Virtual Museum Experiences of Primary School Teacher Candidates During the COVID-19 Pandemic Process

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ABSTRACT

The purpose of this study is to look into primary school teacher candidates' experiences with virtual museums during the pandemic.For this purpose, the study was conducted with a phenomenology design, which is one of the qualitative research designs. The study's participants are 15 teacher candidates enrolled in the faculty of education for the 2020-2021 academic year.In the study, data were collected after 10 virtual museums were experienced by the participants, who made assessments from an educational perspective. The research data were collected through a structured interview form, the Virtual Museum Evaluation Form (VMEF). The data obtained were analyzed with content analysis. According to the findings of the study, it was determined that using virtual museums in educational environments will benefit students and teachers, but also have some disadvantages. At this point, it can be said that virtual museums can be used in education due to such reasons as ensuring the active participation of students in the lesson, supporting permanent learning, making the lesson fun, etc. while being aware of the disadvantages.

INTRODUCTION

People have memories, and the societies and nations that they created have also had memories. National memory, that is, history, is very important for the survival and development of a nation. People who value things and memories in their personal world also want to remember history in their social lives (Bosserman, 1983) and sometimes use the past as their starting point. In this sense, nations with a strong history can draw their direction more easily from instant events (Pakdil, 2010). At this point, museums have become effective in order to preserve the concrete elements of history systematically and safely.

The foundations of museology were laid together with the recognition of different cultures and nations through geographical discoveries and the emergence of an understanding of collection by the members of the palace and the nobility. Museology continuing with the understanding of collecting, started to become systematic in the 17th century (Tezcan Akmehmet & Ödekan, 2006). The Ashmolean Museum, which was opened to the public in 1683 in England, is the oldest museum built on the museum concept today (Morsi, Mansour & Daly, 2014). In the 18th century, with the effect of the Industrial Revolution, the population of the city increased, so museology gained the current understanding of the structure, and it started to be used in education in the 19th century (Tezcan Akmehmet & Ödekan, 2006). Museology has become systematic

after the 20th century and has started to be carried out comprehensively by gaining an international structure towards the middle of the 20th century (Gültekin & Uysal, 2018). At this point, organizations such as 1945 UNESCO (United Nations Educational, Scientific and Cultural Organization) and 1946 ICOM (International Council of Museums) were established. Along with these important institutions, many institutions have been established to protect cultural heritage around the world, and the number and quality of natural and historical museums continue to increase day by day. After the 1980s, fundamental paradigm changes were made in museum activities (Styliani, Fotis, Kostas & Petros, 2009). In the USA and Western European countries, virtual museums started to replace real museums (Barlas Bozkuş, 2014).

With the widespread use of the Internet network, the works in traditional museums became accessible in places such as homes, workplaces, and schools, and museums gained a digital dimension (Bowen, 2000). The fact that real museums have some difficulties, such as a lack of collections, lack of security, cost and time makes virtual museums more advantageous and useful in this sense (Tsichritzis & Gibbs, 1991). Virtual museums allow people of all ages and students of all levels to access artifacts and venues located in different parts of the world. Virtual museums have positive aspects such as equality of opportunity, being economic, safety of artifacts, and accessibility in the intensity of daily life.

The virtual museum is an interactive digital platform built on programmed software, using virtual reality and augmented reality technologies, and including facilities such as museums, exhibitions, and presentations (Günter, 2016). In the field of museums, a significant breakthrough was made in the 1990s with digital infrastructure, and CD-ROM-based virtual museum applications began in the early 1990s (Huhtamo, 2017). In Turkey, virtual museum practices have also been seen in parallel with applications around the world. Some works were transferred to CD media in Topkapı Palace in 1990 firstly, and the digitalization of Istanbul Painting and Sculpture Museum in 1993 was followed by Sakıp Sabancı, Borusan Culture and Art Center and Rahmi Koç Museum (Atagök & Özcan, 2001). Nowadays, with the widespread use of the internet and developing technology throughout the world, most museums offer their services to people through virtual museums. Especially the Covid-19 pandemic that emerged from Wuhan City of China in December 2019 caused virtual environments to increase and our daily routines to transfer to virtual environments. Covid-19 has negatively affected physical museums as well as other social areas. The International Council of Museums mentioned that around 95% of museums in the world were closed to protect staff and visitors in its first report, published in May 2020. In the following period, while the opening of physical museums varies according to countries and regions, virtual museums increased 15% in the same period, reaching almost 50% (ICOM, 2020). The conditions of the pandemic process increase the use of virtual museums.

Museums have been in the education system for a long time. Educational activities took place first at the Louvre Museum, which was opened in Paris at the end of the 18th century. The use of museums in education has become more systematic in the 19th and at the beginning of the 20th centuries (Kumar Singh, 2013). Since the second half of the 20th century, with the establishment of international organizations such as UNESCO and ICOM, a great change has occurred in the educational understanding of museums. After this period, while a scientific approach gained importance, together with school groups, studies for adults started to be emphasized. Today, education is among the main functions of museums (Tezcan Akmehmet & Ödekan, 2006). Museums that offer students the opportunity to learn by doing and experiencing are institutions that are seen as functional educational environments. Students gain field awareness through instruction via museums (Ergin Aydoğdu, Aydoğdu & Aktaş, 2022). In this way, it enables students to internalize the knowledge of various disciplines in education more easily (Sungur & Bülbül, 2019). The inability to use physical museums during the Covid-19 process paved the way for the more intensive use of virtual museums along with distance education.

The most important users of many tools in the education system are teachers. Therefore, the main users of museums and virtual museums are teachers. Virtual museums can be used for education by teachers from different branches at all levels of education. Primary school teachers are the main element in the formation of students' basic skills, including literacy. Primary school teachers are the main actors in using virtual museums and gaining museum skills, too. The education that primary school teachers, who are

effective in the formation of students' basic skills, have received during the undergraduate education process is important. When the literature is reviewed, studies conducted on the opinions of primary school teachers or primary school teacher candidates about the museum and the virtual museum are these: "Views of Candidate Primary School Teachers on the Use of Museums in Education" by Yıldırım (2017), "Examining the Opinions of Primary School Teachers on the Role of Museums in Transferring Value" by Kuşçuoğlu (2017) and "Views of Classroom Teacher Candidates on Virtual Museum Applications" by Sungur & Bülbül (2019). As it can be seen in the literature, there is no study with primary school teacher candidates about applied virtual museum experiences in a critical period such as the Covid-19 pandemic process. It is thought that this research will contribute to the literature. In the research, the virtual museum experiences of the primary school teacher candidates during the pandemic process were deemed worthy of research. In this respect, the aim of the study was determined to examine the opinions of primary school teacher candidates about virtual museums they had experienced during the Covid-19 pandemic process.

RESEARCH METHOD

Research Model

In this study, the virtual museum experiences of primary school teacher candidates during the Covid-19 pandemic were examined. Thus, the study was conducted as phenomenology, one of the qualitative research patterns. Phenomenology is a qualitative research approach that explores how people make sense of their experiences as a result of their interactions with their environment (Sart, 2015). At this point, phenomenology "focuses on phenomena that we are aware of but do not have a deep and detailed understanding." Since the research focused on the virtual museum experiences of the primary school teacher candidates, it was conducted using the phenomenology pattern.

Participants

The criterion sampling method, one of the purposeful sampling types, was used to determine the study group. In criterion sampling, the sample consists of people, events, objects, or situations that have the qualifications determined in relation to the problem (Merriam, 2015). The criterion used in determining the study group was "being a primary school teacher candidate" and "having visited at least 5 of the 10 virtual museums given." Demographic information about the participants of the research is given in Table 1 below.

Table 1. *Demographic Information About the Participants*

Participant	Age	Gender	Grades Studied	Number of Virtual Museums Visited
P-1	22	Male	4. Grade	8
P-2	22	Male	4. Grade	8
P-3	21	Male	3. Grade	9
P-4	21	Female	3. Grade	8
P-5	20	Female	3. Grade	8
P-6	21	Female	3. Grade	7
P-7	22	Male	4. Grade	6
P-8	20	Female	3. Grade	6
P-9	23	Female	4. Grade	7
P-10	21	Female	3. Grade	8
P-11	24	Male	4. Grade	9
P-12	22	Female	4. Grade	8
P-13	23	Female	4. Grade	9
P-14	23	Female	4. Grade	10
P-15	22	Female	4. Grade	10

Demographic information (age, gender, number of museums visited) of the participants of the research is given in Table 1. According to the table, "P" refers to the participant, "P-1" refers to the first participant.

Data Collection Tool

The data used in the research were obtained through Virtual Museum Evaluation Form (VMET) developed by İlhan and Dolmaz (2020). It was a kind of structured interview form, which is a method of data collection in which predetermined questions are asked by the researcher, and it is not allowed to go beyond these questions (Merriam, 2015; Patton, 2015). The form consisted of open-ended questions such as "How do you find the virtual tour of the museum?, How long did your virtual visit take?, etc." and two parts. The first part required individual evaluations of each museum, while the second part asked participants to evaluate the museums they visited comparatively. The participants were asked to visit at least five museums. The forms were delivered and explained to participants before their visit. Each student filled out at least five individual forms and one comparative form.

Before the study started, the forms prepared were evaluated by 2 field experts and 3 primary school teachers. The data collection for the research was carried out via the Edmodo program. There are five basic questions in structured forms. Participants were asked to answer these questions and send them to the researchers. The forms sent by the 20 teacher candidates participating in the study were examined, and the forms of 15 teacher candidates whose data were suitable for the purpose of the study were enumerated to evaluate them. Five teacher candidate forms were not included in the study due to reasons such as being too short and being filled carelessly.

Data Analysis

The qualitative data obtained in this study were analyzed by the content analysis method. Content analysis is defined as scanning qualitative texts for repeated words and themes and reducing voluminous qualitative material to any qualitative data to determine its basic consistencies and meanings (Patton, 2015). In line with the content analysis, the data was read and monitored first, and this process was repeatedly applied. In the second stage, the data were coded, and the themes were reached by correlating the codes to each other (Merriam, 2015).

Validity and Credibility

Table 2. *Measures Taken for the Validity and Reliability of the Study*

Validity and Reliability Type	Procedures Performed
Internal Validity (Credibility)	Long-term interaction Variation Expert review
External Validity (Transferability)	Detailed description Purposeful sampling
Internal Reliability (Consistency)	Having all stages of the research examined by an experienced specialist Examination of codes and themes by different researchers
External Reliability (Verifiability)	Transferring and saving data to computer environment Recording of data with a voice recorder

According to Table 2, the validity and reliability procedures performed during the data collection and data analysis process of the research are given. The data on ensuring internal and external validity and reliability in the study are explained in the table.

FINDINGS

In this section, findings regarding the opinions of primary school teacher candidates on virtual museum experiences during the Covid-19 pandemic are presented. The museums visited by teacher candidates within the scope of the virtual museum experience are given in Table 3 below.

Table-3. *The Museums Visited Within the Scope of the Study*

Order	Virtual Museums and Ruins	N	%
1	Turkic World Science Culture and Art Center	13	86.6
2	Rahmi Koc Museum	12	80
3	Military Museum	10	66.6
4	Troy Museum and Ruins	8	53.3
5	War of Independence Museum	13	86.6
6	Anatolian Artifacts Museum	14	93.3
7	Göbeklitepe Ruins	15	100
8	Republic Museum	14	93.3
9	Anatolian Civilizations Museum	14	93.3
10	Toy Museum	9	60
11	İzmir Ephesus Museum and Ruins	7	46.6
12	Ethnography Museum	11	73.3

When Table 3 is examined, it is seen that the most visited museum by the primary school teacher candidates is Göbeklitepe Ruins and the least visited museum is Troy Museum and Ruins. The results regarding the theme and codes of the research, which was formed as a result of the analysis of the data obtained through the interview forms, are presented in Table-4.

Table-4: *Codes and Themes of the Research*

Theme	Sub-Themes	Codes	N	%
Virtual Museums in Educational Environments	Educational Role of Virtual Museums	Increasing permanence	12	80
		Providing opportunity equality in education	10	66.6
		Being motivative	8	53.3
		Enriching the course content	6	40
		Providing accurate information	5	33.3
		Providing affective learning as well	4	26.6
		Making the education process fun	5	33.3
		Feature of being a course material	3	20
		A new learning space	4	26.6
		Providing out-of-class learning environments	7	46.6
		Learning by having fun	5	33.3
		Gaining top-level thinking skills	1	
		Gaining aesthetic appreciation in education	2	
	Educational Advantages of Virtual Museums	Providing facility equality	5	33.3
		Crossing geographic boundaries	10	66.6
		Being economical	12	80
		Making universal culture available to all humanity	9	60
		Independence of time and space	8	53.3
		Cultural Development	9	60
		Saving time	9	60
		Providing life	9	60
		Increasing the quality of screen time	5	33.3
		Making the pandemic process fun	5	33.3
	Educational Disadvantages of Virtual Museums	Problems that can be experienced on the Internet	14	93.3
		Physical health issues	10	66.6
		Not being like real life experiences	11	73.3
		Possibility to cause screen addiction	8	53.3
		Possibility to cause technology addiction	7	46.6
		Reducing real museum experiences	9	60
		Causing negative social relationships	8	53.3

When Table 4 is examined, the themes, sub-themes and codes related to the virtual museum visits that the primary school teacher candidates have experienced during the pandemic process can be seen. The

theme of the study was determined to be the role of virtual museums in educational environments, and the sub-themes that will support this theme were expressed as the educational role of virtual museums, the educational advantages of virtual museums, and the educational disadvantages of virtual museums. Detailed information about the themes and sub-themes is presented below, supported by one-to-one quotations from primary school teacher candidates' views.

Theme: Virtual Museums in Educational Environments

When the opinions of primary school teacher candidates are examined during the pandemic process, their opinions are that virtual museums can be used in educational environments (in terms of many benefits). In addition, it has been determined that using virtual museums in educational environments has some disadvantages as well as advantages. Sub-themes supporting this theme are listed below.

Sub-Theme: Educational Role of Virtual Museums

When examining the opinions of primary school teacher candidates regarding virtual museum experiences during the pandemic process, it is possible to say that virtual museums can be used in educational environments for educational purposes. According to the opinions of teacher candidates, virtual museums can be used in educational environments due to its educational roles such as ensuring the permanence of learning (P-10 *They can provide permanent learning by enriching in-class and out-of-class learning environment in education*), providing opportunity equality in education (P-8 *They support equality of opportunity in education because they are easy to reach*), taking a motivating role in education (P-12 *Museums can be used to motivate students in the field of research and education*, P-9 *They also motivate and arouse curiosity for students*), enriching the course content (P-2 *Virtual museums can be used to enrich the content of educational courses*), transferring cultural richness to learning environments (P-1 *Virtual museums should be preferred in education in terms of providing cultural richness*), assuming a supportive role for the lessons (P-13 *They can provide a supportive environment for the teaching of the lesson*), providing accurate and reliable information to educational environments (P-14 *Museums can be used easily in educational environments as they are the right information resources*), removing education from monotony (P-11 *Virtual museums can save education from monotony and offer learning opportunities*), having the feature of being a course material (P-7 *They can be a course material for teachers*), being a new learning area (P-6 *They are new learning area for students*), enabling learning outside the school (P-4 *Students can reach museums and get information not only in the primary school but also at home*), supporting learning by having fun (P-12 *They make the lesson interesting and fun in the field of education*), being suitable for individual learning (P-3 *Virtual museums can be used for educational purposes as they support individual learning*). At this point, it is possible to say that virtual museums should be used effectively in educational fields according to the opinions of the teacher candidates. P-15's statements also support the educational role of virtual museums.

> P-15 "*Especially in recent years, studies on museum education have revealed the importance of museum education. I think we should use the virtual museum in cases where we cannot reach the real one. We should benefit from these virtual museums on related subjects in our lessons as the occasion arises. Since I find most museums successful in terms of informing and teaching, I think it would be beneficial to use virtual museums*".

Some teacher candidates stated that virtual museums can be used for educational purposes effectively in transferring national culture, supporting affective learning, gaining top-level thinking skills and aesthetic appreciation. The statements of K-13 support this situation.

> P-13 "*Virtual museum, if used properly in the field of education, students gains rich experiences apart from traditional educational opportunities. We cannot always find the opportunity to go to museums outside of the city. In such cases, we activate the students and provide them a good experience without depriving them of this kind of activity. Thanks to virtual museums, students can get to know their history, national values and culture. In addition to these, they*

contribute to make observation, think differently, develop skills of research and top-level skills. They give sensitivity to their aesthetic perception. They provide affective learning. We ensure students to make comfortable and safe discoveries by encouraging them to visit virtual museums. It is the most important duty of us as teachers to being transferred our national culture and values to future generations. Virtual museums can be used to fulfill this duty properly".

When the above opinions of the teacher candidates are examined, almost all of them stated that they can be used in the educational environments of virtual museums. The opinions of the teacher candidates below also support the view that virtual museums should be used effectively in educational environments.

P-11 *"We can take a virtual trip with our students at the school via the smart board. In this way, they both attract the attention of the students and provide us permanent learning by living in teaching the subject. If we have a crowded primary school, since it will be very difficult to visit the museum, we can have a controlled tour with virtual museums. Disabled students will learn about the museum they may never see. It is economical both in terms of time and financially".*

P-14 *"It can be used for educational purposes in terms of supporting learning outside the primary school. I think that virtual museums will be very beneficial within the scope of "Learning by having fun", especially in a period when technological developments are advancing so rapidly that almost everything has been revealed into the virtual environment. At the same time, their use in the educational environment will make it easier for us as teachers to manage the class because it can be quite difficult to visit museums with crowded classes".*

Sub-Theme: Educational Advantages of Virtual Museums

When their views on virtual museum and ruins they experienced during the pandemic process were examined, it can be seen that the primary school teacher candidates stated that virtual museums had many advantages. Teacher candidates listed the advantages of virtual museums as follows; virtual museums provide the opportunity to travel online without time-space restrictions (P-1 *Virtual museums provide online travel opportunity at home*), they develop individuals culturally (P-2 *I discovered another activity that really adds something to person*), they provide new learnings (P- 3 *I discovered a new learning area*), they help to understand the concept of virtual museum (P-4 *the concept of "virtual museum" has entered my vocabulary*), they save time (P-5 *virtual museum tour enabled me to get to know more than one museum at the same amount of time*), they help to discover cultural richness (P-6 *We have visited museums we have never seen and saw valuable artifacts*), they bring experience (P-7 *they offered experiences beyond just pre-knowledge about the places I want to go*), they support not only cognitive but also affective learning (P-11 *We did not only go through cognitive learning process but we also experienced many emotions such as sensuality and curiosity*), they increase the quality of the time spent in front of the screen (P-3 *they enabled us to realize a relevant cultural synthesis about the places we visited by making the time we spent in front of the computer and telephone better quality*).

Teacher candidates stated also that virtual museums have such advantages as providing opportunity equality to physically disabled students (P-3 Virtual museum tours enable people who cannot leave their homes to reach easily anywhere they want through their computers, phones, tablets, P-7 They are useful and effective applications to ensure equal opportunity), crossing geographical boundaries (P-2 they eliminate time and space limitations), being more economical, providing pre-tour information exactly and providing the opportunity to visit independently from time (P-8 we can visit the museum outside the visiting days and hours determined by museums), presenting universal culture to humanity (P-12 Virtual museums are open to all humanity so every person can reach virtual museums whenever we sit at home), contributing to the development of the general culture of individuals (P-14 Virtual museum tours enable our general culture to

develop), advertising real museums in a positive way (P-11 They advertise museums in a virtual environment, and allow the curious audience to get prior information), playing an active role in the international promotion of the country (P-3 They enable tourists to have an idea about the museums in our country and advertise the country in international areas). The following views of teacher candidates also support the idea that using virtual museums in educational settings has many advantages.

P-1 *"I had the opportunity to visit museums that I was curious about. I was curious about Göbeklitepe Ruins, whose importance has increased and which has been on the agenda especially in recent years, and this virtual museum tour helped me to satisfy my curiosity. Accessing and visiting museums on the screen during the following periods when I was at home due to the virus also enables me to have pleasant times. Virtual museums will give us an advantage in crossing borders".*

P-14 *"Virtual museums provide access to museums all over the country as well as to museums all over the world. While going out of the city communally demands responsibility and financial possibility for primary school students, it is almost impossible to go and see a museum anywhere in the world, for example in Italy. However, we can compensate for this negativity by integrating virtual museum applications with the imagination of our children".*

Sub-Theme: Educational Disadvantages of Virtual Museums

When the opinions of the primary school teacher candidates about virtual museum experiences were examined, it was determined that virtual museums had some disadvantages. The teacher candidates listed these disadvantages as follows; everyone may not have access to the internet (P-2 There is an indispensable element such as an internet connection to organize virtual museum tours. At this point, we need to have sufficient infrastructure to benefit from these applications), they are not like real-life experiences (P-4 Whatever happens, nothing will be like learning by living really, P-6 Virtual museums allow us to see museums, yes, but they cannot give us as much pleasure or information as the museum itself, P-12 they do not keep the same spirit as the one-to-one museum visit), time spent in front of the screen may cause physical diseases (P-15 In this context, time spent in front of the screen also causes physical fatigue, P-10 Time spent with technological devices may cause physical fatigue), widespread use by primary school students may cause screen and technology addiction (P-11 For primary school children, learning from technology costantly can cause them to be screen or technology addiction, P-5 It contains some factors that may cause physical impairments in the individual. Today, technology addiction starts especially at an early age. In this respect, it may have negative effects on individuals who are addicted and, because it is virtual, may support these individuals' addictions), use of digital tools unconsciously may cause excessive use of digital tools (P-7 Unconscious use of the computer in primary school period may lead students to overuse digital tools), may lead to a decrease in real museum experiences (P-9 Museums may face the risk of being thrown back when they are accessible in a virtual environmen, especially for younger audiences, P-8 The number of visitors of museums may decrease with the increase in the use of virtual museums, P-5 They may decrease the physical importance of museums), the information learned is less permanent since they do not provide real-life experiences, (P-15 The information learned as a result of direct life is more permanent, so the permanence of the information obtained in virtual museums is less, P-10 The information obtained in the virtual tour may not be permanent), they will affect the social relations of individuals negatively (P-13 Virtual museums prevent individuals from socializing, make them passive in terms of human relations). In addition, K-1 stated that he does not receive the necessary information from some virtual museums due to inadequate image quality and this situation may cause prejudices against museums.

P-1 "*While some museums are successful in image quality and clarity, some museums are quite insufficient in these matters. In the museums we visited, we had problems such as not reaching every part of the museum and not getting close enough. Sometimes we realized that we could not even understand what the exhibited products were. We could not get information because*

informative texts in which the name of the work, what did it do, and for what purpose it was used are written were not read. , because informative texts were not read. Sometimes we found insufficient that the information buttons describe the museum in some virtual museums. We think that some virtual museums cannot provide enough information due to such problems. Of course, this is unfortunately insufficient in terms of teaching. Because of these kinds of issues, people can be biased towards museums".

The opinions of the primary school teacher candidates below also support the view that using virtual museums in educational environments has some disadvantages.

P-6 "*Being unable to fully examine some works or being unable to read the notes of the work. Okay, it can reflect the museum in terms of ambiance, but it will not be able to create the same effect as if you have visited a real museum, historical texture. In the virtual museum, we can pass the works shallowly but in our real museum visit, we almost live the works. Also, everyone may not has the same ability to use computers. This situation makes virtual museums disadvantageous".*

P-13 "*Travel becomes impossible when there is no internet access. Those who do not have internet access cannot benefit from the virtual museum. In addition, the virtual museum is insufficient to provide information and the didactic quality of it is decreasing. Although we can reach it thanks to the internet, it cannot be as effective as our real-life visit. Feeling that museum, wandering the museum will feel us more differently".*

P-3 "*We discovered that we could not get the pleasure of seeing the artifacts in a museum with the naked eye on a virtual museum tour. If possible, we prefer to visit museums physically. Because the information about the artifacts was not sufficient in most museums and we could not find the opportunity to closely examine the artifacts we wanted".*

DISCUSSION AND CONCLUSION

Museums provide the opportunity to concretize the teaching of historical and cultural items (Solmaz, 2015). This concretization feature has paved the way for museums to be used in education since ancient times. In addition to the importance of museums in education, virtual museums, which provide access to museums for people with access disabilities due to a variety of deficiencies, are becoming more popular (Liarokapis, Sylaiou, Basu, Mourkoussis, White, & Lister, 2004).

On the other hand, due to the Covid 19 pandemic that emerged in December 2019, access to physical museums was banned all over the world, causing viewers to meet on a digital platform (Karadeniz, 2020). In this study, the aim was to investigate the virtual museum experiences of primary school teacher candidates during the pandemic process.

When the data of the study were examined, the primary school teacher candidates stated that virtual museums should be used effectively in education. In parallel with the results of the research, in his study on digital museums during the pandemic process Karadeniz (2020), in the study they conducted with primary school teacher candidates Sungur & Bülbül (2019), in their study with high school students Kaya & Okumuş (2018), in his study with social studies teacher candidates Aktaş, Yılmaz ve İbrahimoğlu (2021), in their study with three different student groups Okolo, Englert, Bouck, Heutsche & Wang (2011), in their study with middle school students Demirboğa (2010) ve Ermiş (2010) all stated that virtual museums should be used effectively in education. Also, the findings seem compatible with İlhan, Tokmak and Aktaş's (2021) study where social studies teacher candidates evaluated positively although it was below the predicted.

The teacher candidates stated that virtual museums can be used in the transfer of national culture. Museums are rich sources for learning (Aktaş & İlhan, 2022). In parallel with the results of the research, Sungur & Bülbül (2019) concluded in a study conducted with primary school teacher candidates that virtual museums should be used to create a museum experience and to transfer culture. Similarly, Liarokapis, Sylaiou, Basu, Mourkoussis, White & Lister (2004) emphasized that museums can be used as a means of transferring culture and Ismaeel & Al-Abdullatif, (2016) stated that virtual museums can be used as a means of transferring culture. Another result reached in this study, which overlaps with the results of the study conducted with teacher candidates by Peker (2014), is that the virtual museum will contribute to the development of high-level skills. Some of the participants stated that virtual museums allow free movement by removing time and space limitations. This finding matches with the studies conducted by Aladağ, Akkaya & Şensöz (2014), Canlı (2016) and Sungur & Bülbül (2019). Participants stated that the virtual museum supports not only cognitive learning but also affective learning. This result coincides with the study conducted by Türkmen, Zengin & Kahraman, (2018). The participants stated that virtual museums are also advantageous in terms of providing equal opportunities to physically disabled students. Liarokapis, Sylaiou, Basu, Mourkoussis, White & Lister, (2004) stated that museums made their collections accessible to physically disabled people thanks to virtual museums. Participants stated that an important advantage of virtual museums is that they offer accurate pre-information and time-independent touring opportunities. Similar to the research result, Fokides & Sfakianou (2017) stated that virtual museums offer students the opportunity to learn without the guidance of the teacher. It was emphasized by the teacher candidates that virtual museums should be used in education due to their advantages such as cultural transfer, opportunity of time and space freedom, equal opportunity, providing high level learning, and providing individual learning convenience.

In the study, the participants stated that the disadvantages of using virtual museums might be the lack of technical means. The results of the research coincide with the results obtained in the studies conducted by Aladağ, Akkaya & Şensöz (2014) and Mamur, Özsoy & Karagöz, (2020) in the literature. In addition, it was revealed that the necessary information could not be obtained from the museums due to the inadequate image quality of some virtual museums, and this situation could lead to prejudices against museums. There is a similarity between this result and expressions of Shehade & Stylianou-Lambert (2020), who stated in their study (2020) that virtual museums should be improved through collective work.

Suggestions

- Participants stated that they may have negative aspects. The use of virtual museums is not like real-life experiences, the time spent in front of the screen may cause physical diseases, widespread use by primary school students may cause screen and technology addiction, unconscious use may cause excessive use of digital tools, they may cause reduce real museum experiences, the information learned will be less permanent since it does not provide real-life experiences, and they will affect the social relations of individuals negatively.

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