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Revista de Cercetare si Interventie Sociala

THE EFFECT OF MUSEUM EDUCATION PRACTICES CARRIED OUT ON VIRTUAL TEACHING ENVIRONMENTS ON PROSPECTIVE TEACHERS' VIEWS

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The Effect of Museum Education Practices Carried out on Virtual Teaching Environments on Prospective Teachers' Views

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Abstract

In this study, the effect of museum education practices implemented with virtual teaching environments on the views of prospective teachers was analysed. The research was carried out with a case study design, which is one of the qualitative methods. The views of the prospective teachers about the museum education practices implemented with virtual teaching environments were examined with content analysis. 25 prospective teachers participated to the study. In the research, first of all, virtual museum environments in the Museum of Anatolian Civilizations were made interactive by using the edpuzzle application, and sound recordings and quiz questions related to museum activities were added to the videos. In addition, instructional materials related to museum hunting activities that the candidates used through virtual museum applications were designed. The experimental study with museum educational activities designed ith virtual teaching environments was implemented for four weeks. The results showed that these activities about the practices positively influenced the views of prospective teachers and that these practices were highly effective in teaching social studies course. In addition to this, it was determined that teacher candidates believed that an active teaching process could be created with virtual museum applications and that the learning about social studies course could be more easily embodied.

Keywords: virtual museum applications, museum educational activities, edpuzzle, social studies prospective teachers, case study, content analysis, sociological approach.

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Introduction

Museums are one of the most important outdoor educational environments preferred by educators in recent years. This education can be effective in increasing students' interest in the course and in learning the course contents more easily (Caliskan & Cerkez, 2012; Gokkaya & Yesilbursa, 2009). Museums embody the historical and cultural objects with learning that they contain and enable the establishment of the historical and cultural relationship between past and present (Meydan & Akkus, 2014; Yilmaz & Seker, 2011). It is emphasized in the literature that museums play an important role in teaching events and facts and historical processes (Yilmaz, Filiz & Yilmaz, 2013). At this point, despite the opportunities offered by the museum environments, studies in the literature revealed that there are some limitations in the implementation of the teaching activities in the museum environments. It is stated that the limitations are as follows: (1) The process of obtaining permission from the relevant institutions (school, culture ministry) and families takes long; (2) Transportation and distance problems; (3) Failure to schedule regular training in the museum; (4) Lack of knowledge of teachers regarding museum education activities; (5) Difficult control of crowded student groups, (6) Museum trips are time-consuming and costly (Caliskan, Onal & Yazici, 2016; Carvalho, Dong & Maton, 2015; Eguz & Kesten, 2012; Karatas, Yilmaz, Kapanoglu & Mericelli, 2016).

In this context, it is stated in the related researches that the use of virtual museums, which is one of the virtual teaching environments, may be effective in eliminating the limitations of the visits to museums in the teaching process (Sylaiou, Mania, Paliokas, Pujol-Tost, Killintzis & Liarokapis 2017; Ulusoy, 2010; Zaharias, Machael & Chrysanthou, 2013). Also, Aladag, Akkaya and Sensoz (2014), Bozkus (2014), Caliskan, Onal and Yazici (2016) Kiourt Koutsoudis, Markantonatou and Pavlidis (2016), and Kluge and Riley (2008) emphasized in their research that virtual museum environments facilitate the promotion of the cultural heritage of the communities, provide limitless access to opportunity and enable the transfer of large collections to digital platforms, ease of access to both national and international museum platforms, and provide an effective teaching environment with 3D and interactive technology. In this context, it is particularly mentioned in the literature that the use of virtual museums and the implementation of museum educational practices can be effective in the teaching process of social studies course (Demirboga, 2010; Ermis, 2011). It is stated in the researches that students will be able to comprehend intercultural differences and similarities more easily, make observations, use imagination, critical thinking and visual perception skills and provide a more motivating learning environment with the use of museum activities performed in virtual environments in social studies course. (Yildirim & Tahiroglu, 2012; Yilmaz & Seker, 2011). It is also mentioned that virtual museum applications provide learner-cantered instruction and enable the individual to learn by doing and living (Sookhanaphibarn & Thawonmas, 2009). In addition, when

the social studies course curriculum is examined; it is understood that the activities related to the course by using virtual museum trips take place at various levels of the program and the importance of using virtual environments in achieving the objectives and objectives for the course is empahsized (Ministry of Education, 2018).

At this point, it is understood that it is important to increase the knowledge level of teachers about virtual environments to a sufficient level, considering the contribution of the museum activities in virtual museum environments to the teaching of the course and its importance in the curriculum, (Aladag, Akkaya & Sensoz, 2014; Ismaeel & Al-Abdullatif, 2016). In particular, it is believed that it will be effective to start training for teachers to realize museum education applications by making use of their virtual environments starting from the pre-service period (Yesilbursa & Uslu, 2014; Yildirim & Tahiroglu, 2012). Within the scope of the social studies teacher candidates' training for virtual applications; It is thought that it is important to include activities such as designing museum hunting activities by using virtual environments, identifying and answering questions related to the work exhibited in the virtual museum environment, creating stories and compositions related to the works, and distinguishing the similarities and differences of the works (Carrozzino & Bergamasco, 2010; Panina, Kazakov, Bartosh & Emelyanov, 2013; Sylaiou & others, 2017).

When literature is examined, it is seen that there are researches about virtual museum environments; importance of virtual museums, evaluation of virtual museum tours according to student and teacher views, examination of social studies teachers' views and attitudes about history and cultural heritage education (Aladag, Akkaya & Sensoz, 2014; Avci & Oner, 2016; Avci & Memisoglu 2016; Cengelci, 2013; Karatas & others, 2016; Meydan & Akkus, 2014; Yildirim & Tahiroglu, 2012; Yilmaz & Seker, 2011).

As a result of these findings obtained from the literature review, it was found that there was no research about the museum education practices carried out with virtual teaching environments. Also, no studies were conducted in which virtual museum activities were applied to prospective social studies teachers and also the effectiveness of the application was evaluated. In this context, it is considered that designing museum education applications that are interactive with virtual teaching environments will be effective both in the teaching of social studies course and in increasing the knowledge and achievement levels of prospective social studies teachers about virtual museum education. In this context, it is believed that conducting a scientific research that will improve the knowledge and skills of prospective social studies teachers for virtual museum applications can eliminate the lack of literature. With this research prepared in this direction, it is expected that teacher candidates will design a more effective teaching environment by making use of virtual environments in transferring social studies course to students during in-service period.

Methodology

The purpose of the study

In this research, it is aimed to apply the museum education applications with virtual teaching environments to prospective social studies teachers and to evaluate the views of the participants. In this direction, the answers to the following questions were sought in the research: (1) What are the views of the prospective social studies teachers about the museum education practices carried out with virtual teaching environments before the application?; (2) What are the views of the prospective social studies teachers about the museum education practices carried out with virtual teaching environments after the application?

In this study, case study design was used. The aim of the case study design is to have a detailed examination of any event or phenomenon (Ekiz, 2013; Glesne, 2006). At this point, in this study, the views of the prospective social studies teachers about the museum education practices and their problems were tried to be examined in depth and the selected situation was limited to the sample determined by the researchers (voluntary prospective teachers).

Participants

Prospective teachers studying in social studies teaching department participated in the study. The research data were obtained from the views of the prospective teachers (n = 25). Information on the demographic characteristics of prospective teachers was given in Table 1.

Table 1. Demographic Characteristics of the Prospective Teachers

Demographic Characteristics	f	%
Gender		
Female	14	56
Male	11	44
Taking Museum Education Activities Lesson		
For the first time	21	84
Taken before	4	16
The Frequency of Getting Benefit from Visual Environments		
Never	20	80
Once a month	3	12
Once a year	2	8

In *Table 1*, it is seen that the majority of the prospective teachers participating in the research are girls (56%). In addition, it is seen that that the majority of the teacher candidates (84%) took the museum education practices course for the first time. It is also understood that the majority of pre-service teachers (80%) do not make use of virtual environments and do not perform practices online with sufficient frequency.

Data Instruments

In this research, the effectiveness of museum education applications with virtual teaching environments was evaluated. Within the scope of the study, virtual museum environments in the Museum of Anatolian Civilizations were made interactive and museum education applications were implemented. In this context, the effect on the views of teachers was evaluated by semi-structured interview form.

Research Process

The study started by creating a work plan. Then, it was determined whether there was a need for evaluating the effectiveness of the museum educational applications with virtual teaching environments. As a result of the survey, no research has been found to determine the effects of applications related to virtual museum environments on the views of prospective social studies teachers. In line with this result, before the application; teacher candidates' views about virtual museum applications were found out. The participants were asked the question 'What are your views on the museum education practices carried out with virtual teaching environments?' And their views were taken. After this stage, the stages of the museum education applications to be implemented with virtual teaching environments were designed and the virtual museum environment related to the museum to be used in the applications was determined. In addition, the stages of the practices were revised in accordance with the views of some experts (training program expert (n = 5), museum training expert (n = 3) and measurement and evaluation expert (n = 2) and redesigned in line with the recommendations. Within the scope of the research, it was deemed appropriate to select the Anatolian Civilizations Museum as it was appropriate to the content of the social studies course. In the next stage, the Anatolian Civilizations Museum was made interactive with the virtual museum environment edpuzzle application and audio recordings and quiz questions were added to the videos. In this way, general information about the works to be examined in the museum environment was given by using the method of drama on the works (See *Figure 1*).
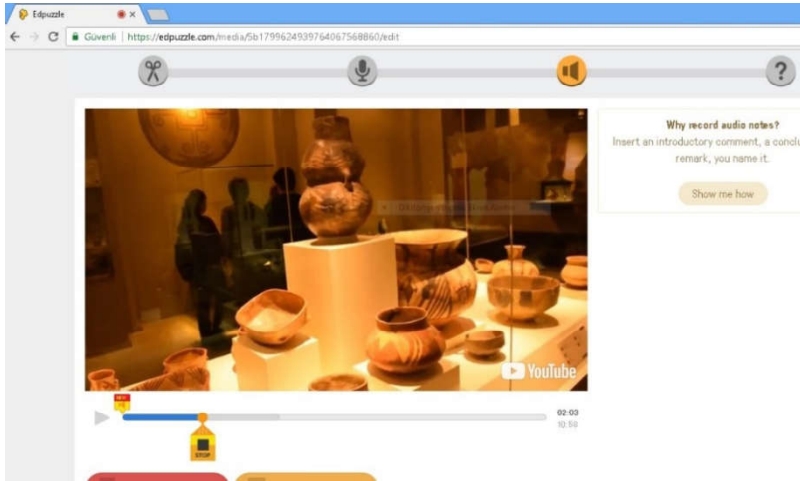
Figure 1. Edpuzzle Application at the Museum of Anatolian Civilizations (Adding Voice Recording)

The sample voice recordings include "Hello, I am a masterpiece from Anatolian Civilizations Museum. I was made by people who lived in the Neolithic. At that time, people just started a new life. The settled life began in this period. " The added quiz questions were prepared in order to improve prospective teachers' awareness and knowledge about the works in the museum environment (See *Figure 2*). The sample questions include; ' in which period and from which material was this work produced? What is the main feature of the period?'.
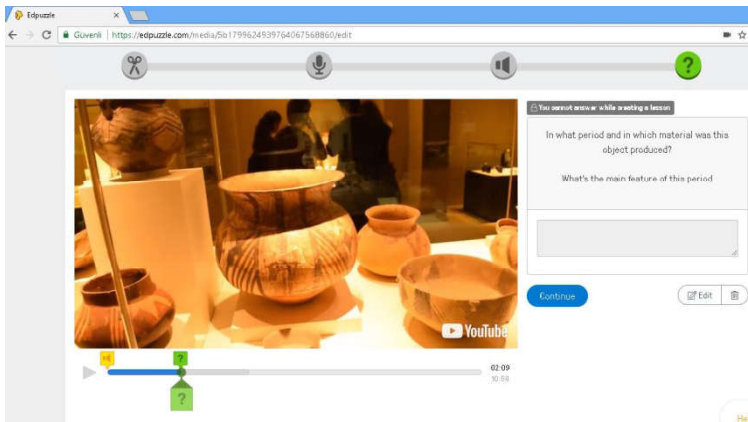

Figure 2. Edpuzzle Practice at the Museum of Anatolian Civilizations (Adding Quiz)

The virtual museum environments, which were made available after these stages, were shared on the Moodle platform (See *Figure 3)*. In the next stage, applications started. The museum education applications with virtual teaching environments were applied for 4 weeks. 4 hours per week interactive applications were established in the classroom and the applications lasted 16 hours.
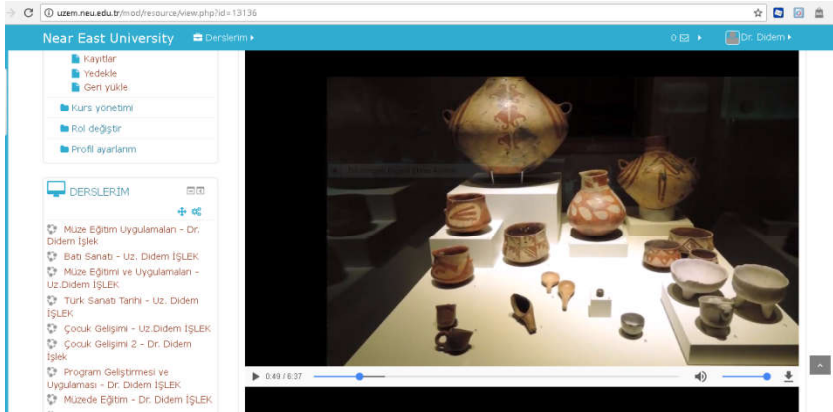

Figure 3. The Sharing of Anatolian Civilizations Museum on Moodle Platform

In accordance with the needs of prospective social studies teachers, educational techniques such as 'using virtual teaching environments', 'identifying and answering questions related to the work exhibited in the virtual museum environment', 'designing and implementing museum hunting activities using the virtual museum environment', 'creating stories and composition studies related to the works in the virtual museum environment', and cooperative learning, critical thinking, discussion and brainstorming methods were used.

In the applications, the virtual museum environments in the Anatolian Civilizations Museum were introduced and a short-term training on the use of the environment was provided. In the next stage, prospective teachers reached the virtual museum environment using Moodle platform. In these applications, which are actively carried out in the classroom environment; the participants were first asked to examine the actual works in museums through virtual museums (See *Figure 4*).

Figure 4. Virtual Excursions at the Museum of Anatolian Civilizations

At this point, prospective teachers took notes about the production materials, their purposes and periods of the works in the virtual museum. Thus, it was aimed to increase the knowledge level of the participants. In the next stage, they were given working papers with questions about the works and activities for the museum hunting activity. Among the questions in the working papers were 'Can you write stories about the historical development processes of Lydian artefacts exhibited in the virtual museum?' 'Can you make a puzzle activity for the names (Kybele, sphinx, relief, Coin, hitit, the sun god) of the exhibited works?'.

In the report created for the museum hunting activity (See *Figure 5*); Questions like 'what is the name of the work? ", 'What is the date of the work?', 'What purpose is it used for?', 'What purpose is it used today?', 'What are the different aspects of the present works?' were asked .

Figure 5. Museum of Anatolian Civilizations Record Report

The prospective teachers first answered the questions in the worksheets. In parallel with this activity, the responses given to the working papers of the participants were evaluated under the guidance of the researchers and necessary feedback was given. In the next stage, prospective teachers were given the opportunity to perform the museum hunting activity by using the virtual museum environments, which were made interactive in the edpuzzle environment. In these activities, the participants were asked to access the works given in the report using the virtual museum environment and to answer the questions in the report. The prospective teachers learned some information about the production date, genre and characteristics of the works through voice recordings. They answered questions such as 'What are the similarities of these works to the present-day works?', 'What are the different aspects from the present-day works?' in the report by using brainstorming technique. At the end of the applications, open-ended quiz questions aimed at reinforcing the knowledge about the works in virtual museum environments were included. The participants were asked to answer these questions and to reinforce their knowledge. At the end of the application, face-to-face interviews were conducted with prospective teachers in order to evaluate the effectiveness of the activities performed using the virtual museum environment and their views were evaluated.

Semi-Structured Interview Form for Museum Education Practices
Implemented with Virtual Teaching Environments

A semi-structured interview form was developed in order to determine the effectiveness of the museum education practices carried out through virtual teaching environments. In the preparation of the questions to be included in the interview form, the literature was searched and the questions were drafted. In the next stage, the necessary arrangements were made with referring to expert opinion ($n = 4$). The final version of the form was created after the review with linguists ($n = 2$) and measurement experts ($n = 3$). In the interview form, the question 'What are your views on museum education practices carried out with virtual teaching environments?' was asked. The interview form was administered twice before and after the application. Both interviews with the candidates lasted 10-15 minutes. Before the interviews, it was stated that their participation in the research would be carried out on a voluntary basis, their names would not be used in the research process and their identities would be kept confidential. As a result, assurance was given to prospective teachers about the confidentiality and security of the research. The interviews were recorded in line with the permissions obtained from the prospective teachers.

Data Analysis

Content analysis was used in the analysis of qualitative data. In the content analysis phase, firstly interviews with prospective teachers were recorded. In this direction, the interviews were transcribed on computer, and the accuracy of computer transcripts was checked by an expert. In the second stage, the data were coded separately considering the word groups expressed by the participants. The data were collected in categories considering similarities between the codes, thus creating themes. In the analysis, the teacher candidates were given a code number. In the third stage, museum education experts (n = 2) and education program experts (n = 2) compared the themes previously determined by the researchers and confirmed whether the codes identified represent conceptual themes or not. At this stage, 'Consensus' and 'Disagreement' codes were determined. The reliability calculation of the qualitative data was carried out with the formula of Miles and Huberman (1994) [Percentage of Consensus = Consensus / (Consensus + Disagreement) x 100]. As a result of this research, 22 of the 26 codes determined by the researchers were approved and 84.6% consensus was reached on the suitability of the codes. The fact that a person other than the researchers conducted the content analysis and the 80% consensus reached as a result of the comparison of the results indicates that the reliability of the coding is high (Miles and Huberman, 1994). Thus, it was aimed to ensure the reliability of coding processes and themes of the data obtained from semi-structured interview form by taking expert views during the interpretation of qualitative data.

In addition, sample excerpts from the views of prospective teachers in order to increase the reliability were included in the research. While expressing the quotations, the views of the prospective teachers were coded with the letter PT (Prospective Teacher) and a number. The data were reported by using quotations taken from the views of the prospective teachers.

A number of measures were conducted to ensure the validity and reliability of the study. In this context, in order to ensure internal validity, the interviews obtained from qualitative data were recorded in audio recordings, and the recordings were transcribed without making any changes. However, the views of the prospective teachers in the research were expressed by direct quotations without commenting. In the internal reliability of the research, the data were coded separately by the researchers and compared according to expert views. Within the scope of external validity, the stages of the research, the method of the research, the working group, the collection of data, the analysis and interpretation of the data, and the findings of the research were explained in detail. In the external reliability, the research process was presented in detail and the participants were not guided during the interviews in order not to affect them. Thus, it was aimed to ensure the validity and reliability of the qualitative findings.

Results

The views of the prospective social studies teachers about the museum education applications carried out with virtual teaching environments before and after the application were given. The findings obtained for the purposes of the research were presented in the sub-sections.

Prospective Social Studies Teachers' Views on Museum Education Practices Carried out with Virtual Teaching Environments

Prospective teachers' views about the museum education practices carried out with virtual teaching environments were presented in *Table 2*.

Table 2. Pre-service Teachers' Views on Museum Education Practices with Virtual Teaching Environments

No	Prospective Teachers' views	f
1	I do not think that it will be an effective teaching since I have not used the virtual museum environments in the teaching of any course before	8
2	I don't know what activities can be done in the social studies course using the virtual museum environment.	6
3	I have no idea what kind of facilities virtual museums can provide.	5
4	The works in virtual museum can only be seen through virtual teaching environment tours.	4
5	The museum educational practices are not student-cantered because they are conducted under the control of teachers.	2

As can be seen in *Table 2*, the majority of the prospective teachers stated that they had not used the virtual museum environments in the teaching of any course before and therefore could not perform an effective teaching (n = 8). The example statement was presented below.

> *"I have never used virtual museum applications in teaching any course before. At this point, I have no idea what effective teaching environment I can carry out." (PT, 21)*

It is understood from the stated statement that the prospective teacher candidates had not performed virtual museum activities in the teaching-learning process before and therefore their knowledge about the usability of virtual applications was not sufficient. The majority of the prospective teachers before the application emphasized that they had not known what activities could be done in social studies course using virtual museum environment (n = 6). The quotation on the subject was given below.

"During the teaching process, I have not performed any activities before using the virtual museum environment. I don't know what activities I can use by using virtual environments for social studies course."(PT, 19)

This finding revealed that the candidates had not used the virtual museum environments before and had not received any training on this subject, so they did not know what kind of activities they could implement in the teaching process of the social studies course. Before the application, some of the prospective teachers stated that they did not have knowledge about the facilities that virtual museums could provide (n = 5). The example statement was given below.

"I don't know how to make use of virtual museum environments. I do not know what kind of facilities can be used by using virtual museum environments." (PT, 3)

This finding shows that the prospective teachers' level of knowledge about the possibilities offered by virtual museums (for example, eliminating the time limit, facilitating access to space) was not sufficient. Some of the prospective teachers stated that the works could only be seen via visiting virtual teaching environments and virtual museums (n = 4). An example of this was given below.

"I think the activities in the virtual museums are limited., Works in virtual environments can only can be viewed and examined using virtual environment tours. I believe that these activities are limited to these activities." (PT, 8)

It is understood from the views of the participants that they did not have any idea about the different activities that could be performed in virtual museum environments (e.g. museum hunting activity, story and composition creation, puzzle activities for works in virtual museum). Prior to the application, minority of the prospective teachers emphasized that the museum education practices carried out with virtual teaching environments were not student-cantered (n = 2). The example statement was given below.

"I think that the museum education practices carried out with virtual teaching environments took place under the control of the teacher. I believe that such instruction is not student-cantered." (PT, 16)

As can be understood, the prospective teachers think that virtual museum applications are carried under the control of the teacher. This view points out that the candidates do not have enough knowledge about virtual museum applications that can be done actively with the group activities by students (for example, answering the questions in the worksheets, practicing the museum hunting activity, distinguishing the similarities and differences of the works). All findings show that prospective teachers' level of knowledge about virtual museum applications was not sufficient before application. However, prior to the application, it was also determined that the candidates did not have any idea about the activities that could be carried out actively in virtual museum environments for social studies course.

Findings revealed that prospective teachers needed to receive training on museum education practices carried out with virtual teaching environments.

Prospective Social Studies Teachers' Views on Museum Education Practices with Virtual Teaching Environments

The views of the prospective teachers after the implementation of the museum education practices with virtual teaching environments were presented in *Table 3*.

Table 3. Prospective Teachers' Views on Museum Education Practices with Virtual Teaching Environments

Theme	Code	f
The contribution of Museum Education Carried with Virtual Teaching Environments to Social Studies Teaching	Effect on social studies teaching	9
	Increasing motivation in social studies teaching	7
	Realization of the subjects in the field of social studies	4
	Increasing the level of knowledge about historical processes	3
	Understanding of intercultural differences	2
Presenting Effective Teaching Environment	Ensuring permanent learning	8
	Providing an active learning environment	6
	Realization of learning by doing	5
	Providing easy access to virtual museum applications	4
	Enabling cooperative learning	2
The Effect of Museum Education Practices Carried outwith Virtual Teaching Environments on Higher Level Thinking Skills	Effect on the development of cognitive skills	7
	Effect of sensual skills on development	6
	The effect of research-examination skills on development	4
	Effect on the development of critical thinking skills	3
	Effect on the development of creativity skill	3
	Effect of observation skills on development	1
	The effect of visual perception on development	1

As can be seen in *Table 3*, prospective teachers' views regarding the effectiveness of museum education practices carried out through virtual teaching environments were divided into themes and codes were formed. In this context, the views were categorized into three themes as 'The Contribution of Museum Education Practices Carried out with Virtual Teaching Environments to Social Studies Teaching ", 'Presenting Effective Teaching Environment and 'The Effect of Museum Education Practices Carried out with Virtual Teaching Environments on Higher Level Thinking Skills'. In the first theme, the majority of the prospective teachers stated that museum education practices carried out with virtual teaching environments were effective on social studies teaching (n = 9). This finding shows that the use of virtual museum environments will increase the effectiveness of teaching social studies according to the prospective teachers' belief. An example of this view is given below.

> *"I think the museum practices that we implement with virtual teaching environments will be effective in teaching social studies course. I will use virtual teaching environments in social studies course while practicing my teaching profession. I believe that students will find these centers motivating." (PT, 13)*

In the same theme, the majority of prospective teachers stated that the motivation in teaching social studies could be increased with the applications performed in virtual environment (n = 7). This finding indicates that teacher candidates found the activities in virtual museum applications as motivating. An example of this view of the candidates was presented below.

> *"I think that I can teach my students in a more motivating way in my professional life with many different activities such as hunting museum activity using virtual environments. The students will be able to find the teaching offered in this way as motivative." (PT, 21)*

A certain part of the prospective teachers stated that the museum education practices carried out with virtual teaching environments could be useful in implementing the subjects in the field of social studies (n = 4). The prospective teachers think that social studies course, which includes abstract concepts, can be more easily assimilated by museum activities applied in virtual teaching environments. An example of this was given below. The social studies course includes more abstract learning. I believe that students will be able to embody the information more easily with different activities related to the works (museum hunting and the participants are in the first theme emphasized that museum education practices in virtual teaching environments contributed to increasing knowledge levels of historical processes (n = 3). It is understood that the museum activities carried out with virtual applications (e.g. creating stories, writing compositions) are effective in teaching historical processes about social studies course more easily from their statements. The example quotation was given below.

"We created stories and compositions about the historical processes of the works in the practices we have carried out through virtual museums. I think that these activities can be useful for better understanding of the historical periods taught in social studies." (PT, 2)

Again in the first theme, some of the prospective teachers emphasized that virtual application activities have an important role in understanding intercultural differences (n = 2). These prospective teachers think that the applications made for the works of different periods through the virtual museum activities are necessary for the understanding of the characteristics of different cultures.

"In the scope of the virtual museum activities, the studies on the works of the Neolithic and Palaeolithic periods contributed to the adoption of differences between cultures. Particularly, the works we have created for the purposes of use and production materials of the works in these two periods have been effective in this regard." (PT, 11)

In the second theme, the majority of prospective teachers stated that museum education practices performed in virtual teaching environments provide an effective teaching environment and thus permanent learning can be achieved (n = 8). It also is understood that the museum activities made in the virtual environment were effective in providing permanent traced behaviour changes related to social studies course. Below is an example quotation.

"With the use of virtual museum environments at the Museum of Anatolian Civilizations, the concepts within the scope of the social studies lesson became more permanent in my mind with the puzzle activity we made for the works. I plan to apply these activities to my students in my professional life." (PT, 19)

The majority of the prospective teachers reported that virtual museum applications are important in providing active learning environment (n = 6) and learning by doing (n = 5). This finding indicates that the candidates perceive the active activities of learning by doing and experiencing museum activities (e.g. completing worksheets, designing stories and composing stories, practicing museum hunting activities) through virtual teaching environments. An example of this view was presented below.

"In the museum hunting activities using virtual museum environments, we actively applied and lived the purpose, the different and similar aspects, and the building materials of the works of Neolithic and Palaeolithic periods by, brainstorming and question-answer techniques and using similar methods. These applications made teaching of social studies course more effective. In the future, I will be able to design similar activities that I can apply through a virtual environment in my professional life. " (PT, 8).

In addition, some of the prospective teachers stated that access to museums could be provided more easily through virtual environments (n = 4). This finding

shows that the virtual applications are easier to access to museums by eliminating the time and space boundary than the trip observation method. The sample views is as follows:

"The visits to the museums with the excursion-observation technique create some limitations in terms of wasting time and accessibility to the place. However, the practical activities we do through virtual museums have facilitated our access to the space and enabled us to use time more effectively." (PT, 25).

In the second theme, some of the prospective teachers stated that the activities they performed in virtual museum applications enabled cooperative learning (n = 2). This finding reveals that candidates think that group activities are important in the effectiveness of social studies course in virtual teaching activities. The sample statement regarding the views of the candidates was given below.

"Using virtual museums, we conducted museum hunting and puzzle activities with group activities. These applications made it easier for us to do teamwork and learn the social studies course in collaboration." (PT, 17)

Finally, in the third theme, most of the prospective teachers emphasized that museum education practices carried out with virtual teaching environments were effective in the development of cognitive (n = 7) and sensual skills (n = 6). This views obtained from the candidates show that the virtual museum activities applied are important in ensuring the mental development in the field of social studies and in acquiring positive attitudes towards teaching in the virtual museum. An example was given below.

"I can have my students do mental activities related to social studies course with the activities done in virtual environments. I can increase my students' awareness and attitudes towards teaching in the virtual museum through these activities and develop their affective skills." (PT, 7)

The majority of the candidates stated that virtual museum activities could allow the development of research-examination skills (n = 4). This view reveals that prospective teachers are able to make more detailed investigations by researching the works in the museum through virtual environments. The example statement was presented below.

"The works we have examined using virtual museum environments have improved our research skills. Our investigations allowed us to discover the past and present uses of the works. I will also use these activities for the teaching of social studies course to my students. " (PT, 5)

Besides, some of the prospective teachers stated that museum activities in virtual environments developed high level thinking skills such as critical thinking (n = 3) and creativity (n = 3). This finding shows that the activities related to the

works performed in virtual environments (for example, determining the similarities and differences of the works, creating stories and creating a composition) are effective in the individuals' critical and creative thinking. The sample statement regarding the views of the participants was given below.

"Identifying the similarities and differences of past and present works of virtual works has improved my critical thinking skills. In addition, the story and composition studies we have created for the works have strengthened my creativity. I believe that the use of these activities in the social studies course will be effective in the development of students' high level skills." (PT, 1)

The minority of the prospective teachers stated that they contribute to the development of observation skills (n = 1) and visual perception (n = 1). These views indicate that the candidates found effective activities in the virtual environment (making observations with museum hunting activity, accessing the works through three-dimensional virtual tours). The sample view was given below.

"The museum hunting activity that we conducted through the virtual environment enabled us to observe the artefacts. In addition, the use of 3D environments through virtual walks allowed us to develop our visual perception. " (PT, 9)

All findings indicate that teacher candidates find the use of virtual environments and designing virtual museum activities in the teaching of social studies course after the application effective. The findings before the application showed that the candidates did not have the knowledge about designing and implementing activities related to the course by using virtual environments. The findings obtained after the application revealed that the museum education practices carried out in virtual environments were effective on the views of the teacher candidates and increased their knowledge level on the subject.

Discussion and Conclusion

In the research, the museum education applications done with virtual teaching environments and its effects of on the prospective social studies teachers' views before and after the implementation were evaluated. As a result of the research, before the implementation, it was determined that teacher candidates did not use virtual museums in teaching of any course before, and therefore they did not know which activities could be applied in virtual environments and social studies course. In addition, it was determined that the prospective teachers could only examine the virtual museum tours and the works among the activities that could be done with the virtual teaching environment, and therefore they did not have any knowledge about the facilities that these environments could provide. In addition, it was found out that the participants thought that the museum education activities done through virtual environments were under the control of the teacher and

were not student-cantered. These results indicate that the level of knowledge of the candidates regarding the museum education practices carried out with virtual teaching environments was not sufficient and their views about the virtual teaching activities in the field of social studies were limited. At this point, in the researches of Aladag, Akkaya and Sensoz (2014), Basaran (2010) and Karatas, and others (2016), it was emphasized that it was important to increase the knowledge levels of teachers regarding the museum education practices performed both in their professional lives and in the pre-service period. As can be seen, these findings obtained from the studies in the literature coincide with the findings of the research.

In addition, the results obtained from the research after the application revealed that the application carried out within the scope of the research had a positive effect on the views of the prospective teachers. This result shows that teacher trainees have found museum education practices performed with virtual teaching environments effective and feasible. Similarly, in Zaharias, Machael and Chrysanthou's (2013) research, it has been stated that museum education practices integrated with virtual teaching environments have positive effects on the academic success of prospective teachers.

Also, in the research, the prospective teachers expressed their views on three themes. Candidates emphasized that virtual museum applications could be effective in social studies teaching and increase motivation in the theme of the contribution of museum education applications carried out with virtual teaching environments to social studies teaching, that subjects in the field of social studies could be more easily embodied, students' level of knowledge about historical processes could be increased and the students would be able to differentiate the intercultural differences. When the literature was examined, it was concluded that virtual museum applications could facilitate and was effective in teaching social studies course in the researches of Yilmaz and Seker (2011) and Avci and Oner (2015). In Yildirim and Tahiroglu's (2012) studies, it was stated that virtual teaching environments in social studies teaching could provide ease in increasing motivation. In the researches of Martini, Librelotto and Henriques (2016) and Meydan and Akkus (2014), it was emphasized that virtual educational environments and museum education practices were effective in teaching the subjects in the field of social studies. Topcu (2017) and Yilmaz, Filiz and Yilmaz (2013) also emphasized that virtual museum environments were important in increasing students' knowledge of historical processes. In addition, Kisa and Gazel (2016) pointed out that the applications performed in virtual teaching environments might be effective in the development of students' knowledge of historical processes. As can be seen, all the mentioned studies support the findings obtained from the first theme of the research.

The prospective teachers of social studies stated that virtual museum activities might be effective in providing permanent and active learning, creating learning environment by doing-living, performing collaborative learning and providing ease of access to virtual museum applications. At this point, it was emphasized

in the literature that virtual museum applications might provide a permanent and active learning environment in the researches of Caliskan, Onal and Yazici (2016), Karatas, Yilmaz, Kapanoglu and Mericelli (2016). In Sylaiou, Mania, Paliokas, Pujol-Tost, Killintzis and Liarokapis' (2017) researches, it was concluded that individuals could actively do museum-based activities through virtual teaching environments. Panciroli, Russo and Macauda (2017) also emphasized that the activities in the virtual museums could be effective in creating a cooperative learning environment. In the researches of Aladag, Akkaya and Sensoz (2014) and Ismaeel and Al-Abdullatif (2016), it was stated that the access to the applications carried out in the virtual museum could be easily provided in the teaching of social studies course. It is understood that the studies in the literature support the findings obtained from the second theme of the research.

In the research, the prospective teachers in the scope of the theme of the effect of museum education applications carried out with virtual teaching environments on high level thinking skills; emphasized that virtual teaching environments improved cognitive and sensual skills, gained research-examination skills, had a positive effect on critical thinking and creativity, increased their ability to make observations, and also enabled the development of visual perceptions. When the literature was examined, it was seen that there were studies parallel to the findings of the research. Demirboga (2010) stated that virtual museum activities were important in the development of students' cognitive and sensual skills. Sener and Zengin (2017) emphasized that students could conduct research and analysis on the works with virtual museum applications and thus acquire research-examination skills. In Kisa and Gazel's (2016) research, it was stated that teachers' teaching activities through virtual museum environments could easily provide students with critical thinking and creativity skills. In addition, Topcu (2017) and Yilmaz and Seker (2011) argued that the students' observation skills could be improved through virtual museum activities related to the social studies course. In the studies of Caliskan, Onal and Yazici (2016) and Oruc (2016), it was found that using 3D environments in virtual museum applications also improved students' visual perception. As can be understood, the results obtained from the researches are in line with the findings of the research.

All the results showed that the practices carried out had a positive effect on the views of the prospective social studies teachers and that the virtual museums created awareness in increasing the knowledge level of the participants. In addition, the results showed that the candidates found the use of virtual museum applications in the teaching of social studies course effective. All the results obtained before and after the application indicate that the virtual museum applications developed and implemented within the scope of the research are applicable by the participants.

Recommendations

Museum applications can be developed in which virtual environments can be integrated by identifying the training needs of prospective teachers in different disciplines within the scope of future researches;. In addition to this, it is recommended to determine the needs of not only prospective teachers but also teachers working in the fields of science and social sciences and in-service trainings for virtual museum applications. In addition, it is believed that the development of virtual museum activities in which second-life and argumentative reality applications can be used in the researches, and that such trainings are given to teachers and prospective teachers will be effective. In the following researches, it is recommended that experimental researches and observation studies can be performed in order to demonstrate the success levels of teachers and prospective teachers towards virtual teaching environments.

References

Aladag, E., Akkaya, D., & Sensoz, G. (2014). Evaluation of using virtual museums in social studies lessons according to teacher's view. *Trakya University Journal of Social Science*, *16*(2), 199-217.

Avci, C., & Oner, G. (2015). Teaching with historic places social studies: Social studies teachers' views and recommendations. *Abant İzzet Baysal University Journal of Education Faculty*, *15*(USBES Special Issue, I), 108-133.

Avci, M., & Memisoglu, H. (2016). Views of social studies teachers about the cultural heritage education. *Elementary Education Online, 15*(1), 104-124.

Basaran, F. (2010). *The Views of the Teacher Candidates about Using Virtual Reality in Education – Sakarya University CITE Sample* (Unpublished Master Thesis). Sakarya University, The Institute of Computer and Instructional Technology Education, Sakarya, Turkey.

Bozkus, B.S. (2014). The development of virtual museums in Turkey: As perspective of culture and art communication. *International Journal of Social Science*, *26*, 329-344.

Caliskan, E., Onal, N., & Yazici, K. (2016). What do social studies pre-service teachers think about virtual museums for instructional activities. *International Periodical for the Languages, Literature and History of Turkish or Turkic*, *11*(3), 689-706.

Caliskan, H., & Cerkez, S. (2012). An evaluation of education with museum practices in social studies classes based on student views. *International Online Journal of Educational Sciences*, *4*(1), 162-173.

Carrozzino, M., & Bergamasco, M. (2010). Beyond virtual museums: Experiencing immersive virtual reality in real museums. *Journal of Cultural Heritage*, *11*(4), 452-458.

Carvalho, L., Dong, A., & Maton, K. (2015). Foregrounding knowledge in e-learning design: An illustration in a museum setting. *Australasian Journal of Educational Technology*, *31* (3), 328-348.

Cengelci, T. (2013). Social studies teachers' views on learning outside the classroom. *Educational Sciences: Theory & Practice, 13*(3),1823-1841.

Demirboga, E. (2010). *The effects of virtual museum tours on students cognitive and affective abilities* (Unpublished Master Thesis). Gazi University, Institute of Educational Sciences, Ankara, Turkey.

Eguz, S., & Kesten, A. (2012). Teachers and students' views regarding learning with museum in social studies course: Case of Samsun. *Inonu University Journal of The Faculty of Education*, *13*(1), 81-103.

Ekiz, D. (2013). *Scientific research methods*. Ankara: Ani Publication.

Ermis, B.(2011). *The point of views of the 6th class students about the "three dimensional virtual museum visit" activity in visual arts lesson* (Unpublished Master Thesis). Gazi University, Institute of Educational Sciences, Ankara, Turkey.

Glesne, C. (2006). *Becoming qualitative researchers: An introduction* (3rd Ed.). Boston: MA: Pearson Education, Inc.

Gokkaya, A. K., & Yesilbursa, C. C. (2009). The effect on academic success of using historical places in teaching social studies. *The Journal of Turkish Educational Sciences*, *7*(2), 483-506.

Ismaeel, D. A., & Al-Abdullatif, A. M. (2016). The impact of an interactive virtual museum on students' attitudes toward cultural heritage education in the region of Al Hassa, Saudi Arabia. *International Journal of Emerging Technologies in Learning (IJET)*, *11*(04), 32-39.

Karatas, S., Yilmaz, A., Kapanoglu, G., & Mericelli, M. (2016). An investigation of teachers' views about virtual museums. *Journal of Research in Education and Teaching*, *5*(1), 112-124.

Kiourt, C., Koutsoudis, A., Markantonatou, S., & Pavlidis, G.(2016). The 'Synthesis' Virtual Museum. *Mediterranean Archaeology and Archaeometry*, *16*(5), 1-9.

Kisa, Y., & Gazel, A. A. (2016). Social studies teacher and student evaluation of teaching museum of use of views (Museums Afyonkarahisar). *International Journal of Field Education*, *2*(1), 51-83.

Kluge, S., & Riley, L. (2008). Teaching in virtual worlds: Opportunities and challenges. *Issues in Informing Science and Information Technology, 5*, 127-135.

Martini, G. R., Librelotto, R. G., & Henriques, R. P. (2016). Formal description and automatic generation of learning spaces based on ontologies. *Procedia Computer Science*,*96*,235- 244.

Meydan, A., & Akkus, A. (2014). The importance of getting students adopt the historical and cultural values through museum visits in social studies teaching. *Marmara Geographical Review*, *4*(13),13–30.

Miles, M. B., & Huberman, A.M. (1994). *Qualitative Data Analysis*. London: Sage Publication.

Ministry of Education (2018). *The curriculum of social studies course*.Ankara.

Panciroli, C., Russo, V., & Macauda, A. (2017). When technology meets art: Museum paths between real and virtual. *Proceedings*, *1*(913), 1-14.

Panina, N., Kazakov, V., Bartosh, N., & Emelyanov, P. (2013). Virtual museum in teaching subjects in the culture area. *Societal Studies*, *5*(2), 501-514.

Sener, N., & Zengin, M. (2017). Effects on virtual museum practices and art education in Turkey and the world. *The Journal of Accademic Social Science*, *5*(58), 277-286.

Sookhanaphibarn, K., & Thawonmas R. (2009). A movement data analysis and synthesis tool for museum visitors' behaviors. In: Muneesawang P., Wu F., Kumazawa

I., Roeksabutr A., Liao M., Tang X. (eds) *Advances in Multimedia Information Processing – PCM*, *5879*, 144-154.

Sylaiou, S., Mania, K., Paliokas, I., Pujol-Tost, L., Killintzis, V., & Liarokapis, F. (2017). Exploring the educational impact of diverse technologies in online virtual museums. *International Journal of Arts and Technology*, *10*(1), 58-84.

Topcu, E. (2017). Out of school learning environments in social studies education: A phenomenological research with teacher candidates. *International Education Studies*, *10* (7), 126-142.

Ulusoy, K. (2010). Open education students' perspectives on using virtual museums application in teaching history subjects. *Turkish Online Journal of Distance Education*,*11*(4)36-46.

Yesilbursa, C. C., & Uslu, S. (2014). Pre-service social studies teachers' self-efficacy beliefs toward museum education. *Journal of Human Sciences*, *5*(16), 410–428.

Yildirim T., & Tahiroglu, M. (2012). The effects of virtual museum visits on elementary students' attitudes towards social studies courses. *Electronic Journal of Social Sciences*, *11*(39), 104-114.

Yilmaz, K., & Seker, M. (2011). The analysis of the views of primary school students on visiting museums and teaching museums in social studies. *The Journal of Science Istanbul Aydin University*, *1*(3), 21-39.

Yilmaz, K., Filiz, N., & Yilmaz, A. (2013). Learning social studies via objects in museums: investigation into Turkish elementary school students' lived experiences. *British Educational Research Journal*, *39*(6), 979-1001.

Zaharias, P., Machael, D., & Chrysanthou, Y. (2013). Learning through multi-touch interfaces in museum exhibits: An emprical investigation. *Educational Technology & Society*, *16* (3), 374-384.