



USE OF TECHNOLOGY IN MUSEUMS, SAMPLE APPLICATIONS

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ABSTRACT

Museums are institutions that provide the protection of cultural heritage and introducing their findings to visitors, while aiming for education, training and entertainment. Our age is now an age of technology. Everyone lives inseparable with technology and uses technology in almost every area in their daily life. However, technology has started to gain importance in education and entertainment field, apart from the daily needs of people. Therefore, from touch screens to augmented reality, museums have been resorting to many interactive and instructive technology types in order to provide more information and a better experience for their visitors.

Keywords: *Museum, technology interactive, audio guide, augmented reality, visual reality, touch screen, hologram*

MUSEUMS AND MUSEOLOGY

In our age, technology continues to develop with an unavoidable speed. Industrial revolution allowed technology to replace people, therefore, it is true that museums, existing from the very old ages to the present date, will finally adopt technologic developments and blend it with its own concept. Today, the museums are not only used to display a work, but also used as a place to acquire information and learn in coordination with libraries. The museums have started to draw attention in terms of tourism and entertainment through the visits of people together with their family and friends. Many attempts have been made to convey the information to visitors in a more optimal way, and also for visitors to have more fun in the museum. The facilities provided to visitors include access on the internet, giant screens or interactive terminals, and audio guiding services. One of the major reasons why museums have adopted technologic developments may be to draw rising generation to museums, who dabble in digital world more, and to provide visitors with more tangible information by use of technology.

This study briefly addressed the museums and short development of museology as well as technologies and practices adopted in the museums, and included technologic applications of museums and examples of technological practices in museums. In addition, foresights were included in the study on how visitor's satisfaction would be improved and what technology should be used in the museums.

INTRODUCTION

The definition of museum in Turkish dictionaries: *"A place or building where works of art and science, or objects that are good for arts and sciences are stored and displayed to people."* (Turkish Language Society, 2020). Turkish Ministry of Culture and Tourism defines the museum as an *"educational, scientific and artistic institution that identifies the historical artifacts, reveals them through scientific methods, and examines, assesses, protects, introduces and exhibits them, or raises the awareness of public about historical artifacts through education programs with the intent of improving the cultural level of society. A museum is the prestigious work of art in that city where it is located."* (Turkish Ministry of Culture and Tourism, 2020). Based on the definitions provided so far, a museum can actually be defined as "a place where old and valuable articles are stored". The word "museum" comes from the Latin word and is originally from the Ancient Greek "Mouseion", which denotes a place dedicated to the "Muses" (the patron divinities of the arts in Greek mythology). However, it was then used in the meaning of "temple of sciences" (Çetin, 2010).

Although museum and museology are considered to be a new concept, in fact, it is dated back a long time to "protect old and valuable articles". In the 20th century, the archeologist Sir Charles Leonard Wolley found old ruins of other regions in the ruins of a Neo-Babylonian palace in the city of Ur in Mesopotamia (the city of Dhi Qar to the north of present Iraq), and noticed that those ruins had been kept together in an organized manner (Pryke, 2019). Those ruins belong to 2100-600 BC and some of them were restored and stored in the palace, moreover, information about what those ruins were was provided in three different languages. It was rather aimed to protect the cultural heritage and inform people, therefore, that place was considered a Neo-Babylonian museum that was managed by the Princess Ennigaldi-Nanna, daughter of the King Nabonidus.

Before a sense of museology was formed, the example could be collection of antique or valuable artifacts in the ancient dates, which is close to this concept. In the 16th century, Italian naturalist Ulisse Aldrovandi, who lived in the same period as Leonardo da Vinci,

collected and displayed the objects that he found in the nature during his travels (Vai ve Cavazza, 2006).The renaissance period was a period that hosted various museums incorporating collecting and associated works of art. The Capitoline Museums was built by Pope Sixtus IV in 1471 to house the sculptures that were salvaged, collected and donated by him from the old ruins. It was initially rather aimed to be an art gallery in that period, but then it was opened to public as a museum in 1734 (Encyclopedia Britannica, 1998).

The interest in works of art was increased particularly in the New Age as a result of the renaissance and reform movement, and increased number of special collections took the lead in building modern museums (Çetin, 2010). In the New Age, the passion of aristocratic families, feudal lords and kings to collect and display antiquities was a sign of power and nobleness.

The museum, as it is known today, is considered to have emerged first in Europe and spread to the rest of the world.Although modern development of museums as accepted today is said to occur through the proliferation of archology between the end of 19th century and beginning of the 20th century (Başaran, 1988;cited by Çetin, 2010), the first example is the Ashmolean Museum built in the 17th century. The Ashmolean Museum built by Elias Ashmole in 1683 is called the first modern museum (Salter and Lobel, 1954).

The first museum that was built in the history, as recognized and known today, is the British Museum that was put into service in1753. The British Museum is the first national, public and free museum in the world (British Museum, 2020).In the 19th Century during the Industrial Revolution, the relationship between the museum and education was enhanced. Development of industrialization towards the end of 19th century and immigrations from the rural to cities as well as the structure of society that was reformed by the sciences and industry have been effective in structuring of museums in terms of education (Akmehmet and Ödekan, 2006).Being inspired by such large museums opened in Europe, many museums of similar size have been opened in Japan, China and North America.

As mentioned before, the museology started with collecting in the Ottoman Period as in other countries. The works mostly included heirloom artifacts, contraband of war, or treasures (Pasinli, 2002). An actual start of museology in Turkey was with Mecma-ı Asar-ı Atika that also formed the origin of Istanbul Archaeological Museums.The Sultan Abdülmecit ordered to transfer the East-Roman inscriptions, which he saw during his trip to Yalova in 1845,to Istanbul. He then collected those inscriptions in Hagia Irene that was used as a warehouse of guns then by Ahmet Fethi Paşa, a Statesman of Ottoman, in 1846 (Turkish Ministry of Culture and Tourism, 2020).That museum was arranged in two parts: Mecma-i Eslihai Atika and Mecma-i Asar-ı Atika. Mecma-i Eslihai Atika that was established before formed the foundation of Harbiye Military Museum.

When it comes to museology, it is considered that the major contribution was made Osman Hamdi Bey both in this area and the area of archeology. Especially, upon discovery of the Tomb of Alexander, twenty tombs transferred with that tomb become too large to fit in the Tiled Pavilion after a while (Dilbaz, 2016).Therefore, many tombs were placed into the wooden crates for the purpose of protection, and then Osman Hamdi Bey's attempt to build a new museum began. This museum is the main building of the Archaeological Museum that is now called Istanbul Archaeological Museums. In the same period, new museums were opened in Bursa and Konya as well, and many excavations were carried out by Osman Hamdi Bey. The excavations carried out by Osman Hamdi Bey in Mesopotamia, Syria, Palestine and Anatolia allowed to bring a large number of important works to Müze-i Hümayun, leading the way for Turkish archeology (Günaydın, 2008).

By the Republic Period, Atatürk ordered to gather the museums under a single roof under the Directorate of Culture by the decree of Atatürk concerning “Instruction on the Museums and Âsar-ı Âtika”, also many circular letters were issued to collect and gather works of archeology and ethnology together (Turkish Ministry of Culture and Tourism, 2020). Additionally, Atatürk ordered to open a “Hittite Museum”, then Kurşun Han and Mahmut Paşa Bedesteni were repaired by the Ministry of National Education in 1923 and reopened as Archaeological Museum. However, the museum was renamed as Museum of Anatolian Civilizations in 1967 based on the diversity of museum. In 1924, Topkapı Palace was repaired quickly upon request by Atatürk, and has been reopened to visitors with collection available in the Palace.

The museums can be grouped by their type, status and authority applicable to that museum. However, the most ideal grouping can be made by the collections contained in the museum. In the world, the museums are usually grouped as Art Museums, History Museums, Anthropological Museums (Archeology, Ethnology and Folk), Nature History Museums, Museums of Sciences and Industry, and museums for various expertise branches (e.g., glass, tobacco, wine, health, etc.)

Another classification groups Turkish museums and monuments as History and Art Museums, Archeology and Ethnography Museums, Archeology Museums, Ethnography Museums, Monument Museums, Museum Houses, Revolution Museums, Military Museums (it would be appropriate to add museums concerning our War of Independence to them), Private Museums and Open Air Museums (ekitap.ktb.gov.tr). There is a total of 465 museums in Turkey: 205 are operated under the Ministry of Culture and Tourism and 260 are operated as private museum supervised by the same ministry (kvmgm.ktb.gov.tr)

NEW APPROACHES IN MUSEUMS AND MUSEOLOGY

A museum is not just a building or collection. A museum collects things but it is not a warehouse, a museum protects but it is not a deepfreeze, a museum collects and classifies documents but it is not a library, and a museum educates but it is not a school. Today, a museum is a research center, an open university, or an institution of education and culture due to tasks put on them where any members of any family can have fun and learn and where learning can be something to enjoy (Atagök, 1999a: 131).

For long years, the societies did not give due importance to museums and cultural assets protected in magnificent buildings because first they refrained from the sacred sovereignty of buildings, because their priority was not to see such valuable collections, or because they did not believe they had right to see them. However, the events, which were mentioned in the beginning of 20th century and especially carried out in 1950s, allowed to add a new dimension to the museum-society relationship (Atagök, 1999b: 143).

The functions of a museum are to exhibit and educate as well as collect, protect and document. The responsibility of museums is primarily for the collections in the last three of these functions, but exhibition and education concern the people. Such responsibility requires to divide the building into two parts in the design: public spaces and non-public spaces. The spaces include Introduction (reception) that is directly related to visitors and guides; Cultural, Educational and Social Services spaces, and Exhibition spaces (Atagök, 1999c:75). The place should guide the visitors in their tour in the museum, make their tour liquid as much as possible to avoid returning the same route, and allow them to complete their visit without obstacles that cannot be overcome. The museums, as an institution,

should allow visitors to safely walk around in the place without feeling bored or worried about getting lost, and provide an environment of confidence (Erkün Oruçoğlu, 1999: 184)

USE OF TECNOLOGY IN MUSEUMS

In these times where digital technology has spread so much, the museums would surely be affected by it. So, the museums have started to use technology both in their administrative functions and exhibitions. The conventional animation methods, use of mock-ups and dummies, and virtual reality created by the digital technology used for the exhibitions alone have been discussed by the museologists both in the scientific studies and in different environments. It is also very important for the museums to provide service, adhering to context of museum and without becoming similar to Disneyland, a popular entertainment center in the United States.

Although the primary purpose of museum exhibitions to draw attention of audience to the object, the multimedia tools allow to create a physical and spiritual space for the visitors. The museum constitutes the most important element of cultural area in the information age. The museums have become an education, cultural and communication institution or have been included in the city and tourism culture and have been successful even in the setting of free economy in line with the demand and needs arising from the social, communal and cultural transformations. The museums that have adopted the modern museology approaches become a successful institution as a result of an ability to recognize the requirements and comprehend anything with foresight (Yücel, 2012)

The museums benefit from the today's technology including video-vision and multi-vision shows; advanced display techniques and equipment such as panorama, cyclorama and global applications, and play an active role in the modern education. The modern applications play an active role in learning and perceiving anything by the audience (Yavuzoğlu Atasoy, 1999).

Virtual Museums

Before mentioning the technologies used in a museum, external technologies should be discussed in general. The most notable example would be the Virtual Museums. The concept of Virtual Museum does not have a clear definition, but online museum, electronic museum, hyper museum, digital museum, cyber museum and web museum are all an example of Virtual Museum. They constitute a database that is digitally provided on the internet (Holdgaard, 2011). The website of many museums provides pictures and videos of that museum and information on the works displayed there. The virtual museums can also be followed on the social media. The first thing coming to mind when somebody talks about a virtual museum is a museum that can be visited on the virtual environment. Although the primary concern of museums has been to display tangible works and provide information for long years, the museums have recently started to serve as a library or archive besides a museum tour, so there is a new fact encountered in terms of acquirement of information (Schweibenz, 2019).

According to Veiga(2013), increased use of websites and social media for museums in the last two decades has raised the question if it would replace the physical museums someday. Although this has been actually discussed from the very first days of photography, this could not avoid the urge to physically see an object, on the contrary, seeing them on the digital media increase the desire to actually see them. In this respect, digitalization could

also serve as a bridge to reality. Currently, many large museums provide a digital museum service. Examples include Louvre Museum, British Museum, Guggenheim Museum, Orsay Museum, Pergamon Museum, and Van Gogh Museum. Examples in Turkey include Istanbul Toys Museum, Rahmi Koç Museum and Panorama 1453 History Museum.

Interactive Museums and Visible Examples of Technology

Interactive museums have become important, particularly in our age. The definition of interactivity can include displays in the museum, 3D environments or environments animated by projection, and even the games that can be played in a museum. Thus, interest of next generation in museums and opportunity to learn something can be increased.

The typical objective of interactive museums is to teach with fun. The way to do this is not only to see an existing work, but also allow visitors to build a physical link to such work. Examples of this are pushing by the visitors the buttons around the museum in order to acquire some information, or viewing the works they want to have information about in the digital displays. In this respect, interactivity allows visitors to learn in a wider scope than an exhibition can provide (Haywood and Cairns, 2006).

So, the new museums in particular have started to use interactive contents more (Haywood and Cairns, 2006; Gammon, 2003). However, according to Hume (2015), although the museums with many facilities for interaction are quite attractive for the families, young population and children, it is observed that elderly seems more timid in the museums that provide such interactivity facilities in the digital setting in particular. In addition, according to Haywood and Cairns (2006), excess interaction facilities in the museums could cause visitors to spend more time on them instead of acquiring information. The commonly used technologies in the interactive museums include:

- **Kiosks and Touchscreens:** There is no exact Turkish word for kiosk, however, it is defined as *a small store that is used to provide information, show advertisements or provide services generally via a computer screen in a public space* (Oxford Dictionary, 2020). The touchscreens have become an integral part of today's museums.

According to Burmistrov (2015), the visitors of museums usually busy themselves with such objects when they have the chance of interaction. In addition, the research on the learning of visitors suggests that interactivity allows for a better understanding of contents. The visitors using digital tools appear to spend more time in the museums as compared to those who do not use such tools. Therefore, increasing the number of kiosks also plays an important role in especially attracting the rising generation who has no interest in museums.

According to Vaz et al. (2018) however, since the museums aim at learning as well as providing social interaction between people, such kiosks are also claimed to limit the social communication between people. Thus, there are opinions that number of kiosks more than the number of museums would have negative impacts on the people's communication. One of the problems with kiosk is that visitors have to await their turn to use the kiosks, which hinders the purpose of kiosks to provide guidance.

- **Projections and Audio Guides:** Poyraz (2019) states that the mission of projections to display is to provide sub-images (such as figures of historical persons) associated with general information flow. The projections create a three-dimensional environment using the hologram method in many museums and are used to provide visitors with a visual

interaction. A projector is one of the devices that is often preferred by the museums to tell a story in particular.

The audio guides are the most widely used devices in the digital guiding applications, but particularly used for museums, exhibitions, congresses and many more (Harmankaya, 2010). An electronic audio guide allows for a better understanding of visited historical places, museums and exhibitions. Currently, the audio guides can be listened by downloading the guiding application (if any) of visited place on the smart phones. It is typically preferred by visitors that travel alone and want to see the materials displayed in the museums with the information about them.

- **Virtual Reality and Augmented Reality Technologies:** Today, interactive museums have technologic initiatives that have yet been used or are intended to be used. One of the most important ones is the Augmented Reality technology. The Augmented Reality is the simultaneous integration of physical world into virtual world with the purpose of having them in the same frame (Taşkıran, Koral and Bozkurt, 2015).

This term was first suggested in 1990 and initially used for the trade, television, and military. However, development of internet and smart phones has caused the augmented reality technology to surface again and it has mostly become interaction with smart phones. In the augmented reality, the 3D models are reflected on the physical media and combined in real time. Various applications of augmented reality affect the habits, social life and entertainment industry (Kovach, 2020). Use of augmented reality now is considered an important tool, and especially providing this technology in the museums and trips would allow to easily visit and learn about such places without causing damage to works and historical ruins (Akkuş and Akkuş, 2017). Examples of use of augmented reality in the museums include projection of animated version of fossils on the screen in the Florida Museum of Natural History, or viewing fossils of animated dinosaurs on the screens of museum in the Swedish National Museum of Science and Technology (<https://artsandculture.google.com/partner/tekniska-museet>).

The Virtual Reality has started to gain a significant importance in coordination with Augmented Reality. The Virtual Reality allows users to directly experience a place created on the computer environment in three dimensions. Such environment may be interactive or a 360-degree video. The virtual reality cuts the connection of users with the real world and integrates users with virtual world alone. The Virtual Reality is now especially used to generate museum tours, make exhibitions interactive, or make scenes actual (Coates, 2020)

Because it was difficult to see Mona Lisa in the Louvre Museum, the Virtual Reality glasses allow to view this work of art closely. The Virtual Reality is considered to be useful if used in combination with the augmented reality in order to reanimate the historical places again, and discover and experience such places by people (Carlsson, 2020). For example, the Smithsonian American Art Museum lets visitors to experience the works of art through the virtual reality glasses.

Although these two concepts are similar to each other, the major difference between them is that virtual reality allows users to only interact with a world created in the digital environment, and the augmented reality allows users to witness the interaction between the virtual world and the physical world (“Augmented Reality vs Virtual Reality: What’s the Difference?” 2019)

The holograms are now used in many museums, but their area of use is considered to extend further in the future. This technology that is used on the holographic displays and in

the application systems would be reflected as 3D in the real world using mirrors (Pietroni et al., 2019). Pietroni et al. (2019) are of the opinion that this would avoid damage to historical artifacts in particular and allow people to view the works in 3D.

EXAMPLE OF TECHNOLOGIES USED IN THE MUSEUMS

- **The Louvre Museum – Guide for Nintendo 3DS:** There are examples that a game console is used for something other than games. An example would be “Oculus Rift” (the virtual reality glasses) that has considerably affected the game world in the last years. These virtual reality glasses, which were initially developed for the games, are now used by the automobile companies in the design of cars (“How will virtual reality change our lives?”, 2016).

Figure 1. The Louvre Museum, example of use of Nintendo 3Ds



Kaynak: <https://www.louvre.fr/en/museum-audio-guide>, 2020

Before that, the portable Nintendo 3DS game console, released in 2011, sold 75.71 million units and was considered by the Louvre Museum to be a good guiding tool, therefore, the device was loaded with a map that would be helpful to be a guide for the Louvre Museum, an audio guide and information on the works that can be read (Mongodin, 2019).

This digital guide contains more than 30 audio narrations in seven different languages (English, French, German, Spanish, Italian, Japanese and Korean), more than 600 works of art and more than 400 pictures of the museum. This guide can be purchased and used by a Nintendo account (“Nintendo 3DS Guide Louvre”, 2013).

- **The British Museum – Augmented Reality Project:** In coordination with the Virtual Reality discussed before, the British Museum especially targets the children under 18 years of age and has provided a new application for the smart phones and tablet computers by the help of Samsung in order to use the “Augmented Reality” technology. This application was designed to gamify some things during a museum tour with the purpose of teaching the young people. This application called “A Gift for Athena” and first launched on Samsung Galaxy Tab 10.1 assigns certain tasks to players, asks them to find particular artifacts in the museum, and provides information on those artifacts (Anderson, 2014).

Especially after the games such as Pokémon GO have become popular, it is considered that Augmented Reality technology would become more important for the museums as well.

According to Coates(2020), there are many advantages to use augmented reality in the museums. For example, it would be possible to acquire more information using the phones during the exhibitions through the augmented reality. In addition, augmented reality would animate and reflect the objects or scenes on the display of phones or tablet computers, allowing users to have a 3D experience.

Figure 2. The British Museum, Example of Augmented Reality



Kaynak:<https://indeliblepieces.wordpress.com/2014/08/20/news-british-museum-rolls-out-augmented-reality-games/>, 2020

- **The Victoria and Albert Museum – Touch Table:**The Victoria and Albert Museum is one of the most visited museums in the United States, and its management has recognized the importance of acquiring information by touching, therefore, it deems appropriate to touch certain works to acquire information (Hoskin, 2014).The digital tables located in the furniture section of museum offer a different way to introduce materials. The materials are placed on the digital tables, and when the visitors touch those materials, some information is displayed on the screen about those materials.

The interaction is achieved by the heat resistant sensors embedded in the materials. The sensors reflect what they detect on the primary screen, i.e., the table, by means of specifically designed and manufactured PCBs and an Arduino microcontroller. So, the visitors both feel the structure of the material they touch and read its information on the screen (“V&A To Unveil New Furniture Gallery”, 2013).

Figure 3. Example of VAM Touch Table



Kaynak: <http://chrismullany.com/projects/v-a-furniture-gallery-interactive-tables>, 2020

- **Taipei National Palace Museum – Asia’s Largest Interactive Wall:** The National Palace Museum is one of the most visited museums of Taiwan and built the Asia’s largest interactive wall of 12 m on 27 May 2020 for the visitors to have an interactive experience. This wall allows visitors to select, drag and scroll many images, videos and animations at the same time through a sensitive, user-friendly interface and infrared sensors, and is able to read more than 300 works. Visitors are able to virtually review the works of art as well as visit the original collections in the museum (Tzu-ti, 2020).

Figure 4. Asia’s largest interactive wall



Kaynak: www.taiwannews.com.tw/en/news/3941035, 2020

- **Zeugma Mosaic Museum – Interactive Mosaic Pool:** The Zeugma Mosaic Museum, the largest one of mosaic museums located in Gaziantep, was designed by the Etkivizyon system in cooperation with Reo-Tek operating in ODTÜ Teknokent in order to animate the use of water mosaics in the old times. The water mosaics were found in the pools (where rainwater was accumulated) located in the center of Roman houses. The pool was designed with an interactive hologram. The water moves with the movements of visitors and augmented reality contains fish and leaf effects, etc. The artificial intelligence was integrated to get the effects, and the fish scurries around with the movement of visitors (“Technologic revolution in the journey of history”, 2020).

Figure 5. Interactive Mosaic Pool

Kaynak: <https://muze.gov.tr/muze-detay?SectionId=GZN01&DistId=GZN>, 2020

- **Corum Archaeological Museum – Chariot Simulator:**As in the Zeugma Mosaic Museum, the Çorum Archaeological Museum developed a cart simulator in cooperation with Reo-Tek. This simulator allows visitors to have a tour by a Hittite chariot in Hattusa, the capital of Hittite Empire. The visitors are able to control the chariot and see Hattusa in the old age in the virtual environment as soon as they get on the chariot and grab the bridles. The visitors come across the monks, local people, military men, specific animals and plants as they ride the chariot on the roads of the city so they can experience the atmosphere of the period(Kılıç, 2018).

Figure 6. Chariot Simulator

Kaynak: <https://www.reo-tek.com/corum-arkeoloji-muzesi>, 2020

- **TroyMuseum – Projection and exploration boxes:**The Troy Museum is one of the museums that is rich in interactive technology. It provides many interactive opportunities. It displays the lifestyle of people lived in the antique age in a specific story through many different interactive ways including pictures, photographs, drawings, interactive screens, and videos.

Figure 7. Troy Museum, Projection Section



Kaynak: <https://www.kulturportali.gov.tr/portal/troya-muzesi>, 2020

Besides, there are exploration boxes that describe the works or names in a simple way for the purpose of teaching children. According to Korkmaz (2019), the Troy Museum contributes to knowledge of visitors due to its advanced level of visual technology and ensures that information provided is understandable and catchy.

Figure 8. Example of Puzzle



Kaynak: <https://www.kulturportali.gov.tr/portal/troya-muzesi>, 2020

CONCLUSIONS AND DISCUSSION

Currently, the museums are no longer a place where a group of people visits to see any art of work, but they are places where people also have fun. Especially, the steps taken in the interactive museums show that the museums endeavor to maintain the visual quality and interactive learning at a higher level. The research on the area of education suggests that the millennium generation (born between 1989 and 2000) has an attention span of 12 seconds whereas Z generation (born between 1996 and 2010) has an attention span of eight seconds (Nicholas, 2020; Sparks & Honey, 2017). Therefore, most of the technologic

innovations adopted by the museums is considered a marketing method to draw attention of rising generation not to make learning easy.

According to Millennial Marketing (2020), the millennium generation has a positive approach to museums and considers museums quite important. But despite this, they allow only a little time for the museums. For this reason, it is recommended to improve interactivity in many more museums, organize interesting events to allow young people to experience special moments, promote museums on the social media, and find ways to encourage them to visit a museum such as “Museum Day” in order to increase the rate of visits to museums. This is proven by the actions taken by the museums in technology, as detailed before.

On contrary to the Millennium Generation and Z Generation raised in the digital age, the research conducted by Hume (2015) suggests that although the interactive museums and digital guides play an important role in learning of rising generation, the elderly has hesitations about the new technologies and tends to avoid places where kiosks or displays exist. According to Hume, although the rising generation finds learning by technology interesting, most of the time young people are interested in such devices for spending time not for learning. In addition, Hume suggests that continuous maintenance and storage of technologic devices would be a waste.

The technologies used in the museums are mostly about the interactivity, and this shows that the perception “learning by playing” has occurred in the museums. Nintendo 3DS was primarily developed as a game console, but now is used as an audio guide in the Louvre Museum and this can be an example of this. The Virtual Reality glasses, which were primarily designed to make games more realistic, will be started to be used in the museums as well (Coates, 2020). Therefore, it would be useful if the game companies and museums worked together in the future (Naskali, Suominen and Saarikoski, 2017).

Regarding the technology used in the museums, it is not impossible to use augmented reality and audio guides in the archaeological sites and important destinations in the future. So, the profession “tourist guiding” is also considered to be affected. According to Yıldız(2018), technologic guides would reduce the need for tourist guides in the future. But despite this, since there is a little chance for a robot guide that is able to talk, describe or guide as an actual tourist guide, it can be said that this assertion is not so true. However, there is an opinion that tourism would evolve from the collective travels to individual travels because of the pandemic we have been through (Kiesnoski, 2020). For this reason, it would be helpful to develop audio guides in many different languages for the museums in Turkey. Besides, improvement of virtual museology by the museums through their own websites and social media would allow museology to reach more and various people. Since there are many museums mainly housing archeological finds in Turkey, it is unavoidable that museums would increase their interactive applications in the future in order to attract rising generation in particular. Use of augmented reality system in the British Museum in coordination with smart phones and in more effective way in the museums in Turkey would be significant to have a quality time in the museums.

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