "save"?"

Group leader: Saving water, using it efficiently.

Researcher: What do you think will happen if we don't save water?

Group leader: People will suffer from lack of water, drought will begin. Living creatures can get into trouble.

Researcher: What did you mean by the word "careful"?

Group leader: We must be careful when using the water. We should not waste water.

After the class completed the evaluation of their answers, the activity ended.

The Water Song Activity

This activity aims to increase students' knowledge about saving water through the song placed in the QR code. In addition, it aims to help the students have fun through the song. The groups were asked to sing the song together in harmony. It was explained to the students that the group that sings the song with the loudest voice and in harmony would get 10 points. In order to follow the lyrics of the song, each group was given a sheet of paper on which the lyrics of the song were written (Appendix 4). The time allotted for the 3.52-minute song "Water belongs to children" (Pembe Bere, 2017) placed on the QR code was 4 minutes. The students

reflected on the lyrics and discussed what they learned from completing this activity first within the group and then between the groups. Student comments showing that this activity has achieved its purpose and that students have acquired information about the subject are shared in the findings section of this article.

At the end of the activity, the groups were asked their opinions about the song, the feeling of singing together, and the messages the song gave. The leader of the group "Sun" responded as follows:

It was very nice to sing the song as a group. Sometimes some of our friends fell behind us. Then we managed to sing together. It was told in the song that we should not waste water, that plants would die without water, and that every living creature needed water.

The leader of another group, "Kings and Queens" said:

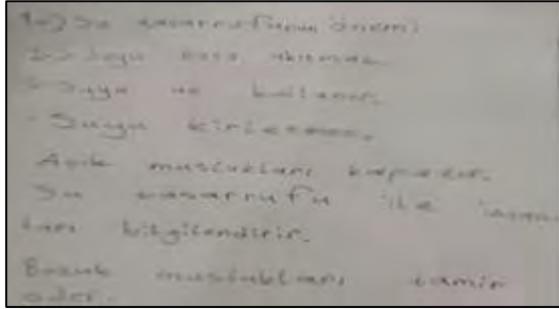
I was happy that we sang the song best. I congratulate my friends. We loved the song. We will sing the song again later. The song gives the message that water is important and should not be wasted. I understood from the song that we should save water for the children who will come after us.

The Water Movie Activity

This activity aims to raise students' awareness about "saving water" through a video. The video used in the Activity is a short Movie called "Lest the Future Doesn't Dry Up", which came third in the "Water Day Short Movie Competition". The movie was accessed via Youtube (Özel Ceceli Okulları, 2020). As the video was long (5.15 minutes), the first 2.40 minute-section was cut. Activity instructions were given to five groups consisting of two students each (Appendix 5). The students were informed that they would get 10 points for each question in the instructions. The time allocated for the movie was 7 minutes. Each group was given a blank A4 sheet of paper and asked for their answers. Correct answers and group scores were announced when the time was over. As seen in the sample worksheet (Photograph 2), the students reflected on the information about the efficient use of water.

The opinions of S24 and S35 can be given as an example of evidence for the student learning

during this activity: “I liked the video. It was giving information about water wars and children in Africa. I learned about these issues.” (S35). “The video caught my attention. I was struck by the dehydration of children in Africa. I understood that we should use water economically” (S24). In their comments, the students mentioned the importance of using water carefully and expressed their sadness at the presence of children suffering from thirst.



Photograph 2. An Example of a Group Work from the “The Water Movie” Activity

At the end of the activity, the groups’ performances were assessed. The following is a dialogue that the researcher had with the leader of the group named “Princes and Princesses:

Researcher: What did your group think about the video you watched? What was covered in the video?

Group leader: We enjoyed the video. In the video, it was stated that water would run out and that water is important for people. It was said that there would be days without water, that there would be no water left in the dams, and that there would be no water in most places.

Researcher: Were the questions given in the activity difficult? Were you able to answer as a group?

Group leader: The questions were easy. We helped each other with the answers. Everyone tried to voice their opinion.

After all the groups reflected on their learning and progress, the activity ended.

The Water Tree Activity

In the water tree activity, the diagnostic branch tree (DBT) technique, which is found useful in determining what was or was not learned about the subject (Çepni & Çil, 2016), was used (Appendix 6). This technique is preferred to assess student learning at the end of the lesson. With its unique form, DBT is one of the

alternative assessment techniques. It resembles true and false questions, one of the traditional measurement tools (Kocaarslan, 2012). The difference between them is that while true-false questions are independent of each other, the questions in DBT are interconnected (Bahar et al., 2015). The correct or incorrect answers to the questions are decisive in the next steps. In other words, at each step the student has to either turn to a correct or an incorrect branch of the tree (Başol, 2019). The aim in this activity is to find the right exit (Çepni & Çil, 2016). It is stated that the use of this technique in education increases student success (Şeyihoğlu & Erbaş, 2010).

The DBT developed in this study was created using the Edrawmax program. The students were divided into five pairs. A diagnostic branch tree was placed on the floor of the gym before the lesson. The questions written in the QR codes in the DBT were pasted as two different sets for both groups. Before starting the activity, the student groups were asked to queue up and come to the activity area. In order to motivate the students for the activity, they were asked whether they have seen such a large QR code before; whether they have done an activity like this before, what their predictions about the activity are with regard to the QR codes pasted on the ground. Then, the researcher distributed the instructions. Each group was given a mobile phone and asked to do the activity simultaneously. In this activity, each student in the group did the activity individually. The total points earned by each student was noted. The mean score of the individual scores of the students in the group constituted the group score. Ten minutes was allocated for this activity, and the groups found the time sufficient. Each student answered the questions individually during the activity. Before starting the lesson, the use of the QR code was demonstrated to the students individually. At the end of the activity, the statements in the QR codes were read to the students, allowing them to reconsider their answers, and the correct and incorrect statements were explained to the students by the researcher.

Regarding this activity, the researcher and the leader of the group "Star" had the following dialogue to reflect on the group’s learning process:

Researcher: What did you think about the activity?

Group leader: It was fun. Using the mobile phone in class felt different.

Researcher: Did you find yourself successful as a group? What were the questions like?

Group leader: As a group, we tried to find the right exits. The questions were not difficult, except for one or two questions.

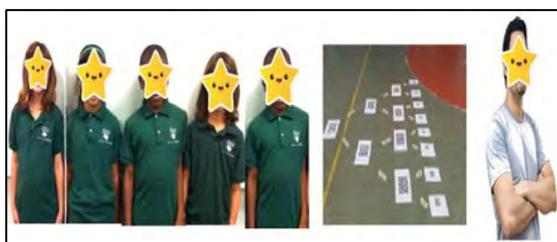
Researcher: Based on the questions in the activity, what can you say about saving water?

Group leader: The questions addressed the conscious use of water. There may be water wars in the future. I realized that water is an indispensable part of our life. Therefore, we must use it carefully.

Researcher: So, what do we do to use water carefully? Can you give an example?

Group leader: We must turn off the taps that keeps running. If there are broken taps, we should have them repaired immediately. We should wash the dishes in the dishwasher. We should warn those who waste water. Our country is also a water poor country. If we love our country, we should protect the water by thinking about the children who are the future of the country.

Photograph 3 shows the “Water Tree” placed on the floor of the gym and the students and the teacher in the activity area. In Photograph 4, a group of students during the implementation process is shown.



Photograph 3. The Students and the Teacher at the Water Tree Activity



Photograph 4. A Group of Students During the Implementation Process

FINDINGS

In the interview, students’ positive and negative opinions about the social studies teaching supported by the QR code application were taken. Table 1 shows the codes and themes emerged from the student opinions.

Table 1. Students’ Views on Social Studies Education Supported by the QR Code Application

Theme	Code	Frequency (<i>f</i>)
Positive	Content of the activities	41
	Affective behaviors	30
	Cooperation	28
	Cognitive behaviors	16
	Competition	11
Negative	The difficulty of questions	1

According to Table 1, almost all of the students had positive opinions about the activities and only one student stated a negative opinion about social studies teaching supported by the QR code application. The positive opinions were about the content of the activities, development of affective and cognitive behaviors, collaboration, and competition. The only negative comment expressed by one student was that the questions asked in the activities were difficult. Some of the students' opinions are as follows:

S27: It was nice that some words were written one under the other and that we as a group tried to form the words. We couldn't find some words, but it was good to race with our friends. It was so much fun.

S36: I liked this activity the most. It was nice to see the questions by scanning the QR code. It's been fun for me. I am happy. This activity increased my intelligence. I learned things about saving water.

Another question that was asked to the students in the interview form is about what they achieved/gained through completing social studies activities supported by the QR code application. The student opinions are given in Table 2.

Table 2. Students’ Views on the Benefits of Social Studies Education Supported by the QR Code Application

Theme	Code	f
Affective Behaviors	Having entertaining time	41
	Not wasting water	41
Cognitive Behaviors	Understanding the importance of water	23
	Learning that water wars might break out	8
	Finding out that there is little available water	8
	Not polluting the water	6
	Learning to read QR codes	4
	Informing people about saving water	2
	Using sea water by purifying	1
	Learning directions (right/left)	1

When Table 2 is examined, it is seen that all the students (f=41) who participated in the research found the social studies education supported by the QR code application enjoyable. Another finding is that all students have awareness about and knowledge of the importance of not wasting water. In addition, it is seen that more than half of the students (f=23) realized the importance of water, however, only one of them (f=1) realized that sea water can be used after purification. The following statements can be given as examples of student responses:

S15: For example, we thought about it in the activities. We tried to find out...We should use less water. I realized that we have to warn people when they leave the tap on. Then we should encourage people all over the world to save water. If we overuse limited water resources, they will run out. Let's not use too much water. Let's use as much as we need. Let's save water.

S35: We should use water economically. We may experience water shortage in the future. We should not waste water at home. We should turn off the tap while brushing our teeth. We must wash the dishes in the dishwasher. We should not use too much water while washing our hands.

In the current research, the opinions of the teachers of the two classes participating in the implementation were taken. Table 3 presents the opinions of the classroom teachers regarding the implementation.

Table 3. The Classroom Teachers’ Views on Social Studies Education Supported by the QR Code Application

Theme	Code	f	
Positive	Students learn while having fun	2	
	Using technology to attract students' attention	2	
	Contributing to the comprehension of the topic	2	
	Doing the activities as a group increases motivation	2	
	Realizing the usability of the QR code application in other courses and subjects	1	
	Increasing the curiosity of students	1	
	Students liked QR codes	1	
	Negative	The need for a phone for the application	2

Table 3 shows that the two participating classroom teachers have more positive opinions about the implementation. It is seen that there is a consensus (f=2) on the topics of learning by having fun, using technology to attract students' attention, contributing to the understanding of the subject, and increasing motivation by doing the activities as a group. The issue that the two teachers shared a negative opinion on is the need for a mobile phone for the implementation (f=2).

In the interview form, the students were also asked whether they had used the QR code application before, and whether they knew the areas QR code used. Student responses regarding the subject are given in Table 4. When Table 4 is examined, it is possible to say that more than half of the students (f=23) who participated in the activities had not used the QR code application before. It is understood that almost all of the students have an idea about the different usage areas of the QR code application (f=39). It is noteworthy that the examples given for the usage areas of the QR code application in education are smart boards (f=36) and textbooks (f=26). It is also seen from the table

that the students know that the QR code is used in different areas.

Table 4. Students' Knowledge about the QR Code Application and Areas It is Used

Theme	Code	<i>f</i>	
Usage Status	No	23	
	Yes	18	
Knowing the Usage Areas	Smart board	36	
	Textbook	26	
	Market	13	
	Internet	11	
	TV	10	
	Yes (f=39)	HES Code	6
		WhatsApp	5
		EBA	3
		Hospital	2
		Withdrawing Money	1
		The food menu	1
		Bookstore	1
		Banner	1
		No	2

Another question asked to the students in the interview form is about the applicability of QR code implementations in other courses. The findings are given in Table 5.

Table 5. Students' Views on the Applicability of QR Code Implementations in Teaching Other Subject Areas

Theme	Code	<i>f</i>
Applicable	All subjects	25
	English	7
	Physical education	7
Inapplicable (f=16)	Art	5
	Music	5
	Religious culture and ethics	5
	Turkish	1
	Mathematics	1

Table 5 reveals that more than half of the students (f=25) who participated in the implementation found the QR code application to be applicable in all courses. A significant part of the students (f=16) did not find it appropriate to use the QR code in all courses. There are seven different subject areas for which the students found the QR codes inapplicable, English (f=7) and Physical Education (f=7) being the most prominent among them.

CONCLUSION and SUGGESTIONS

This study was conducted to present an example of a QR code-supported activity in social studies education and to determine the opinions of the students and teachers about the implementation. The findings showed that almost all of the students expressed positive opinions about the implementation. The teachers also stated that the activities had more positive aspects than negative aspects.

According to the findings based on the analysis of student and teacher opinions, it can be said that teaching and learning social studies using the QR code application is enjoyable. This result is in parallel with the studies by Yılmaz (2017), Gogova and Koceska (2014), and Rivers (2009). Yılmaz (2017), in the study on teaching astronomy concepts with QR-supported games, reported that the students found the games supported by QR codes entertaining. Similarly, in the study by Gogova and Koceska (2014), the students stated that the use of QR code made the lesson fun. Rivers (2009) found that 92% of the students thought that the teaching supported by QR code made the lesson enjoyable.

According to the opinions of the students and teachers, social studies education supported by the QR code application contributed to the students' understanding of the concepts and thus probably supported their cognitive development (Table 2). This result is compatible with the results of the studies by Akın (2014), Barros et al. (2019), Büyükkol-Köse (2019), Güleç (2019), and McCabe and Todesco (2012).

Using group work technique in the activity implementations was found positive by the students and teachers in the current study. Similarly, Gogova and Koceska (2014) found that using QR codes facilitated collaborative learning. Another result of the current study is that according to the teachers, the use of technology attracted the attention of the students. Both teachers agreed on the motivational effect of technology. This result is in line with the result of the research conducted by Çelik (2012).

In the current study, it was determined that more than half of the students had not used the QR

code before. In their research, Gogova and Koceska (2014) determined that only a few of the students used the QR code beforehand. Ramsden and Jordan (2009) also found in their study that very few (2.2%) of the students used the QR code. Although they had not used the QR code prior to this study, it was revealed that almost all of the students had an idea about the usage areas of the QR code, especially in the field of education. Considering that the QR code is used in a very wide area today (TV, electronic devices, markets, educational environments and materials, health sector, etc.), it can be thought that students encountered this technology in their daily lives. The fact that education comes to the fore the most among the usage areas of the QR code in the students' opinions can be explained by the widespread use of smartboards, which are turned on with QR codes in schools, and the use of QR code in the textbooks in recent years.

Another finding of the current research is that more than half of the students who participated in the activities found the QR code application to be applicable in other courses as well. Considering the advantages of QR code-supported education, this result can be seen as an opportunity to enhance the design of other courses using QR codes. Aligned with this idea, Çelik (2012) found that students wanted to use QR code applications in different courses.

Based on the current research study's findings, the researchers recommend the following suggestions:

- In light of the results of the current research, QR code-supported activities can be used to teach different social studies topics at all grade levels and to teach other subject areas.
- The mobile phone needed for activities can be provided by the teacher or by using the phones of the staff at the school.
- In this research, the QR codes were retrieved from free resources (e.g., karekod oluştur, n.d.). To create QR codes, many different open-source or paid applications on the Internet can be used.
- Researchers/teachers should allow students to practice using QR codes before participating in the actual teaching activities. This is important for carrying out sound research and creating an effective learning environment.
- Determining the group members and group leaders before the lesson, placing the DBT on the floor where the implementation will be made, and downloading the QR code reader application on the phones will be beneficial in terms of managing the time more effectively.
- Researchers might conduct quantitative studies to investigate the effects of teaching social studies using the QR code application on different variables such as academic achievement and attitude towards the course.

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Appendix 1

Student Interview Form Regarding the Use of QR Codes

Dear Student,

First of all, thank you for sparing time for the interview.

This research is carried out with you after obtaining the necessary permissions. The research is carried out in order to set an example for the use of QR codes in social studies lessons. Student opinions are viewed as important for the research at this point. I would like to record the interview in order to ensure the validity and reliability of the research and to prevent possible interruptions during the interview. I want you to know that the audio recording will only be used for scientific purposes. Upon your request, the audio recording will be given to you after the data has been written down. Your name will be kept confidential in the research. Instead, your name will be specified with a code. You can pause or end the conversation whenever you want. I estimate that this interview will take about 10 minutes. With your permission, I'm starting the interview.

1. Gender: Female () Male ()
2. Do you have a mobile phone of your own?
3. Have you ever used the QR code before?
4. Do you know in which areas QR codes are used? If you know, could you please tell me what they are?
5. What do you like about the QR code-supported teaching of the concept of saving water?
6. What are the things you don't like about the QR code-supported teaching of the concept of saving water?
7. What contributions have the QR code-supported education on saving water made to you?
8. Would you like QR code-supported teaching activities to be used in social studies lessons from now on? Why?
9. Would you like the QR code-supported teaching activities to be used in other courses? If yes, can you tell me the names of these courses?
10. In which courses do you not want QR code-supported teaching activities to be implemented?

Appendix 3

Lesson Plan Example

SECTION 1

COURSE	Social Studies
GRADE	4 th Grade
LEARNING AREA	Production, Distribution, and Consumption
SUBJECT	Saving Water
TIME LIMIT	40 minutes

SECTION 2

Learning Objectives	SC.4.5.5. The student will use environmental resources without wasting them.
Values and skills	Saving, solidarity, patriotism and responsibility, cooperation, communication, environmental literacy, digital literacy, social participation skills
Methods and Techniques	Cooperative learning, Acrostic, Diagnostic Branched Tree, Question and answer, Web 2.0 tools supported learning
Educational Technologies, Tools, and Equipment Used	Mobile phone, activity papers, video, the internet, pen, eraser, A4 papers

TEACHING AND LEARNING ACTIVITIES

Before starting the lesson, students are demonstrated how to use of QR code application in the class. Each student is taught how to read the QR code from their mobile phone. Four tables and rows are placed in the gym so that two groups can sit. The students are divided into two groups in line with their own choices and the group leaders are determined. Group members are asked to come up with a name for their groups. The group names are written on A4 paper and stuck on the desks.

"Word Formation" activity is done in the warm-up stage of the lesson. For this activity, each group is given a blank A4 paper, pencil, eraser, and group leaders are given a mobile phone with internet and QR code application. Before the activity, intriguing questions such as "Do you know what an acrostic is, have you ever seen an acrostic before, or have you ever written an acrostic?" are asked in order to attract the attention of the students. The students express their opinion on the topic and the activity begins. For the activity, the groups are given 30 seconds to examine the activity papers. Then, the activity starts, and 5 minutes is allocated for the activity. After the time is over, the worksheets are collected. The answers given are checked by the teacher first. The group leaders are asked what they mean by the words produced in the activity. In line with the explanations of the group leaders, additional questions are asked to evaluate how their explanations and water-saving are related. Correct explanations (for each correct word found) made by the group leaders about saving water are awarded 10 points. All answers

evaluated as correct are summed up to calculate the score of the groups for the first activity, which was noted on a blank A4 paper.

In the development part of the lesson, activities called “The Water Song” and “The Water Movie” are carried out. A worksheet is distributed to the groups for the activity called “The Water Song”. In addition, a sheet of paper with the lyrics of the songs is given to the students so that they can follow and sing easily. It is told to the students that the group that sings the song in the loudest and most harmonious way will get a higher score. Then the activity moves on. Groups are given 4 minutes for the activity. At the end of the activity, the group that sings the loudest and most harmoniously is chosen together and applauded. Afterward, the groups are asked for their “opinions about the song and their thoughts on its message”. Group leaders make explanations about the questions. Based on the song, additional questions are asked to the group leaders about saving water to find out their learning about saving water.

After the song activity, the activity called “The Water Movie” started. For this activity, the groups are given activity paper, blank A4 paper, a pencil, and an eraser. Afterward, they are given 30 seconds to review the activity sheet. Groups are informed that they have 7 minutes for the activity. Then the activity starts, and activity sheets are collected at the end of the activity. The teacher asks about how the activity went, whether the questions were easy, how they found the video in the activity, and what the video explained. Group leaders share the group perspective. Afterward, the group responses for the activity are checked by the teacher. Correct answers are given 10 points and group scores are calculated. At this stage, the groups are also informed about the total scores they have achieved during the lesson.

At the last stage of the lesson, the "The Water Tree" activity is done to make an evaluation. Ten minutes is allocated for this activity. The QR codes printed on A4 paper to be used on the diagnostic branched tree for the activity are stuck on the floor of the gym in two sets (a single set can be pasted upon preference). Groups are asked to line up and come to the starting point of DBT. To motivate them for the activity, the groups are asked whether they have seen such large QR codes before. Opinions of the students about the QR codes are taken. How the activity will be done is explained to students. A mobile phone capable of reading QR codes is used for the activity. It is ensured that the students in the group do the activity taking turns. The teacher notes the exit points achieved by each student throughout the activity and calculates the score accordingly. At the end of the activity, the exit points achieved by each student in the group are summed up and the group's total score is found. Evaluation questions are asked to the groups about how the activity went, whether the questions were easy or not, and what they can say about saving water based on the questions. Then, the questions in the QR codes are read one by one by the teacher. The correct and incorrect statements are explained to the students, and they are allowed to review their answers. In the last stage, the learning outcomes about saving water are summarized by the teacher, and the lesson ends.

Appendix 4

Word Formation Activity



1. As the leader of the group, scan the QR code.
2. Click on the page and examine the screen as a group.
3. After examining the screen, write what is requested from you on the blank papers given to you and complete the activity in cooperation.

Appendix 5

The Water Song Activity



1. As the leader of the group, scan the QR code.
2. Click on the link on the screen that opens.
3. Try to get your group to sing the song in harmony and enthusiasm.
4. You can follow the lyrics given below.

WATER BELONGS TO KIDS

There is no world without water
Man can't stay thirsty
The plants wither
No living thing survives.

Don't waste water
Don't black out the future
You shall not forget
About the next generations

This World belongs to the kids
Let's not forget this
Do not waste water
Let's use it carefully.

Don't waste water
Don't black out the future
You shall not forget
About the next generations

Appendix 6

The Water Movie Activity



1. As the group leader, scan the QR code and click on the link that appears.
2. After clicking the link, watch the video carefully as a group.
3. After watching the video, as the group leader, read the two questions in the QR codes below and answer the questions as a group.
4. Write the answers to the questions on the blank papers provided to you.

Question 1.



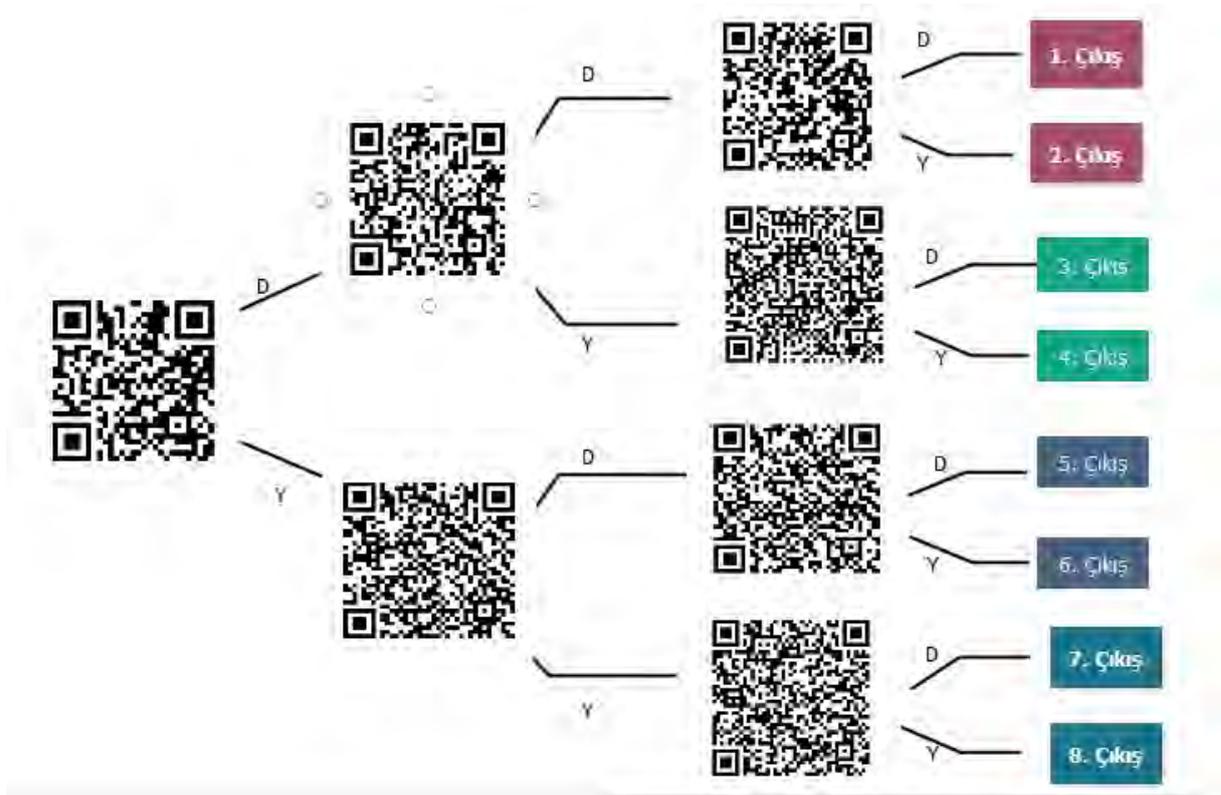
Question 2.



Appendix 7

The Water Tree Activity

1. Take a brief look at the activity drawn on the floor.
2. Read the questions by scanning the QR codes on the tree.
3. Move towards the exit points by following the arrows according to your answers.
4. The scores you get at each exit point will be shared at the end of the activity.
5. You should read the questions silently.



- 1st Exit= 3 Points
 2nd Exit = 2 Points
 3rd Exit = 2 Points
 4th Exit = 1 Point
 5th Exit = 1 Point
 6th Exit = 2 Points
 7th Exit = 2 Points
 8th Exit = 0 Point