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Digital Learning Experience in Museums: Cultural Readings in a Virtual Environment

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Abstract

This study revolves around primary and secondary school visual arts teachers' cultural and critical readings on their VR museum experience through object and representation. As part of the in-service training and research project, the study was carried out in the provinces of Çanakkale, Erzincan, Kayseri, Diyarbakır, Giresun, Mersin, Denizli, which were selected from seven regions of Turkey within a seven-month period. 508 primary and secondary school visual arts teachers participated in the study. The study is a case study and teachers' readings related to the object and representation in the virtual museum and their VR museum experiences formed the units of analysis in the study. The data of the study was collected through worksheets, pre-evaluation forms, participant diaries and focus group interviews with voluntary teachers and content analysis method was employed to analyse the data. In the study, teachers were motivated to incorporate social and personal contexts into their readings of the object-space-representation. The results denoted that the activity enhanced teachers' learning experiences in terms of personal and professional contexts. Although teachers highlighted that VR museum experiences could not offer much more rich experiences than the actual museum visits, they believed that it could be effective for visual arts classes and be blended with various learning activities given that the virtual museum experience offers the possibility of exploring a museum without a barrier of distance and incite enthusiasm and learning interest through digital technologies (e.g., sound, motion, immersive experience).

Key words: Teacher training, cultural heritage, virtual reality, virtual museum, visual culture in visual arts education

Introduction

With rapid technological advances in recent years, museums have sought new ways to document, conserve and exhibit cultural heritage. In museums, digital technologies, which initially manifested themselves in areas such as recording and tracking of works, began to be used in time to communicate with the society and to make exhibited objects, thematic expressions or digital art productions more immersive and impressive. Further, the fact that museums with educational activities have assumed the responsibility of being a major cultural force in society since the second half of the 20th century and consequently integrated with information technologies paved the way for digital environments that offer personalized experiences. For example, according to 24 Hour Museum's data in 2003 and museums' own annual reports, as early as 2002 the number of virtual visitors to many museums' websites had already overtaken the number of physical visitors on-site (Hawkey, 2004). In recent years, however, different types of mobile apps have provided artists, museum educators, academicians, and visitors the opportunity to come together on a common platform with real-time interaction. To illustrate, British Museum provided a virtual tour of the exhibition titled "*Defining beauty: The Body in Ancient Greek Art*", which presented by British historian and broadcaster Dan Snow through Periscope broadcast, a live-streaming app. Lots of people thus interacted within a virtual exhibition environment. In other words, museums have become places where visitors share their ideas and socialize through social platforms. Recent research on the context of museums and technology (Karatay & Karatay, 2015; Özer, 2016; Karadeniz, 2020) shows that digital technologies encourage different age groups to visit the museum and facilitate their access to the museum with presentations such as exhibitions and games. It is seen that this process has accelerated due to the COVID-19 epidemic that emerged in December 2019 and affected the whole world. The physical closure of museums

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due to the epidemic has caused museums to shift social communication opportunities to digital platforms. Museums have opened their collections, past and present exhibitions to the online experience, designed online educational activities, games or competitions via social media (Karadeniz, 2020; Akça, 2020; Ertürk, 2020).

As can be seen from the examples, the biggest impact of digital media and developing technologies on museums is undisputedly digital access to museum and art experiences anytime from anywhere where the Internet is available. Yücel (2012) asserts that "Digital technologies have been very effective in the development of "accessibility" and "democratization" discourses, which are crucial in contemporary museology in the context of mass communication at least" (p. 28). This is of vital importance in terms of creating a large-scale change. Because museums potentially became a part of everyday life, abandoning the image of corporate and even authoritarian whereby they offered an opportunity for more dynamic and personalized learning.

The term that is often used when the digitized exhibits of a museum are publicly available, is "virtual museum". Lewis (1996) describes the virtual museum as a collection of digitally recorded images, sound files, text documents, and other data of historical, scientific, or cultural interest that are accessed through electronic media. Amongst the opportunities provided by digital process, one can mention that publishing digital museum collections on the web, 360-degree panoramic virtual tour of collections in more advanced applications, various interfaces that allows the users to easily navigate through the collections, enrichment of high-resolution images with sound, music, motion and multiple narrative. In addition to that, the way we perceive artworks in virtual reality and actual physical environment differ. In this context, there is an ongoing theoretical debate in the literature (Barlas Bozkuş, 2014; Yenisehirlioglu, 2007). The focus of the debate addresses to exhibition of artworks in virtual museums without time and space limitations and the blurry effect which this process creates in the identity of artworks. On the other hand, Utkan Özden (2019) contends that "Whereas it will not replace actual museum, virtual museum experience allows us to read and explore any piece just by sitting in front of a computer" (p. 60).

In recent years, the digitization process of museums has evolved into virtual reality (VR) and augmented reality (AR) applications that attract considerable attention in many fields. Historians, curators, and archaeologists have started using virtual reality technologies to promote a deeper level of perception for historical reconstructions and artworks (Zouboula, Fakides & Tsolakidis, 2008; Hürst, Coninck & Tan, 2016; Bülbül, 2017; Schofield, Beale, Beale, Fell, Hadley, Hook, Murphy, Richards & Thresh, 2018; Zhao, Forte & Kopper, 2018). Virtual reality can offer a number of advantages to museums, offering a way to overcome some common problems like the lack of space or the need of visitors to interact with the exhibits (Lepouras, Charitos, Vassilakis, Charisi & Halatsi, 2001). Virtual reality facilitates exhibition of objects that cannot be exhibited especially because of the limited space or that may be too fragile or valuable to be exhibited. Exhibits can be interactively observed from different viewpoints or even manipulated. It also allows the visitors to explore environments that may be no longer exist today be somehow damaged and in need of reconstruction or cannot be easily experienced, either because they exist at a remote site or because their condition does not allow for their interior to be navigated (Lepouras and et al., 2001).

From the perspective of museum education, it is clear that the Internet provides opportunities for art teachers to work on museum collections. "As technology becomes increasingly integral to our lives, it is imperative for students (and teachers) to critically evaluate electronic data and become savvy consumers of art information on the Internet" (Stone, 2001, p. 83). This quotation is taken from the book dated 2001 and titled "*Using the art museum*". In the last 20 years, technological developments have contributed immensely to the progress of museums in virtual environments, and it urged teachers to implement these developments in their classes. The effect of virtual museum environments on the student knowledge and understanding on a certain work of art is no longer questionable.

This study serves to in-service teacher training program supported by the Scientific and Technical Research Council of Turkey (TUBITAK), which was designed to incorporate visual culture inquiries into visual arts courses. The study attempted to integrate virtual museum environments with critical approaches to visual culture whereby it was intended to contribute to the field of learning "*cultural heritage*" in the visual arts teaching program. Visual culture studies in art education is an approach that requires more critical consciousness, in other words, critical-visual literacy, due to the rapidly increasing of visual information as a result of advanced reimaging technologies and the effect of each visible image on human perception and attitudes.

Visual culture theory, which takes a wider perspective on visual arts education, is not only concerned with the appropriate perception of artworks, but also invites us to question our relationship with all kinds of visual

images (advertisements, YouTube videos, social media posts, shopping malls and etc.), which form much of our everyday interaction or appeal to our senses via eye-catching techniques, our viewpoints towards these visual images as well as questioning the underlying factors of our viewpoints. The visual culture theory is closely related to "critical pedagogy, social reconstruction, critical theory, feminist theory/criticism, multiculturalism, social justice and semiotics" (Mamur, 2019).

Tavin (2003) posits that images trigger individuals' emotions in terms of ethnicity, race, nationality, gender, family life, independence, and citizenship. The visual culture theory in visual art education concentrates on every type of cultural and emotional factors that influence individuals' cultural identity. In this respect, aesthetics experiences emanated from everyday visual images have been regarded more meaningful than human's interaction with museum works. This idea is in direct proportion to the frequency of visiting a museum (once a month, maybe once a year) and the lack of connection with artworks. Yet, the recent rise of virtual reality in museums has minimized accessibility issues, and museums have become a part of our ordinary everyday world. When this situation assessed in the context of Turkey, it can be said that the studies on the visibility of museum collections in the digital environment, is not reach sufficient numbers. According to Akça (2020), developing technology and new media opportunities are not used adequately, especially in exhibiting the collections in museums affiliated to the Ministry of Culture and Tourism. Moreover, it is a fact that digitization in these institutions of cultural memory provides added value to the culture sector (pp. 271-272). Given the accelerating digitalization of Covid19 epidemic period, the museums in Turkey are expected to enter this expedited process. The initiatives of museums towards digital platforms create the opportunity to diversify classroom practices in the context of museum and cultural education through online access. In this vein, this study was intended to integrate museum education with visual culture inquiries. This is yet not the only reason. Another reason is the effects of museum education and visual culture education on creating personal meanings through cultural and internal inquiries and the relationship between museum education and visual culture education. We can highlight three factors for this relationship.

One of them is the significance of intercultural interaction built through images in visual culture education. Many museums in the world have now moved their collections to online environments, and these environments "create a cultural heritage and art platform, thereby promoting intercultural codes on a global scale." (Barlas Bozkuş, 2014, p. 330). Exhibiting cultural heritage and works of art through virtual museums increases intercultural recognition and accelerates the process of commodification of culture. Given especially the online platforms of the world's leading museums in the USA and the UK, it is seen that the promotion of the dominant cultural elements that serve to the tourism industry is prioritized rather than the promotion of local cultural identities (Barlas Bozkuş, 2014, p. 332). The fact that museums become a part of the culture industry makes it possible to associate with the critical questioning dimension of visual culture teaching.

The second factor is that museums offer infinite viewing opportunities that stimulate its visitors' perceptions. As for the design of the space, attractive elements are used. "Several visual culture elements are used to determine what the audience will see, how they will determine the direction, what they should focus on, and why being attractive is important" (Karadeniz, Okvuran, Artar & Çakır İlhan, 2015, p. 210). This is valid not only for physical museums but also for virtual museum environments. In fact, it is seen that sound, light, music, motion, and impressive narrative are employed to create more attractive virtual museum environments.

The third factor is that the social ground in the context of makers and viewers is as important as works of art in visual culture education. In other words, the interpreter's role and socio-cultural context are relevant in the intertextual inquiry methods of visual culture (Anderson, 2003; Duncum, 2002; Tavin, 2000; Wilson, 2002). As Hagberg (2016) points out, "Museums are not full of physical objects. They are full of intentional objects made manifest. This distinction is embedded at a foundational level within our highly-evolved language about these intention-enmeshed artefacts: once one knows the identity of an artefact, one can rarely immediately subsequently inquire into its meaning" (p. 261-293). We can thus imply that both museum education and visual culture studies entail a visual learning environment that stimulates audiences' interpretation strategies.

In that context therefore, it can be said that virtual museums offer new presentation and narrative forms and create new representations with the narrative techniques they present to visitors. According to Leppert (2009), vision and representation mutually work to produce the knowledge. From the perspective of visual culture, "the connection between reality and its representation should be noticed and analyzed" (Türkkan, 2008; Dilli, 2020). What kind of questions can be posed regarding representation in these virtual environments? Özsoy (2019) stresses the priority of "*looking and seeing*" practices in museums and/or exhibition spaces which will ensure that the perception is meaningful and permanent. In other words, the interaction of looking and seeing with the object should be achieved. In museum education, objects play a crucial role in the learning process. "The fact

that the meaning of the object varies, and it can be interpreted differently each time is an important feature of the learning process with the object" (Onur, 2012, p. 230). How this learning process can be realized in virtual environments? This study attempted to read object and representation in the context of virtual museum and to focus the investigation of teachers' virtual experiences. To this end, the study sought to answer the following research questions: *What personal experiences and professional qualifications did visual arts teachers gain regarding the activity of 'Representation: Virtual Museum Experience'*?

Method

The study is a case study which delves into the activity, namely, *"Representation: Virtual Museum Experience"* as part of an in-service teacher training program. This activity focuses on learning cultural heritage in visual art education along with a critical approach to visual culture. As for the implementation of the activity, it involves two VR museum experiences and analysis of this experience through the object and representation. In case studies, the case may involve an individual, a small group, an organization or association" (Creswell, 2013, p. 98). In the study, teachers who attended the in-service training program were regarded as a case. Teachers' evaluations regarding the object and representation in the virtual museum and their VR museum experiences formed the units of analysis in the study. Since the study is concerned with a single analysis unit, "single case-holistic design" was used. "A holistic single case pattern is a study conducted with a single unit of analysis (such as an individual, a program, a school)" (Yıldırım & Şimşek, 2013, p.290).

As part of the in-service training and research Project, the study was carried out in the provinces of Çanakkale, Erzincan, Kayseri, Diyarbakır, Giresun, Mersin, Denizli which were selected from seven regions of Turkey within a seven-month period, between the months of September 2018 and April 2019. 508 primary and secondary visual arts teachers participated in the in-service training program. 284 of the teachers are visual arts teachers, 224 are classroom teachers. Necessary explanations were made to these teachers about the research dimension of in-service training, and focus groups of 5-6 people were formed in each province (except Giresun[†]) who were willing to participate in the study. In this context, focus group interviews were held with a total of 66 teachers, including 31 classroom teachers and 36 visual arts teachers.

Data Collection

This study was realized in the three phases. In the first phase, **a pre-interview form** was submitted to gather preliminary information about teachers. This form was employed to find out whether teachers used virtual museum and visual reality applications in their classes and, if so, how they used. The pre-interview form comprises of three questions.

1. *What do you think virtual reality is about?*
2. *How do you benefit from mobile or digital applications in visual art education?*
3. *In which aspects do you think digital technologies contribute to primary and secondary school students in visual art education?*

Afterwards, the next step included the phases of briefing and implementation. Teachers were informed about digital applications and virtual reality applications in museums thorough virtual museum examples in the world and Turkey. The second phase is the VR museum experience which involves ***Art Plunge***[‡] and ***The Museum of Innocence***[§]. These museums were selected because they have collections that urge teachers to question object, representation, and space in the context of visual culture education.

[†] Focus group interviews were not conducted in Giresun province as the number of participating teachers was limited to two.

[‡] **Art Plunge** is a virtual reality gallery that exhibits famous works of art. The VR headset allows the users to get the feeling of being inside famous paintings and to perceive objects and figures in an immersive virtual environment. By the use of sound and motion, each painting offer an enhanced experience. (https://store.steampowered.com/app/570900/Art_Plunge/).

[§] **The Museum of Innocence** is a museum inspired by Nobel Prize-winning author Orhan Pamuk's novel of the same name. The Museum of Innocence tells the story of Istanbul life between 1950 and 2000 through memories and flashbacks centered around two families – one wealthy, the other lower middle class. The author presents what the novel's characters used, wore, heard, saw, collected and dreamed of. (https://tr.masumiyetmuzesi.org/page/muze)
https://artsandculture.google.com/exhibit/masumi%CC%87yet-m%C3%BCzesi%CC%87/XgJyIqBekvaEKw?hl=tr

Image 1. Art Plunge, A girl reading a letter in front of the open window A, J. Vermeer, 1657
Image 2. The Museum of Innocence, The Pain of Waiting

In the literature, learning in museum is defined as meaning-making from objects and experiences (Falk, 2009; Dierking, 2002; Burnham and Kai-Kee, 2015). Because museums are expected to give "visitors a creative and emotional experiences" (Clutterbuck, 2007, p. 75). The aim here is to read and make sense. To this end, teachers were invited to use **worksheet** whereby they were motivated to think about their VR experience. The content of worksheet is based on fostering the practice of looking and seeing in the context of visual culture through the concept of representation along with Dierking's contextual model of learning in the context of museum education. The notion of *"representation"* is used to demonstrate the creation of meaning in visual culture. The use of the contextual model of learning is recommended for visual art education in museum and gallery and this model includes overlapping contexts. These contexts are as follows: *personal context* which refers to the internal and/or external motivation degree demonstrated by learners, *physical context* which defines clues that help the student understand the work of art and phenomena and lastly, *socio-cultural context* which is related to museum audiences who interact with each other, museum and museum staff (Cited in. Lepouras and et al., 2001). This model is mostly offered for learning from physical museums. However, Özer (2016) researched the effect of this model on learning through the virtual aviation museum and stated that it could be a good model for virtual museums, except for some limitations in the physical context. The content of the worksheet is shown in Figure 1.

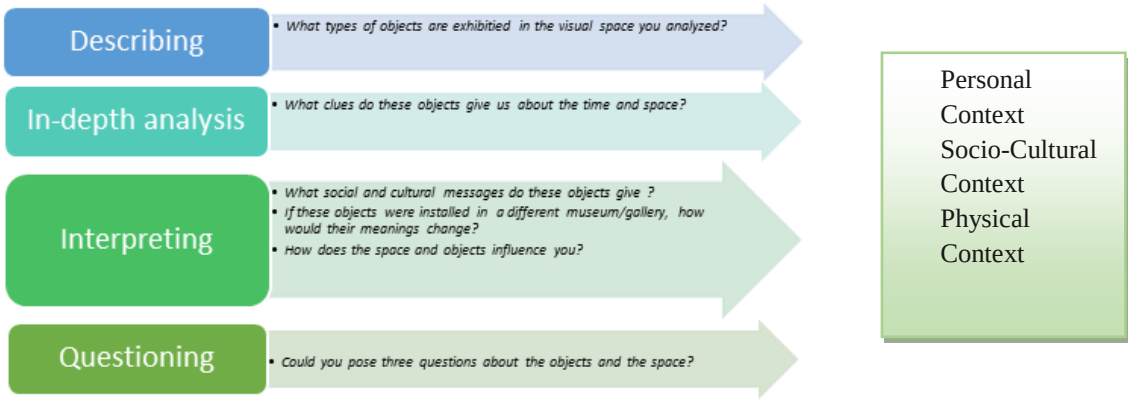

Figure 1. The format of worksheet

After the museum experience, teachers were asked to share their personal experiences in a way that serves to socio-cultural context. Further, **participant diaries** were distributed to each teacher to write their personal experiences. The participant diary consisted of questions that help teachers describe their thoughts, emotions and experiences and included questions that investigated the contribution of the application to the teaching profession and art education. The questions posed are:

1. *What are the contributions of VR learning activity to you?*
2. *What are the contributions of VR learning activity in terms of your teaching profession?*
3. *Which aspects of VR museum experience did make you satisfied and concerned?*
4. *In what ways do you think VR museum applications contribute to primary and secondary school students in the context of visual culture?*

In addition to that, focus group interview with volunteer teachers were conducted in each province as part of the in-service training program. Thus, teachers were asked to share their views on whether the theory of visual culture can be incorporated into art course. In the research, the focus group interview was used to analyse the new ideas of teachers about their classroom practices in depth, based on the education received and experiences. Focus group interviews were preferred because they enabled an intense brainstorming thanks to group interaction compared to individual interviews. According to Yıldırım & Şimşek (2013), "some issues that will not come to mind in individual interviews may come to mind within the framework of the statements of other individuals in group meetings and it may be possible to make additional comments" (p.179). The participants of the focus group interview comprised of 5-6 classroom and visual arts teachers individually from each province. Two interview questions are related to museum experience. Following the interview, these questions were transcribed and regarded as data source.

1. *How do you use the VR museum experience in visual art courses to promote the importance of preservation of cultural heritage?*
2. *Given the VR experience you gained during the learning activity, what do you think you can do for a more effective course?*

All these data collection tools were presented to the project coordinator for checking, and then presented to an expert who has research in the field of visual culture pedagogy and museum education for validity. Following the pilot study in the first city (Çanakkale) the Project was realized; the content of the implementation and data collection tools were revised. To this end, the structure of questions was revised whereby it was intended to use the time more effectively.

Data Analysis

In the study, 1564 pages of data (pre-evaluation form, worksheet and participant diaries) were obtained from participating teachers. These data were classified on a provincial basis and were read by two authors of this study during the research process. Since similar data contents are encountered in each province, 165 pages of data belonging to 55 teachers in total were allocated for in-depth analysis, based on the number of participants in the province in a random manner. Considering that sufficient data saturation was reached after the analysis, the data set in which the analysis was made was considered sufficient by the authors of the study. Table 1 shows the number of participants by province.

Table 1. Distribution of analysis data by provinces

	Çanakkale	**Kayseri**	**Erzincan**	**Diyarbakır**	**Giresun**	**Mersin**	**Denizli**	**Total**
Class Teacher	3	5	4	5	-	4	4	25
Visual Arts Teacher	5	5	5	5	1	5	4	30
Total	**8**	**10**	**9**	**10**	**1**	**9**	**8**	**55**

In addition to that, a total of 8 pages of data obtained from focus group interviews, which were conducted with voluntary teachers upon the completion of the project, were analyzed. The data obtained from the study was analyzed through content analysis. During data analysis, the first and third writers of the research independently prepared the drafts of similar vocabularies and thematics. Then, draft codes and themes were compared and following the mutual agreement, the second writer of the study submitted the final version to the expert. Following the data analysis, two themes were developed as follows: 1) *learning experiences in virtual museums,* 2) *the evaluation of museum experience in the context of teaching profession*. Table 2 provides information about which data collection tool is employed regarding identification of the codes.

Table 2. The relationship between theme and data collection tools

Theme	**Data Collection Tool**	**Abbreviation Code**
1- Learning experiences in virtual museums	Worksheet	WS
	Participant diary	PD
2- The evaluation of virtual museum experience in the context of teaching profession	Pre-evaluation form	PEF
	Participant diary	PD
	Focus group interview	FGI

Findings

Under the theme of **learning in virtual museums,** the following two sub-themes were identified: 1) making sense of space and object and 2) questioning approaches through space and object. Four codes, namely, "making sense of socio-cultural codes", "questioning the relationship between change and continuity", "making sense of the relationship between object and space" and "questioning the perception of space, time and reality" were created in the sub-theme of the making sense of space and object. The relationship between the codes created were given in Figure 2.

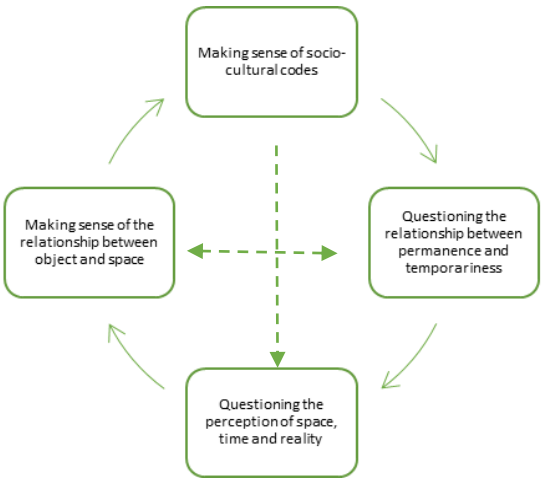

Figure 2. The relationship between the codes created in the sub-theme of making sense of space and object.

Regarding the readings on making sense of socio-cultural codes, it is seen that the participants highlighted social status and gender representation in the context of interior space, objects in the space and figure's stance. To illustrate, while the visual arts teacher coded 49 stated, "*In the work of art (Mona Lisa) I examined, the figure's stance, clothing, the objects around give me the impression of social status. It evokes a sense of perfection"* (WS-49, Visual Arts Teacher [VAT]), the classroom teacher coded 1 commented, *"Given that the woman's clothes and the room decoration are quite gorgeous, I get the impression of upper-middle- income and assuming that reading letter I mean she is literate, I get the impression that she has a high level of status"* (WS-1, Classroom Teacher [CT]). On the other hand, the visual arts teacher coded 4 questioned the place of woman in society considering the interior space and the image of woman and remarked: "*Women is at home, closed and passive. These images show that object can change in time, but perceptions don't change*" (WS-4, VAT). It is worth noting that she emphasized the perception of change and continuity. More specifically, by underlining perceptions about women, she noted that although the object changes, perceptions about woman hardly change. A great number of teachers questioned the relationship between change and continuity in the worksheets. For instance, while the visual arts teacher coded 30 stressed object permanence, saying that "*By offering different socio-cultural experiences, objects show us that time is passing but objects are permanent and do not disappear*"(WS-30, VAT), the classroom teacher coded 31 considered object as a reflection of human in the pursuit of comfort , stating that "*I see although centuries pass, the needs of people remain the same, objects only become more contemporary although time goes by and object is only a reflection of human in the pursuit of comfort"*(WS-31, CT). The teacher coded 43 who experienced the Museum of Innocence considered the objects as the witnesses of life stating that *"When I look objects, I see the experience. I see that life is defeated by time, but the object is permanent, these objects are the witnesses of passionate love…"* (WS-43, VAT). Similar expressions regarding the question of change and continuity were recorded in almost every worksheet of the teachers. On the other hand, the participants' perceptions of the change of object-space are different from each other. While some teachers claimed that the exhibition of the same object in a different space would not cause a change in mood, some teachers argued that it would not evoke the same feelings. To illustrate,

> *Its impact power on us can change, but I do not think that its meaning will change (WS-12, VAT)*
> *It does not give the same feeling. The fact that objects are in their own environment increases its effect. It emphasizes the meaning better. (WS-22 CT).*
> *Pulling the object from its environment changes the emotion (WS-11, CT).*

Given the teachers' expressions, they have different opinions about the object and its spatial context. It is seen that some comments or sense-making approaches of the participants rely on experiencing virtual environment. Regarding the code of "questioning the perception of space, time and reality", one teacher stated:

> *I had the feeling that I lived in the space and time that the painting was drawn. It was like everything created an emotional depth like watching the girl reading the letter in that room, feeling the warm wind coming from the open window, the girl's reflection on the mirror (WS-27, VAT).*

As can be seen from the teacher's statement, virtual reality environment influenced teachers' sense-making the object, space, and time. Given teachers' statements, it is evident that virtual reality activated the senses of hearing, touching, and smelling rather than seeing. It is thus can be argued that the practice of reading through the objects in the work of art or space urged teachers to create various meanings. "Creating meaning, making the world meaningful and meaningful interaction with others are important for visual culture practices" (Sarıbaş, 2020, p. 245). According to Hall (2017), "Meaning is also produced whenever we express ourselves in, make use of, consume or appropriate cultural 'things'; that is to say, when we incorporate them in different ways into everyday rituals and practices of daily life and in this way give them value or significance" (p.10).

The sub-theme of questioning approaches through space and object consisted of teachers' questions and approaches based on their experience regarding the work of art or the object in the museum. In other words, teachers' mind was occupied with these questions during their experiences. Consequently, it was observed that teachers developed questions pertaining to the space, objects, virtual reality, personal narrative, and formal aesthetics. Some examples of teachers' questions are categorized and presented in Table 3 below:

Table 3. The Questions Teachers Posed

Code	Some Questions Teachers Posed
Questions regarding the space	*If we change the space in the painting, what changes do you think happen? (WS-15, VAT)* *What kind of taste and smell do you get from this space? (WS-24, VAT)* *What does this space inspire you?? (WS-30, VAT)* *What emotions does this space evoke you? (WS-32, CT)* *How would you call this space?? (WS -2, VAT)*
Questions regarding the object	*How did the letter change the woman's mood? (WS-26, VAT)* *What is the story of the carpet on the table?? (WS -27, VAT)* *What is the relationship between objects? (WS -3, VAT)* *How does objects function in painting? (WS -7, VAT)* *If we changed the objects in the work of art, what changes in the meaning of artwork would occur? (WS-15, VAT)* *What period do objects show us? (WS-8, VAT)* *If you were the artist, how would you design objects and space? (WS-21, VAT)* *What would be the differences in the narration, if more visual and sound effects were added to the objects? (WS-25, VAT)* *If you added new objects to the work of art, what would you add, Why? (WS--41, VAT)* *Which objects in the space do have a different intended purpose today (WS--51, CT)*
Questions regarding VR experience	*If you were really there, what would you do? (WS-17, VAT)* *Could you describe the difference between watching the work of art and being inside? (WS-19, VAT)* *What music and motion effect would you add to this space? In which aspects motion and music do influence the meaning of the work of art? (WS-39, CT)*
Questions Regarding Personal Context	*Is there any section or object that you face the reality in this space? (WS-48, VAT).* *Which object in the museum does say something about you? (WS-41, CT)* *If any museum object you used was exhibited in the future, what thing would you want to exhibit about you? (WS-55, CT)*
Questions Regarding Formal Aesthetics	*If we change the colors, does it change the meaning? (WS-25, VAT)* *How does lighting affect the artwork? (WS-4, VAT)* *How were the integrity created in the artwork? (WS-9, VAT)*

These findings revealed that teachers were mostly inclined to question the object. This might be because of the museums chosen for the activity. Since historical, natural, or artistic objects are generally exhibited in museums, object-based learning is mostly adopted in educational activities. It can be said that the worksheets used for investigating teachers' virtual museum experience led teachers to examine the objects critically and effectively rather than just monitoring it whereby teachers developed different perceptions towards the object. For example, the visual arts teacher coded 2 stated, "This *experience definitely evokes excitement and interest. As I examine the details of the work of art, it makes you feel admiration and excitement"* (WS-2, VAT). The expression of "excitement" here is emancipated from the immersive VR perception of the piece. Yet, the teacher emphasized her increased admiration as she examined the artwork in detail. This might be because virtual museum experience facilitates more careful viewing. Education via museum should be realized through a perspective that stimulates critical thinking skills. In particular, a perspective that focuses on the effect of details on creating meaning is required. Shari Tishman (2018) uses her concept of slow looking to explain it. Slow looking is a way of building knowledge between the work of art and visitor, that is to say, as a mode of learning through observation. There is a need to allocate time for observation. Some of the teachers' comments on observation and learning are as follows:

Realizing, investigating, inciting curiosity (PD. 12, CT).
Creating opportunity for cultural encounters (PD. 55, VAT).
Different perspectives, teaching diversity (PD. 49, VAT).
A contribution to learning appetite, critically looking (PD. 36, CT).

Given teachers' participants diaries, they most frequently highlighted the following descriptions: "realizing, investigating, curiosity, different ways of looking, immersive perception of the space and objects, critical/multidimensional questioning, cultural encounters and learning appetite". It is seen that teachers' VR museum experience in the context of visual culture enabled them to focus on cognitive and emotional learning.
5 sub-themes were developed **under the theme of the evaluation of virtual museum experience in the context of teaching profession**. These are: 1) Preliminary information regarding virtual museum experiences, 2) Evaluations regarding the contribution of virtual museum experience, 3) Evaluations regarding potential problems and challenges 4) Evaluations regarding the contribution of VR museum experience to visual arts course/education and lastly 5) Ideas regarding the classroom practices.

Preliminary information regarding virtual museum experiences was obtained from pre-evaluation forms and entails information with respect to teachers' virtual museum practices. The data obtained in this sub-theme was grouped into the following three categories. Code and themes are presented in Figure 3.

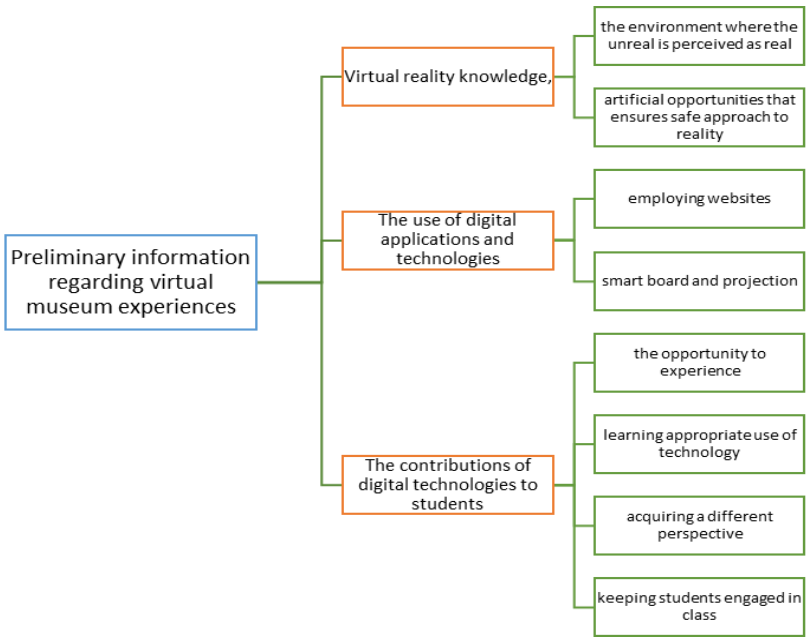

Figure 3. Codes and themes for preliminary information on virtual museum experiences

Teachers mostly described the virtual reality as the experience of spaces that cannot be visited physically and where the reality does not exist. Some teachers, however, reported that visual reality keeps the person from

dangers and allows the user to experience the space. The 5-coded visual arts teacher expressed her opinion in this direction as "Artificial possibilities that bring the real person closer by keeping them away from possible dangers as if they were physically in that environment.

In the category of the use of digital applications and technologies, a great majority of the teachers were found to use digital applications to access to different web pages. Besides, some teachers also stated that they used digital tools available in classes such as smart board and projection. Teachers predominantly expressed their purpose in making use of these technologies as teaching abstract subjects by concretizing.

As for the category of the contribution of digital technologies to students, most of the teachers noted that digital technologies promoted equality of educational opportunities for low-income students. Teachers frequently stated that students could easily and safely access to physical environment or resources that they would not normally have access to. Amongst the teachers who reported that using technology in classroom would lead to more highly engaged students, the teacher coded 41 commented, *"I believe that the goal can be realized more quickly as it draws more attention. Besides, since the age group we reach is very good at technology use, curiosity and interaction will occur."* (PEF-VAT) In addition to that, some of the teachers noted that integrating digital technologies into courses will also help students learn appropriate use of technology.

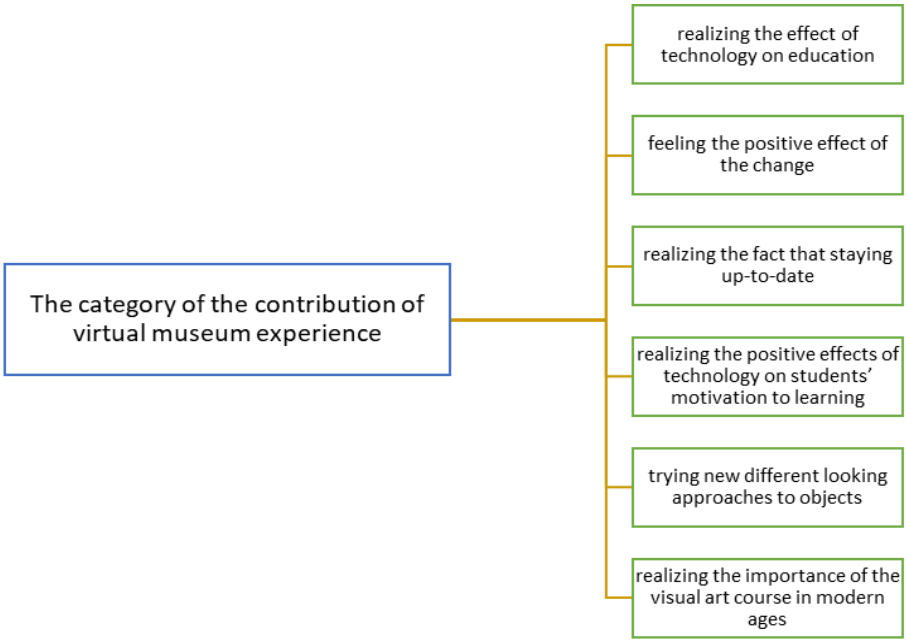

Figure 4. Codes for teachers' evaluations of the virtual museum experience on their contribution to them

Under the category of the contribution of virtual museum experience, 6 codes have emerged as shown in Figure 4. Most teachers emphasized that they gained awareness of the effects of technology on education. For example, the visual arts teacher coded PD.1 stated, *"Looking at the evolution of technology, I see how it impacts on art and thanks to technology, I could move freely in places where it is not possible to go".* The visual arts teacher, yet, coded PD.2 made self-criticism and presented his/her observation saying that *" As employees of Ministry of National Education, I saw how we lagged behind tech opportunities, I face the truth that we fell behind with staying up to date.* The visual arts teacher coded PD.11 stressed the opportunities virtual museum provided to class environment stating that "*I realized that I can make my students do activities such as museum visits or art work analysis without restriction of place, location or time*." Similar expressions were also identified in the focus group interviews. For example:

> *We need to digitize. This is the need of our era. Even if we want, we cannot alienate... However, we should not introduce the digital environment to the students immediately. As teachers, we should be conscious and selective. (Denizli, FGI. VAT-1).*

We could thus imply that VR museum experience raised teachers' awareness of digital learning and using technology as a learning tool. It is seen that teachers frequently used the words "realize" and "feel" when they shared their views in respect to the contributions of technology to themselves. They also made self-criticism for

their lack of digital skills. This critical attitude also gave them a refreshed belief concerning their fields or the significance of the visual arts course. Below are some excerpts taken from the comments of the teachers:

> *Visual arts course is not just a practice course, unfortunately, students and my colleagues still perceive it like that. We gradually started to destroy this perception. I believe my course covers many areas of life (PD. 38, VAT).*
>
> *Once again, I realized how much I love my job. This feeling will reflect positively on my students and my environment. Then, I think I will be a more helpful teacher (PD. 42, VAT).*

Some concerns, however, were raised related to VR museum experience. These concerns were divided into 7 codes under the sub-theme of "*evaluations regarding potential problems and challenges in practice*". The codes are presented in Figure 5.

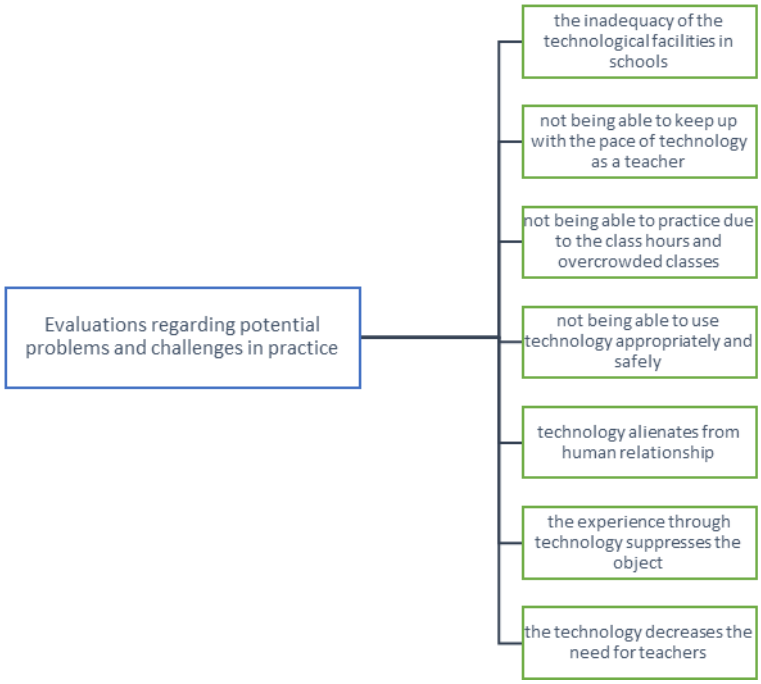

Figure 5. Concerns about virtual museum experiences

Some of the teachers explained their anxieties through their own competencies, the limitations offered by the internet and the inability to control it safely, and the dominant influencing role of technology. For instance, the teacher coded 4 stated, *"My only concern is that there will be no need us in case of heavy use of technology in future?"* (PD. 4, VAT). The teacher coded 5 commented, *"The possibility that technology will suppress hand crafted artworks makes me concerned"* (PD. 5, VAT). The teacher coded 12 made a more objective comment saying that *"My satisfaction and concern are at the same level. Limitless…* (PD. 12, CT). The teacher coded 14 stated, *"I concern that digitizing of art, human and artist and its prevalence will alienate people from socializing, social and human relations"* A great majority of the teachers stressed the challenges that they might encounter during the practice in school environments. Amongst the challenges they identified, there are Internet infrastructure in school, hardware inadequacies in rural schools, and the difficulty of the practice due to limited course hours with overcrowded classrooms. For instance, the teacher coded 35 stated, *"It offers the opportunity to watch and see on-site regardless of time, money and formal procedures. What makes me concerned is internet is only available in cities and inequality of opportunity, rural schools are lacking these opportunities"* (PD. 35, CT). More detailed evaluations were found in focus group interviews with respect to the difficulties in schools. Example quotations from the teachers' statements are presented below:

> *You need to have a sound Internet. Internet does not work properly in schools. Besides, since the child could not go to museum physically and it cannot be like the real atmosphere it has an adverse side (Çanakkale, FGI. VAT-5).*
>
> *Some psychological effects can be… The child would like to detach from reality (Çanakkale, FG. VAT-2).*
>
> *Visual realty draws a lot of attention from students. But I will have flying experience when I go to Louvre Museum to see Mona Lisa, I will see Paris, and I will interact with people. Virtual reality is nice, but it cannot replace it (Denizli, FGI. VAT-3).*

As teachers' statements demonstrated, they mostly believed that virtual museum experience could adversely affect the child in terms of detaching from reality. Yet, when it comes to the contribution of VR museum experience to the course and visual art education, a total of 9 codes were determined. These codes are presented in Figure 6.

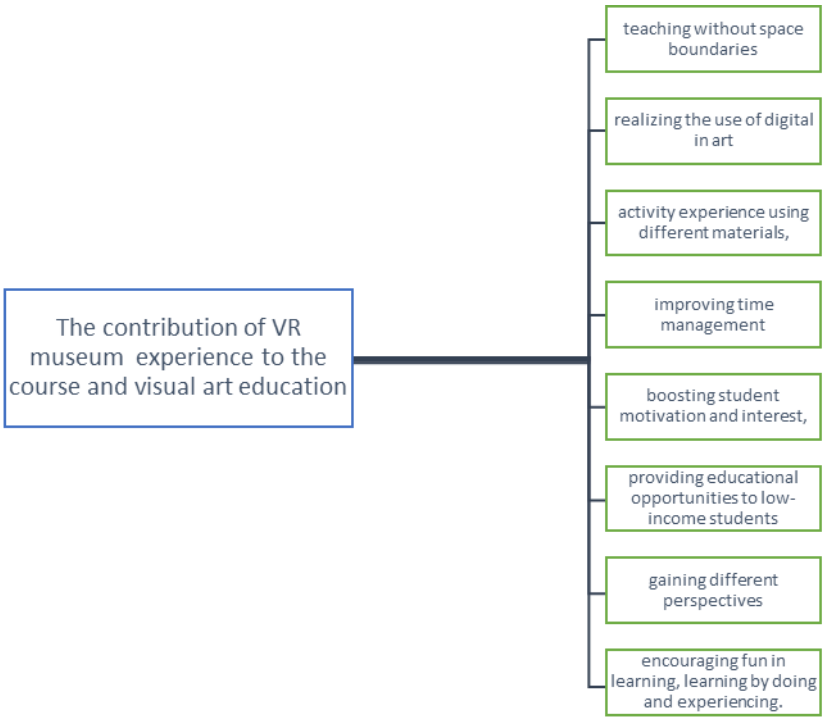

Figure 6. Evaluations on the contributions of the virtual museum experience to visual arts teaching

For example, the classroom teacher coded 14 reported, *"I can incite interest and curiosity in art. Eventually, students follow technological products. If we make them experience that they can use it to access to art, they will be more interested. They have the chance to encounter more branch of art and artworks".* The visual arts teacher coded PD 42 stressed its contribution in terms of accessibility stating that *"Given that students may be stay in the city they live throughout their life, this experience they have, some will have the chance to see these art pieces in the distance, this will be an unprecedented happiness for them"* Teachers coded 29 and 15 mostly focused on the effect of this experience on children.

> *Instead of looking and examining a fixed painting, children have the chance to go to museum without changing the time and space, they will like it (PD. 29, VAT).*
> *It will promote children's interest in art. Their interest on making art and producing (PD. 15, CT).*

Similar expressions were observed in the focus group interviews with teachers. Teachers agreed on that it would be useful in terms of practicing the topic learned, permanent learning and critical thinking. Some excerpts of the participants are given below:

> *It is tough to teach children the concept of art. But I believe that this immersive experience will allow the practicing of any concept very well (Kayseri, FGI. CT-4).*
> *Instead of lecturing, you let the children experience it personally, he/she wants to see the real one after experiencing. Even this is a big gain (Erzincan, FGI. VAT-1).*
> *When I experienced it, I felt the period Leonardo lived. It is important for students in terms of feeling the same, being curious about the history and making more in-depth research (Erzincan, FGI. VAT-2).*

During the focus group interviews, teachers were asked to answer what activities they prefer to conduct in line with the experiences they gained after the in-service training and their responses were classified under the theme of *"opinions regarding the in-class activities".* With respect to the VR museum experience in visual culture education, teachers' responses are as follow: examining the artwork/object in virtual environment, completing the painting or reinterpreting, developing stories or visual narratives about the before and after the moment, building interdisciplinary perspective, planning activities integrated with interactive boards. To illustrate, the following expressions were obtained in the focus group interviews and participant diaries:

> *We can ask the students to make a painting like "if you were an artist, how would you make this painting or complete it? (Kayseri, FGI. VAT-1).*

Writing activities can be conducted. Like which dentist Mona Lisa did she visit before posing, what kind of things did she come across at the street and even drawing activities can be done (Erzincan, FGI. VAT-6). It can be incorporated into all courses and subjects and it can be integrated with other courses. Different cultures can be introduced (PD 13, CT).

Although teachers frequently mentioned that they found the experience of a physical visit to the museum more valuable, they expressed that virtual museum experience could be more effective in classes in terms of the opportunity to visit exhibitions without having to travel far, promoting interest and learning appetite by means of technological opportunities (sound, motion, immersive and etc.) and it can be incorporated into various learning activities. Interestingly, the idea of creating interdisciplinary lesson plan was mostly emphasized by classroom teachers.

Discussion and Conclusion

Visual culture studies in art education (Duncum, 2002; Tavin, 2007) are predominantly shaped on aesthetic experiences (Billboards, advertisements, Youtube videos, social media posts, digital games, shopping malls, tourist attractions, etc.) obtained from daily life. It is emphasized that daily aesthetic experiences are more on one's identity and world experiences than the artistic experiences encountered in museums. However, although some arts education researchers (Eisner, 2002; Efland, 2005) are positive towards the creation of an arts teaching program that relates learning with real-life experiences, they express concern that a focus solely on visual culture will hamper the true goals of arts education. However, in recent years, museums have found more places in digital media through new narratives, exhibitions, digital games and even various teaching activities, making it easier for them to penetrate into daily life and meet with the audience. Based on this fact, the two museums experienced with virtual reality glasses were included in a teacher education process created in the context of visual culture inquiries. Thus, it was aimed to present a new perspective to the teachers on how visual culture can be interpreted in the context of museum education.

The contact with the artworks and objects in the virtual museum is not same as the contact in real museum environment. However, virtual museum applications and technologies bring museum collections of an actual museum anywhere in the world to class environments, thereby serving to educational purposes. Learning in virtual museum environments should be constructed in a way that ensures effective learning and empowers students' critical thinking skills as the learning in actual museums do. "In virtual museum activities, the quality of the activity and its educational outputs are closely linked to teachers' planning and implementing of teaching" (Yılmaz, Yıldırım, Filiz & İbrahimoğlu, 2018, p. 34).

It is important to examine what appears in visual culture studies, to question who or what the meaning attributed to it and the created images represent. Associating, questioning and interpreting create individual and social contexts that are attributed to the meaning of that object. (Mamur, 2012, p.2163). This study revealed that the participant teachers questioned the visual culture in the context of the relationship through object, space-time, social cultural codes, permanence and temporariness and they produced meanings. Visual culture in art education involves multidimensional thinking and deeper thinking skills, which is designed through constructivist approach and critical pedagogy. This also can be seen in the theoretical foundation of museum education. "Museum education centers on a holistic approach that emphasizes individual learning characteristics such as cognitive styles, constructivist approach and multiple intelligence theory" (Lepouras and et al., 2001). Indeed, it was found that following their VR museum experience, teachers developed questioning approaches pertaining to space, object, virtual reality, personal context, form and aesthetics and they effectively employed their cognitive and emotional skills. Similar findings were found in a study conducted in Eskişehir Cartoon Museum (Sarıbaş, 2020) on museum, visual culture and representation. In the physical environment of the museum, visual arts teacher candidates made inquiries on visual representation and meaning, and the meanings they created through the cartoons they examined were reflected in their reproduction as cognitive and affective wealth. The important outcomes of the implemented program were shown as the motivation of the students and the context they established with their own lives. On the other hand, it can be said that social interaction is limited because the teachers have a more personalized museum experience. In this study, it was found that teachers' motivation in the process, being influenced by the virtual collection and their opinions about the virtual museum application were positive; however, it has been found that the influence stemming from the physical context provided by a real museum has shifted more to the possibilities offered by technology. Similar results were found in a study conducted by Özer (2016) with the content of a virtual museum, and it was stated that the effect of the physical environment did not occur, and the social context remained in a more limited perspective. The data obtained from reflective tools demonstrate that teachers gained learning experiences through the in-service training project in terms of personal and professional contexts. Teachers reported that they became

aware of the power and capacity of especially VR technologies and virtual museum environments in visual art courses in terms of practicing the course, permanent learning, critical thinking and demonstrating cultural diversity to students by bringing any museum across the world into the classroom environment. In this context, it can be said that when technological tools are combined with well-structured curricula, they direct learners to higher level thinking skills. According to Silberman (2016), technological tools facilitate learning by engaging students in high-level active learning, allowing them to reach information faster and to do many things with that information, allowing them to think critically, analyse topics and practice (Cited in Karadeniz, 2020).

While access to museums and incorporating them into visual culture teaching activity seems to be the strength of this study, most teachers expressed their concerns about not keeping up with the pace of technology or using it properly and safely in the classroom. In addition to that, teachers mentioned that the practice of virtual museum experiences might be challenging due to the limited course hours with overcrowded classrooms and schools lacking Internet infrastructure. Another finding, however, revealed that such educational process increased teachers' willingness to benefit from technology more effectively in art teaching. It was observed that teachers developed some ideas to enrich their own course activities with virtual museum experiences as a result of the experiences they gained during the activity process. Teachers most frequently developed such ideas as examining artworks / objects in the virtual environment, comparing works of different cultures, writing stories about before or after the moment or creating visual narratives, and ensuring interaction between virtual museum environment and other courses. Creating networks of interdisciplinary relationship and cultural comparisons or the opportunity to examine the codes of a different culture through art works might be the most important output of virtual museum examination in the scope of visual culture. Because while a student has the opportunity to encounter cultural museum objects in his/her country, she may not have the opportunity to encounter objects and works of another culture. It can thus be said that virtual museum environments give us the opportunity to realize, understand and interpret cultural codes and intercultural interactions.

Based on the results of the research, it is especially suggested that the awareness and competencies of teachers should be further increased through different in-service training activities in order to diversify the opportunities for remote access to museums in art classes with critical visual reading approaches. This study was carried out as a qualitative research, without the aim of generalization. However, new research can be made on the use of virtual museums in education by considering different learning theories and models. In these studies, it can be studied on models in which both real and virtual museum applications are used together to strengthen the social and physical dimensions of the contextual learning model.

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