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Pre-Service History Teacher's Opinions About the Use of Virtual Museum Applications in History Courses

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Abstract

The opportunities offered by technology are used in educational processes to make education more qualified. One of the technology-based applications is virtual museums. Virtual museums make important contributions to bringing the works of art in museums to the classroom environment and making the lesson more concrete and understandable. Especially considering the exhibition of the past, virtual museums could be used for history courses but more research needs to be done on the subject. This study aimed at exploring pre-service history teachers' opinions and experiences about virtual museum applications. The research was conducted via qualitative research approach and phenomenology design in line with the nature of this approach. The study group of the research consists of 15, 3rd grade teacher candidates studying in Department of History Teaching at Marmara University Atatürk Education Faculty in 2020-2021 academic year. The data was collected via semi-structured interview form and analysed using the content analysis method. Considering the results obtained, it was reported that the participants responded considering the pandemic conditions, they regarded technology as a way to facilitate the learning-teaching processes of history courses and stated that virtual museum applications would contribute to history courses.

Keywords: Virtual Museum Applications, History Courses, Pandemic, Use of Technology

1. Introduction

Museums contribute to the exhibition and preservation of cultural heritage with works of art /artefacts that shed light on ancient ages and recent history. Apart from this, as education and training centres, they have an important role in the process of raising young generation and instilling human values and a sense of self-worth in them (Atamuratov, 2020: 89). Museums are unique places of interest to nurture curiosity and inspire students to develop their understanding of the world we live in (Foreman-Peck & Travers, 2013: 28). Museums are a memory that reflects experiences and are non-formal education institutions that play an active role in learning. Benefiting from museums as learning environments in teaching of every field will increase interest and excitement in learning and

have a positive role on the cognitive, affective, and social development of students (Buyurgan, 2019: 4). Considering the opportunities offered by museums, its use in learning processes has gained importance. Today, it is known that museums are located in virtual environments in line with the opportunities offered by technology in order to provide access to everyone from anywhere whenever they want especially to meet the needs in the field of education and culture.

Technology is more accessible than ever and plays an important role in keeping cultural institutions up-to-date and transferring them (Gaylord-Opalewski & O'Leary, 2019: 230). Virtual museums are the most important contribution to the field of museology /museum studies in line with the educational pedagogy of technologies. Virtual museum is a communication channel for transmitting cultural heritage based on information and communication technologies (Taranova, 2020: 2515). Virtual museums offer time and place-independent learning through indirect experience (Syarifuddin, Syahrial, & Suparman, 2017: 51). Virtual museums as an innovative technology in their systemic definition appears to be a complex educational phenomenon involving cultural-historical, social, and psychological-pedagogical aspects (Taranova, 2020: 2516).

Virtual museums have offered a new form of visit that eliminates many of the difficulties that can be experienced in classical museum and historical field trips with many facilities provided by technology (Turan, 2015: 190). Thanks to the worldwide access to virtual museums, they brought heritage of humanity and products of civilization to people's feet. In addition, because virtual museums are accurate and reliable sources of information, they have turned into an important material of in-class, online, or lifelong learning process both in formal or informal education (Kabapınar, 2014: 327).

Virtual museums offer many technology-assisted facilities. Virtual museums are participatory, educational, and collaborative. With purposeful professional guidance and support, it is possible for students to create and exhibit virtual museum content (Paliokas & Kekkeris, 2008). It is possible to add more descriptive and historical background information to the artefacts in the virtual museum (Cui & Yokoi, 2012: 18-19). The individual can interact with virtual environment artefacts, build their own understanding, develop their cognitive processes, and foster their creativity and the development of new innovation (Daniela, 2020: 1). One of the greatest facilities of virtual museums is that it offers the opportunity to update itself for every new visitor based on visitor experiences. At the same time, these data facilitate the preparation and evaluation of the actual experience of a museum visit (Kersten, Tschirschwitz, & Deggim, 2017: 362).

There are many studies in the literature regarding the use of virtual museums in educational activities. In addition, there are studies in literature which reveal that a lesson taught using a virtual museum supports active learning (Sylaiou et al. 2005; Gaylord-Opalewski & O'Leary, 2019; Okumuş, 2019), supports individual and independent learning (Atamuratov, 2020), improves students' academic success (Uslu, 2008; Ustaoglu, 2012), positively promotes their contributions (Demirboğa, 2010; Ermiş, 2010; Okumuş, 2019), attitudes and motivations (Ulusoy, 2010; Yıldırım & Tahiroğlu, 2012; Kampouropoulou, Fokiali, Efstathiou, & Stefos, 2013; Turgut, 2015; Kaya & Okumuş, 2018, Okumuş, 2019; Sungur & Bülbül, 2019; Okumuş, 2020). Moreover, virtual museums make important contributions to the preservation and sustainability of culture (Styliani, Fotis, Kostas, & Petros, 2009; Cui & Yokoi, 2012; Kampouropoulou, Fokiali, Efstathiou, & Stefos, 2013; Mortara et al., 2014; Atamuratov, 2020; Ismaeel & Al-Abdullatif, 2016; Taranova, 2020), the development of many technological skills by integrating with other technologies (Daniela, 2020), the preservation of historical memory (Kampouropoulou, Fokiali, Efstathiou, & Stefos, 2013; Taranova, 2020), the development of the feeling of patriotism (Atamuratov, 2020; Taranova, 2020), acquisition of democratic skills (Okumuş & Güven, 2018), the development of aesthetic skills (Taranova, 2020), and the active participation of individuals of all ages (Walczak, Cellary, & White, 2006). It ensures awareness, consideration, reintegration, and development of components of national cultural heritage through the educational process. Virtual museums are learning environments that increase diversity and richness in teaching. Considering the benefits offered by virtual museums, educational institutions should pay more attention to such museums in order to expand and improve the learning experience (Ismaeel & Al-Abdullatif, 2016: 38).

With the developments in technology, it is regarded that virtual museums are used more in teaching processes and the subject has drawn intense attention in the literature in recent years. Museums and history share the past. The artefacts exhibited through museums have an important place in the visualization and concretization of history. In this respect, the use of museums and technology-based virtual museums in history teaching processes will contribute to the teaching of the course. In the literature, there are theoretical and research-based studies about the use of virtual museums in history lessons. However, both the pandemic conditions that have adversely affected the world recently and the inevitable necessity of using technology in education made it necessary to increase the number and diversity of these studies. Considering the developments in technology, classroom facilities and literature, the perceptions of teachers, pre-service teachers, and students regarding the use of virtual museums in history courses have become important.

1.1. Purpose and Importance

Using technology in education is an inevitable fact. The fact that teachers are flexible in this regard and using technology tools in history courses with a constructive orientation contributes to the acquisition of inquiry-based learning skills as well as developing students' technology literacy (Lévesque, 2014: 62). Virtual museums are also one of the reflections of technology in the classroom. Museum visits and virtual museum applications, which are an area suitable for providing many technological and pedagogical skills have an important place in the curriculum created with the constructivist learning approach (Ulusoy, 2010: 39).

One of the biggest problems of history lessons is the lack of experience. Students' learning distant past especially through textbook-centred learning does not make a meaningful contribution to meaningful and permanent learning (Syarifuddin, Syahril, & Suparman, 2017: 53). During the virtual museum visit, students can learn historical knowledge interactively with different pedagogical strategies (Traum, 2016: 807-808). We can expect some benefits in history courses from virtual museums. In the history courses carried out with the virtual museum application, we have the opportunity to carry out the educational process with an effective and active participation due to the visualization and more concretization of the subjects and to have students gain some technological, general and field-oriented pedagogical skills.

It has been revealed in many studies in literature that virtual museums contribute to the educational process. Evaluating the process in terms of history courses, determining the teachers, teacher candidates and students' perceptions and experiences towards virtual museums will be beneficial in terms of improving the process and ensuring quality (Okumuş, 2019: 717). There are studies based on theory, teacher, and student opinions about the use of virtual museums in history courses. It is considered that studies intended for teacher candidates will allow for a more holistic view of the process. In this sense, the main purpose of the research is to learn the opinions and experiences of teacher candidates about the use of virtual museum applications in history courses. In line with this purpose, it is anticipated that the research will make contributions to the literature. In addition, considering the fact that pre-service teachers' attitudes will be reflected in the situations they encounter later in their professional lives, the importance of determining the current approaches becomes important. For the sake of achieving the purpose of the research, the study sought to answer the following research questions/sub-problems.

- What are the participants' opinions about the use of technology in history lessons?
- What are the participants' opinions about the concept of virtual museum?
- Have the participants had any virtual museum experiences before?
- What are the participants' opinions about the feasibility of virtual museum applications in history courses?
- What are the participants' opinions about the effectiveness and efficiency of using virtual museum on which subjects in history courses?
- What are the participants' opinions about the contribution of virtual museum applications to history courses?
- What are the participants' opinions about the limitations of virtual museum applications in history courses?
- What are the participants' opinions on the usability of the virtual museum applications when extraordinary circumstances exist?

2. Method

This section included information about the research method, study group, data collection tool, and data analysis.

2.1. Research Method

The study aimed at exploring history teacher candidates' opinions and experiences about the virtual museum application in history courses based on the qualitative research approach. Qualitative research, in Creswell's words (Creswell, 2020: 43), is figuratively a thin yarn, an intricate fabric consisting of many colours, different textures and various materials, and researchers are the people who meticulously weave and combine this fabric. Due to its clear and spontaneous nature and lack of rigid standards, qualitative research brings along the management of an uncertain and complex process (Glesne, 2013: 35). Considering the nature of qualitative research, the study was conducted with phenomenology design. Phenomenological studies are studies that reveal the lived experiences of participants regarding a phenomenon or concept (Creswell, 2020: 79). In other words, it is the process of finding the meanings people derive from their already-lived experiences and past experiences (Güler, Halıcıoğlu, & Taşkın, 2013: 234).

2.2. The Study Group/Participants

The study group of the research consisted of 15 third grade students studying in the Department of History Teaching at Marmara University Atatürk Education Faculty in 2020-2021 academic year. 8 of the participants are male and 7 of them are female. The participants were selected using the convenience sampling method. Convenience sampling method is defined as a method adopted where data is collected from a close and easily accessible/conveniently available groups because it offers quick and practical data collection (Yıldırım & Şimşek, 2008: 113). The sampling method was determined considering the pandemic conditions and the difficulty of data collection from the students in universities located in geographies independent of each other as well as low cost and advantages.

2.3. Data Collection Tool

Semi-structured interview form was used to collect research data. Semi-structured interviews are a type of interview that is frequently used in qualitative research and after the determination of the general framework related to the research subject, various changes can be made in the interview process and new questions can be added (Güler, Halıcıoğlu, & Taşğın, 2013: 113). In other words, it is an interview technique in which interview questions are corrected and even modified according to the needs sometimes by the researchers and sometimes by the respondents (Sönmez & Alacapınar, 2013: 108). In this sense, when compared to structured interview, it is an interview process in which the participants are more active in responding and state their experiences more easily. Considering the studies by Aladağ, Akkaya, & Şensöz (2014), Karataş et al. (2016) and based on the studies of Kaya & Okumuş (2018) during the preparation stage of the form, some additions were made on the form developed by Okumuş (2019) and the form was created. The form developed was first examined by 4 teacher candidates and 2 questions were removed from the form on the grounds that they measure the same information in line with the teacher candidates' opinions. The form, which was revised in line with the teacher candidates' opinions, was examined by 3 field experts and 1 method expert and it was concluded that there was no need for another change and the form could be used in its current form. The data collection tool was sent to the participants online, and the participants' responses were also received online. Extra interviews were made online with some of the participants about the incomprehensible issues due to some participants' responses.

2.4. Data Analysis

Content analysis method was adopted in the analysis of qualitative data. Content analysis is a systematic, holistic, and purposeful analysis of the interview content, field notes, and written documents. The main purpose of content

analysis is to understand and interpret systematically and carefully what the content of the text means and what it emphasizes (Bal, 2016: 258). In qualitative research, data analysis aims to understand and interpret reality with an inductive approach. The data are collected and recorded, the recorded data is divided into categories after various classification processes, connections are established between the concepts and categories, explanations and interpretations are made and the research is reported (Gürbüz & Şahin, 2014: 385-386). The data obtained from the participants were reported by taking the specified process into account.

2.5. Validity and Reliability

In qualitative research, validity is related to the process of data collection and to what extent the meanings derived from the data constitute objective reality (Stiles, 1993; as cited in Güler, Halıcıoğlu, & Taşkın, 2013: 334). In other words, the researcher must introduce the subject he is working on as objective as possible and as it is (Kirk & Miller, 1986; as cited in Yıldırım & Şimşek, 2008: 256). Reliability in qualitative research is about how consistently a method measures the samples obtained from the data when assigned in the same category by different observers or by the same observer at different times (Hammersley, 1992; as cited in Güler, Halıcıoğlu, & Taşkın, 2013: 354). In other words, the research results would be the same when carried out by different researchers on the same data no matter they are obtained from the similar environments (Kirk & Miller, 1986; as cited in Yıldırım & Şimşek, 2008: 259-260). Within the context of this study, some validity and reliability measures were taken. Before this study, researchers have conducted studies based on qualitative research many times. Pilot interviews and evaluations with field experts were carried out before finalizing the interview form. The interviews were taken in writing and a final evaluation of the responses was made with the participants. The data were analysed separately by both researchers. After the analysis of both researchers was completed, joint reviews were made, and the analysis was finalized. The results of the analysis were shared with the participants regarding the correct understanding of the expressions, and the analysis was finalized after the last feedback. The opinions introduced by the researcher were supported with participants' examples.

3. Findings and Interpretation

This section will seek answers to the sub-problems / research questions determined in line with the purpose of the research. Based on the sub-questions, the contribution of the virtual museum applications to history courses will be explored.

3.1. Participants' Opinions Regarding Technology-assisted History Education

Within the scope of the research, the participants were first asked what they thought about the use of technology in history lessons. It was found that the pre-service history teachers' opinions about this question focused on the effect of technology on history lessons and some suggestions. The participants' opinions were presented in Table 1:

Table 1: Participants' Opinions About the Effects of Technology on History Courses

Reason	Opinions	f	%
Opinions about the Learning Process (%38)	Makes the lesson effective, interesting, and fun	5	10
	Makes the lesson easier and more understandable	4	8
	Facilitates access to sources	4	8
	Provides permanent learning	3	6
	Supports acquisition of skills	2	4
	Facilitates teaching process of the lesson	1	2
Opinions about the Contribution to Students (% 48)	Draws students' attention to history lesson/ active participation	6	12
	Beneficial for students	5	10
	Keeps students' interest alive	4	8
	Affects student achievement and learning positively	4	8

	Increases students' enthusiasm to do research	2	4
	Gets students to gain skills from studying history	1	2
	Provides students' active participation in lesson	1	2
	Facilitates students' access to sources	1	2
Opinions about the Contribution to Teachers (%14)	Provides convenience to the teacher (time/effort and etc.)	4	8
	Facilitates teacher's in-class communication	2	4
	Develops teacher's imagination	1	2
	Total	50	100

First, it must be indicated that the participants agree that history lessons are suitable for the use of technology and the technology use in history lessons will provide some benefits in educational processes. It draws attention that the participants' opinions about the effects of technology on history lessons are grouped under three principles. These include learning-teaching process of history course, student, and teacher. About the contributions of using technology in history courses, the participants mostly expressed opinions based on students. In terms of learning and teaching process of history course, the participant opinions that draws attention first is that technology "makes the lesson effective, interesting, and fun." Following this view, the emphasis was on "making the lesson easier to understand, facilitating access to sources, providing permanent learning, supporting the acquisition of skills for the course, and facilitating the teaching process of the course." Considering its effects on students, the participants mostly emphasized that technology "drew students' attention to history lesson/ active participation." Secondly, it was stated that it was "beneficial for the student." Following this view, they stated that "it keeps the student's attention alive and positively affects the students' achievement and learning." Next, the following opinions were stated: increasing students' enthusiasm to do research, having students gain historical skills, providing students' active participation in the lesson, and facilitating students' access to sources. When evaluated regarding teacher, it was stated that technology "provides convenience to the teacher (time/effort etc.), facilitates teacher's in-class communication, and develops teacher's imagination."

Quotes from some participants regarding their opinions about the subject were given below:

"I think it has a positive effect on the achievement level of the students and the percentage of retaining the information about the subjects in mind. In this way, students actively and effectively participate in the lesson and have the opportunity to learn and revise according to their own learning pace." (P-3)

"While the teacher is teaching a historical person, place, or a war, s/he can present them with visuals, videos, voice recordings and sections from films. This situation is more intriguing, catchy, and attention-grabbing than it is verbally conveyed. Thus, the student realizes that history is not really just memorization and is eager to do research." (P -6)

"The imagination of the teacher about technological tools will indirectly develop the students' imagination. And this will enable them to contribute to the social life as more entrepreneurial, farsighted people." (P -7)

"As an example of technology use, the map called Roman World developed by Stanford University will provide great convenience especially in Roman / Byzantine lessons. Using this map, we can find and calculate how long it takes to go from one city to another on foot or horse on average, how weather conditions and seasons affect the speed of transportation, and what the best route is between the selected cities to reach the place we want to go in that period. With the use of this technology, it will be possible to better understand and explain the Roman Empire, one of the biggest empires in the world." (P -9)

"Considering that the new generation is born and grows up with technology, I think that the use of technology in education should play an important role to attract students' interest in history and history courses. Especially distractibility, a problem emerged with the widespread use of technological devices, has negative effects on students' reading books; thus, I find it particularly important for them to develop an interest in this direction." (P -11)

It was noteworthy that some participants made suggestions on the use of technology in history lessons. Suggestions generally include increasing the competence of teachers through in-service training, providing an appropriate infrastructure (for school-teacher-student), and developing and using educational software, programs, and materials. Quotes from some participants regarding their opinions about the subject were presented below:

“Older teachers or those with lack of knowledge in the field of technological knowledge are unable to teach in line with the age of technology. To be able to use the new technological tools, if teachers have a command of the tool or get training on it, then the efficiency of the lesson will increase effectively.” (P -1)

“It is extremely important for the students to revive the historical places in their minds to comprehend and interpret the events. Visuals such as maps that will help the student visualize the historical places in their minds should be presented to the student through the slides prepared before.” (P -4)

“In order to ensure the effective and efficient use of ICT tools and applications in history education in our country, it is necessary to develop innovative teaching methods supported by ICT and effective materials designed in accordance with them.” (P -12)

“There are many technological tools that we can use today. This situation allows for a better teaching of history. With software such as Socrative, Kahoot, Edplus, etc., the lessons could be more fun, it can be learned, and knowledge can be retained in mind.” (P -14)

3.2. Participants’ Opinions About the Concept of Visual Museum

Participants were asked to explain the concept of virtual museum. The participants’ responses about the concept of virtual museum show to what extent they know the concept. Participants’ opinions about the concept of virtual museum were presented in Table 2.

Table 2: Participants’ Opinions About the Concept of Virtual Museum

Opinions	f	%
Remote visits to the museum with the help of technology	9	56,3
An application introduced by the technology	3	18,8
Virtual reflection of physical museum	2	12,5
A tool whose value is understood with pandemic	1	6,3
Learning style	1	6,3
Total	16	100

When Table 2 is examined, it is found that the participants mostly think of the virtual museum concept as “remote visits to museums with the help of technology.” After that, it was stated that the virtual museum was “an application introduced by technology.” Another opinion of the pre-service history teachers about the virtual museum was “the virtual reflection of a physical museum.” Other opinions stated by the participants included the following: “the virtual museum is a tool and learning style whose value is appreciated by the pandemic.” Based on this, it is understood that the participants generally emphasized technology and remote visits about the virtual museum. Quotes from some participants regarding their opinions about the subject were given below:

“Thanks to virtual museums, culture and history are introduced to large masses with just one click.” (P -3)

“Virtual museum is like a point on the Internet called virtual “world.” Like a grocery store in a neighbourhood.” (P-7)

“In my opinion, virtual museum is a perfect learning style. Just like visiting a museum, we visit museums, churches, and buildings and historical buildings on the Internet thanks to technology and thus we learn by visiting and seeing.” (P -8)

“Due to various reasons, we may not have the opportunity to visit every museum. It is possible to include geographical reasons, financial problems, and the distance from the region where we live. We can solve this problem with visual museums; we can visit any museum we want with visual museums.” (P -14)

Since the study was conducted during the covid-19 pandemic process, it was observed that while explaining the concept of virtual museum, some participants associated it with the pandemic process. Quotes from some participants’ opinions who evaluated the virtual museum-pandemic relationship were presented below:

“With the virtual museum application which arouse the feeling as if you are visiting the museums in-situ which are closed due to the coronavirus measures, Turkey’s biggest 13 museums have been visited 810.410 times. This has been effective in preventing people from killing leisure time and leading them to educational and useful activities on days when we cannot leave the house.” (P -2)

“We can say that a virtual museum has become a tool which we understood its value because of coronavirus in our life.” (P -6)

“The widespread use and recognition of virtual museum applications occurred during the pandemic period when we were stuck at home. As a matter of fact, when we are really restricted in many respects in this period, the value of such technological infrastructures becomes more evident.” (P -9)

3.3. Participants’ Experiences About Virtual Museum Applications

In the study, the participants were asked whether they had virtual museum experiences in the past and their opinions on this issue. When the opinions were examined, all the participants stated that they had virtual museum experiences. While mentioning their experiences, the participants emphasized the school period during which they visited the virtual museums, the names of the virtual museums they visited, how it affected them and the pandemic process. For example, while P -10 said, *“I had my virtual museum experience in secondary school when my computer teacher was introducing the virtual environments.”*; P -7 stated, *“In the 9th grade of high school, while I was exploring Mt. Everest via Google Maps, I found a museum and visited it.”* P-8 told how she met a virtual museum during the lesson at the university: *“During the online education, while our history teacher was teaching, she was showing us the photos of a church in Italy in European history. Due to my curiosity, I searched it on Google, and I found that church with Google Maps and took a virtual tour of the church.”* The participants who used virtual museum application gave the names of the museums they visited. P -2 told his virtual museum adventure by giving the names of the museums: *“I visited Zeugma museum which I haven’t had the chance to visit for a long time due to its location in Gaziantep. Then, I took a tour of Anatolian Civilization Museum. I saw the artefacts of Hittites and Assyrians. I visited Trojan Museum due to its admirable architectural design. I went from one city to another and examined without having time constraints and getting bored. Then Göbeklitepe came to my mind. I visited both the archaeological site and Şanlıurfa Museum with its perfect architecture and I toured all of them in one day.”* Similarly, P -13 stated that he visited Göbeklitepe archaeological site, and P -11 visited Istanbul Archaeology Museum. P -14 stated that he visited the War of Independence Museum and toured the Republic Museum as they presented historical periods from recent history. While these names gave examples of virtual museums in Turkey, P-9 drew attention to the museums abroad: *“I have experienced the virtual museum tours of world famous museums which are accessible such as the Metropolitan and the British Museum.”*

Some participants who had the virtual museum experience commented on how these experiences affected them. P-3, one of these names, explained the change in his opinion about the virtual museum as follows: *“Although I did not have positive opinions before my experience, but my ideas changed after I experienced it.”* P-1 expressed this impression with the intensity of that emotion: *“It was like a dream... I felt as if all the history, museum, and art were at my hand.”* Some participants made a comparison with the real museums when describing the effect of virtual museum experiences. For example, P -14 made a positive comparison, *“I am quite satisfied with the museums I have visited. Since I had visited these museums live before, I felt as if I was experiencing the same environment which I knew the content, texture, and smell. I felt as if my soul was revisiting these museums.”* P -15 opined differently: *“Despite my expectations before using the virtual museum application, I was a bit disappointed. I had the opportunity to visit various museums before. Although Göbeklitepe is an archaeological site that aroused a lot of excitement in me, I was less excited to experience it on the virtual museum application. It is quite different from standing in front of a history, feasting my eyes on it, thinking about the work at that moment than visiting it virtually, even if it is panoramic”* Because the research was conducted at the end of the first year of the pandemic, it revealed that it naturally had an effect on the participants’ opinions. In this context, the participants stated that the pandemic enhanced the interest and awareness in the virtual museum application: *“During the pandemic period, I visited the museums that I could not visit due to the lock down thanks to the virtual museum application.” (P -3)*

“As a person who frequently visits museums and enjoys it very much, I re-experienced the feeling of a museum visit, even from a distance, thanks to the virtual museum application.” (P -9)

“While there is a virus epidemic affecting the world today, and I need a budget and a safe environment to go there in this period, as a student I felt as if I went there using my computer at home thanks to the virtual museums.” (P -13)

3.4. Participants' Opinions About the Use of Virtual Museum Applications in History Courses

Participants were asked the feasibility of virtual museum application in history courses and, if applicable, on which subjects it would be used more effectively and efficiently. When the participant opinions were examined, except for one participant, they stated that the virtual museum applications could be used in history lessons.

Table 3: Participants' Opinions About the Use of Virtual Museum in History Courses

Reason	Opinions	f	%
Possible	Draws interest in the course	7	25,9
	Provides permanent learning	6	22,2
	Makes the lesson enjoyable	3	11,1
	Offers an opportunity to access history materials	3	11,1
	Adds value	2	7,4
	Makes contribution to the teacher	2	7,4
	Makes contribution to teaching process	2	7,4
	Promotes individual learning	1	3,7
Impossible	Has a web technology that will cause a problem	1	3,7
Total		27	100

When Table 3 was examined, the participants stated positive opinions about the use of virtual museums in history courses as follows: virtual museums attract the attention of the lesson, provide permanent learning, make the lesson enjoyable, provide access to historical materials, add value, contribute to the teacher and the teaching process, and support individual learning. One participant who had a negative opinion stated that virtual museums had a network technology that can cause problems when used in class. As it can be understood from here, the participants drew attention to the fact that using virtual museums in history courses would provide various contributions and this would be most effective on attracting the attention to the lesson and learning process. This situation shows that especially the use of technology will increase the interest in history courses and will make serious contributions to the educational process. It also suggests that prospective history teachers will benefit from virtual museums when they work in the future. The quotes from the opinions of some participants who think positively about the use of virtual museums in history lessons were presented below:

"In my opinion, the virtual museum applications should be used frequently in history courses because it increases the retention of what is learned in the lesson, makes the lessons more understandable and enjoyable." (P -3)

"All the materials on the subject can be easily accessed through virtual museums and the students' interest can be enhanced and thus their learning becomes more permanent." (P -9)

"It increases students' interest in teaching, facilitates their understanding of historical facts and concepts, creates collaborative learning environments, encourages student-centered learning, supports differentiated individual learning processes, and prepares a suitable environment for learning based on primary resources." (P -12)

Participants were asked on which subjects virtual museums would be effective and efficient in history courses. Thus, history teacher candidates' opinions about the effect of virtual museums as a history teaching tool on the course were evaluated. In this context, the participants' opinions about the effective and efficient use of virtual museum applications in history courses were presented in the table.

Table 4: Subjects Where Virtual Museum Applications Can Be Used Effectively in History Courses

Subject	f	%
No subject limitation	5	25
Ancient Age	3	15
Independence War	3	15
Culture and Civilization	3	15
Art history	2	10
Ottoman History	1	5
History of Republic	1	5

History of Religion	1	5
National Heroism	1	5
Total	20	100

When Table 4 was examined, the participants stated that virtual museums would be used effectively and efficiently on subjects such as ancient ages, the War of Independence, culture and civilization, art history, Ottoman history, history of republic, history of religion, and national heroism. Five participants drew attention to the fact that virtual museums could be used effectively and efficiently on all subjects of history without any subject limitation. As can be understood here, virtual museums can be used effectively in many areas of history. Regarding the effects of museums on history education, it is considered that virtual museums can naturally create this effect. Quotes from some of the participants' opinions on the effective and efficient use of virtual museums on historical subjects were presented below:

"If you tell the students that "there were millions of bullets in the air," this will have a different effect, but if you show the bullets colliding in the air in a million to one-chance in Çanakkale (Gallipoli) War Museum, the effect will be different." (P -2)

"Different archaeology museums could be visited while teaching about ancient history, history of states established and the Museum of Turkish-Islamic Arts could be visited to learn subjects involving the history of states established after Islam such as Karahanli (Karahan), Gaznelis (Ghaznevids), and Seljuks. The Ottoman House Museum, the Enameled Kiosk Museum, Harbiye Military Museum, the Panorama 1453 Museum will be effective on subjects related to the Ottoman. Considering the recent period, Kazım Karabekir Museum, Atatürk Museums in Istanbul and İzmir, Gazi Museum in Samsun, Independence War and Republic Museums in Ankara can be visited. In addition, museums such as Istanbul Modern Museum, Pera Museum and Sakıp Sabancı Museum can be used effectively in art history courses. Moreover, without being limited to our country, many world-famous museums such as the Salvador Dali Museum could be visited. Apart from this, while studying the Second World War subjects, the Holocaust Museum in Germany regarding the Jewish genocide can also be toured by the students." (P -9)

3.5. Participants' Opinions About the Contributions of Virtual Museum Applications to History Education

It was found that all participants made a virtual museum tour and stated that virtual museum applications could be used in history lessons in almost any subject. In this section, considering the participants' virtual museum experiences, their opinions about the contributions of using virtual museum applications in history courses were evaluated. In this context, the opinions of the participants about the contributions of the virtual museum applications were presented in Table 5.

Table 5: Contributions of Virtual Museum Application

Reason	Opinions	f	%
Contributions	No time constraints	13	20,3
	No space limitation	13	20,3
	Economical	11	17,2
	Practical	7	10,9
	Accessible to everyone	5	7,8
	Provides permanent learning	3	4,7
	Provides opportunity for different activities	3	4,7
	Provides opportunities for detailed examination	3	4,7
	Opportunity for orientation	2	3,1
	Increases interest in the lesson	2	3,1
	Provides an opportunity to access rich knowledge	2	3,1
	Total		64

Examining Table 5, it was revealed that the participants expressed a wide variety of opinions about the contributions of using virtual museums in history education. The participants stated that the virtual museums had

several advantages in history teaching including not having time and space limit, being economical, practical, and accessible to everyone, providing permanent learning, allowing different activities and detailed examination, having the opportunity of orientation, accessing rich information, and increasing the interest in the course. When these opinions are evaluated, it can be stated that virtual museums will make a serious contribution to history education. It can also be noted that virtual museums can expand the boundaries of history education by removing some problems, especially in teaching history out-of-school settings. Quotes from some of the participants' opinions on the contribution of using virtual museums in history teaching were presented below:

"In virtual museum applications, we have the opportunity to see and examine the artefacts in more detail by zooming in as much as we want." (P -4)

"You can reach the museum that you need to mention or introduce in your research or homework without worrying about the time spent on the road." (P -6)

"Virtual museum applications allow us to visit museums in different cities and different countries at home in front of the screen by eliminating geographical boundaries. In this respect, it is a very economical tool both financially and time." (P -7)

"Wherever you are in the world and no matter what time it is; a virtual museum can be visited via the internet." (P -12)

3.6. Participants' Opinions About the Limitations Introduced by Virtual Museum Applications During the History Education Process

There may be some limitations of using the virtual museum application in history courses as well as its advantages. In this context, the opinions of participants about the limitations of the virtual museum applications in history education were presented in Table 6.

Table 6: Limitations of Virtual Museum Applications

Reason	Opinions	f	%
Limitations	Problems related to access/physical infrastructure	8	26,7
	Lack of knowledge	7	23,3
	Lack of guidance	6	20
	Lack of affective atmosphere	6	20
	Being far from reality	2	6,7
	Taking the easy way out in museum visit	1	3,3
Total		30	100

When Table 6 was examined, the participants stated that there were some limitations such as physical infrastructure and access problems, lack of information, lack of guidance and lack of affective atmosphere, being far from reality and taking the easy way out in museum visits during the process of using virtual museum applications in history education. The participants' focus on the lack of information and guidance reveals the importance of doing some preparations and guidance services in using virtual museum applications in history education. Some of the participants' opinions on the limitations of using virtual museums in history education were presented below:

"One of the most prominent disadvantages of virtual museums is the lack of opportunity to visit historical places with a real guide, to ask questions to the guide when necessary, and to share the issues stuck in our minds." (P -4)

"Being in a place, seeing a work of art live and seeing it on the screen cannot provide the same feeling." (P -6)

"The biggest disadvantage of the virtual museum is actually its biggest advantage. That is, being virtual is to be far from reality." (P -7)

"In order to access the virtual museum applications, it is necessary to have the internet and a technological communication device that provides access to the internet. Therefore, individuals, organizations, or classes that do not have these cannot have access to these applications, or use them in the course." (P -13)

3.7. Participants' Opinions About the Use of Virtual Museum Applications Under Extraordinary Conditions

Participants' opinions and evaluations about the use of virtual museum applications under extraordinary conditions were presented in Table 7.

Table 7: The Use of Virtual Museum Applications Under Extraordinary Conditions

Reason	Opinions	f	%
Use Under Extraordinary Conditions	An outstanding application	10	20
	An effective way of teaching	9	18
	Support online process	9	18
	Facilitates teacher	7	14
	Facilitates learning process	7	14
	Provides making use of time efficiently	5	10
	A healthy way of learning	3	6
Total		50	100

When Table 7 was examined, the participants stated the following regarding the use of virtual museums in case extraordinary conditions occur: it is a prominent application, it could be used effectively in the pandemic process, it contributes to online lessons, teachers, learning process and effective and efficient use of time and it is healthy. It is clearly viewed that because the study was carried out during the Covid 19 pandemic, it was effective on participants' opinions. In other words, it is understood that using virtual museums under extraordinary conditions is a necessity and provides important benefits. Quotes from some of the participants' opinions on the use of virtual museums under extraordinary conditions were presented below:

"Using the virtual museums under extraordinary conditions turns a bad situation into an opportunity. Those who do not have the opportunity to go, visit, and explore the museums in -situ can access them via the Internet." (P -3)

"I think the virtual museum applications can be used most effectively during the pandemic period." (P -9)

"When there are restrictions on public spaces and even residents are prohibited from going out, virtual museums become the only alternative in terms of museums." (P -10)

"The virtual museum applications allow us to avoid risks in terms of health while providing access to some museums regardless of time and place. The use and value of virtual museum applications in adverse circumstances such as pandemic are increasing." (P -15)

Pointing to the importance of using virtual museums under extraordinary circumstances, some participants made some suggestions, however. These participants' opinions were presented below:

"As long as distance education continues during the pandemic period, the interest in virtual museums has increased and attention has been paid to use them in education. However, due to lack of information and technical problems, it was found that they were not sufficiently equipped. Therefore, the content of virtual museums should be enriched, and problems should be solved." (P -3)

"They can be used as an important part of distance education with user-oriented training and technical improvements." (P -7)

"The infrastructure of the virtual museum applications must be strong. In addition, the application itself should be highly developed, that is, it should be deployed in such a way to replace any real museum." (P -13)

4. Results, Discussion, and Suggestions

Some results were obtained in this study which tried to reveal the opinions and experiences of pre-service history teachers about virtual museum applications. Before the presentation of the results in general, it is known that the world is going through tough times. People will most likely remember these periods as a painful memory many centuries later. Or maybe there will be greater suffering in the world. It is difficult to interpret the future of the world; however, there is an important fact that the current situation has left a significant mark on people and the interest in technology has increased more than ever.

The participants were first asked about their opinions on the use of technology in history courses. When the mentioned opinions were examined, it was determined that the use of technology in history courses facilitated learning process and contributed to students and teachers. Regarding the contributions of using technology in history courses, Dilek (2007: 75) stated that the lack of knowledge and experience that students encounter in history courses can be minimized with direct intervention of the teacher and the appropriate course material in the learning process. Turan (2012: 220-221) stated that the use of technology in history lessons would make the course interesting for students who use these technologies frequently in daily life and thus increase their participation in the lesson. In addition, according to the author, he suggested that necessary arrangements should be made not only in terms of infrastructure but also in school culture, education system, and teacher training. Güven et al. (2014: 202)'s study is remarkable. In line with the increasing importance of technology in this study, the importance of technology in terms of access to sources, enrichment of the learning environment and modern educational pedagogy was highlighted. Ulusoy (2014: 86) mentioned that many applications including computers and the internet promoted the teaching process of history course. Kaya (2017: 132) stated that with the development of technology today, history courses are more innovative and offers variety.

It was observed that the participants' opinions about the virtual museum concept were generally correct and each participant had a virtual museum experience. It was found that these results were similar to the results of Aladağ, Akkaya, & Şensöz (2014: 204), Karataş et al. (2016: 119-120), Okumuş (2019: 725). It was revealed that participants in these studies generally regarded virtual museums as the presentation of artifacts in museums through technology-based applications. In addition, Karataş et al. (2016: 119-120, 121) and Okumuş (2019: 725) reported that the participants visited the virtual museum and had sufficient experience; however, it drew attention that a similar situation was not valid in Egüz's (2011: 91) study. Okumuş (2019: 726) stated in his study that this situation was time-related and more technology-based studies would be used in history lessons in time. This study supports this finding. In addition, when participants were asked about which subjects would be most efficient in the virtual museum applications in history courses, some of the participants indicated all subjects, yet some drew attention to the wide variety of subjects. The participants' virtual museum experiences and their opinions about their use in history courses give the impression that these applications will be used more in the future and that there will be developments on more efficient use of these applications.

Participants drew attention to unlimited access and easy and practical use as the contribution of virtual museum applications. There are also many opinions about their contributions to learning processes. In terms of the contribution of virtual museums to the course, it is found that similar results have been obtained from many theoretical and research-based studies such as Sylaiou et al. (2005: 5-6), Ulusoy (2010: 42), Aladağ, Akkaya, & Şensöz (2014: 210), Kabapınar (2014: 327-328), Ulusoy (2014: 91), Turan (2015: 195-196) such as Kaya & Okumuş (2018: 137), Okumuş (2019: 726-727), Okumuş (2020: 214). According to Syarifuddin, Syahrial, & Suparman (2017: 56), despite some infrastructural needs, virtual museums are learning environments that are useful in terms of time and cost and contribute to meaningful and permanent learning.

Considering the limitations of virtual museum applications, physical infrastructure and some access problems and lack of information drew attention. In addition, some participants stated the "virtual" nature of virtual museums as a limitation. The studies carried out by Aladağ, Akkaya, & Şensöz (2014: 211), Turan (2015: 195-196) and Okumuş (2019: 727) also support these results. In addition, Cui & Yokoi (2012: 8) mentioned that many virtual museums lacked the necessary background information for the beginners in history. Daniela (2020: 23) stated that the application should meet the learning purpose for the pedagogical use of virtual museums.

It has been stated in most opinions that virtual museum applications are prominent for use under extraordinary conditions, they are an effective way of learning, and they support online education process. In addition, there are some participants who stated that virtual museum applications will contribute to teachers, learning process, and effective use of time and they are healthy. Many studies (see for example Journal of National Education, Special Edition on Education in Turkey and the World During Pandemic, 2020; Campbell, 2020; Koçoğlu et al., 2020) were carried out on the process during the pandemic. Sirer (2020: 2008-2009) stated that technology drew attention in education with the pandemic process and technological tools that support online education were used more.

Bozkurt (2020: 119) stated that the use of technology in education was not related to the pandemic; however, he added that these environments attracted attention during the pandemic period and concrete technology products should be used more functionally in this process. With the pandemic and the new world order, virtual museums ceased to be a necessity of the alternative and became a necessity. Museums that had to be closed opened their doors to visitors virtually to survive, maintain their continuity, not to lose their visibility, and continue to fulfil their functions such as education, entertainment, and communication with the intention of making contributions to society (Kasapoğlu-Akyol, 2020: 77).

The following recommendations are made within the framework of the results obtained from this study.

- Virtual museum environments should be diversified by providing educational explanations considering their pedagogical benefits under the coordination of the Ministry of National Education.
- In-service training should be given to teachers for the use of virtual museums in history courses.
- Student awareness should be developed so that they can use these environments to support the lesson. In this regard, less costly and local history-oriented virtual museums can be developed as an activity in which students and teachers are engaged in the process.
- Further studies focusing on application-oriented quasi-experimental research and action research should be carried out in the future.

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