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Virtual Museum. Museum of the Future?

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Abstract

The following article discusses examples of museums that implement virtual reality in presentations of exhibits and museum objects. Trends that shape contemporary museums are discussed. The aim of the article is to familiarise the reader with the possibilities of modern applications in museum exhibition presentations.

Keywords: virtual museum, new museology, virtual reconstruction, virtual reality, VR applications, VR goggles

1. Introduction

Technological and information development generates progress in every area of life, and this includes museology. Museums have performed various functions for years – as collector's, as research and educational facilities, and as entertainment attractions. The change in the function of museums results from different degrees of society's development, its needs and the level of knowledge, education and age (Borusiewicz, 2012). What requirements does society set for a contemporary museum in the age of the Internet and the general availability of information?

"A museum is an non-profit institution, serving society and its development, it is publicly available, which conducts research on the testimony of human activity and human environment, has collections, preserves and protects them, makes them available to people and exhibits them, conducts educational activities and serves entertainment" – this is the definition by Georges Henri Rivière adopted by ICOM and UNESCO (Folga-Januszewska, 2008).

The Faro Convention (2005) adopted by the European Union has had an impact on the man-monument relationship. Man has become more important in this relationship. The modern presentation of monuments will have to meet the requirements of the modern society. Presentation techniques will follow modern technology (Sroczyńska, 2012). In 2008, the *Charter for Interpretation and Presentation of Cultural Heritage Sites* (ICOMOS Canada) was accepted. The employees of the Ename Center for Public Archaeology and Heritage Presentation (Belgium) worked on the document (Sroczyńska, 2015). The research team presented "seven cardinal principles, upon which Interpretation and Presentation – in whatever form or medium is deemed appropriate in specific circumstances – should be based.

These principles are as follows:

1. Access and understanding,
2. Information Sources,
3. Attention to Setting and Context
4. Preservation of Authenticity,
5. Planning for Sustainability,
6. Concern for Inclusiveness
7. Importance of Research, Training, and Evaluation" (Sroczyńska, 2015).

"Following these seven principles, the objectives of Interpretation and Presentation of Cultural Heritage Sites were drawn.

These objectives were:

1. Facilitate understanding and appreciation of the heritage,
2. Communicate the meaning of cultural heritage,
3. Safeguard the tangible and intangible values,
4. Respect the authenticity,
5. Contribute to the sustainable conservation,
6. Encourage inclusiveness in the interpretation of cultural heritage sites and finally,
7. Develop technical and professional guidelines for heritage interpretation and presentation" (Sroczyńska, 2015).

"The concept of new museology and ecomuseum is understood as a new formula of a regional museum institution dispersed in a spatial sense but integrated territorially, accepted and supported by conscious actions of local communities interested in using heritage as a fundamental value in local or regional sustainable development projects" (Kadłuczka, 2015).

New Museology (Vergo, 1989) is a trend striving to depart from the traditional form of museology. Technological and information progress has an impact on the presentation method and the type of museum exhibits. According to *new museumology*, the development of museums consists of: "going from orientation to museum objects to orientation on society, broadening the concept of a museum object, changing the ways museum

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objects are presented, striving to protect and present monuments in situ, decentralizing the concept of a museum – instead of one building or museum complex, network systems are created, a museum as an organization combining various types of collections dispersed in the field, rationalizing museum management – a museum from an institution subsidized by the state or other sponsors turns into a quasi-market enterprise. «Musealization» of commercial and cultural facilities" (Idziak, 2003). The new approach presents the possibility of protecting museum objects not only by collecting movable exhibits. An object of a presentation does not have to be tangible, it can be an idea. An example is the Plato Digital Museum in Athens. Despite the lack of physical exhibits, the museum protects cultural heritage and influences public knowledge (The Plato Digital Museum was established at the Plato Academy, Athens, Greece. The Plato Academy also presents exhibits in the traditional form-author's comment). Contemporary museums, in addition to caring for monuments and cultural heritage, must also take care of the human being – the recipient. Providing high-quality presentation of the museum facility and its accessibility is as important as its physical protection. Public interest in the museum building affects its protection. Changes in the management of a modern museum are necessary due to the socio-political changes that have taken place in the last few decades. An effectively managed museum should act as a self-sufficient enterprise, be customer-oriented, competitive, use the latest technological solutions and meet its function, namely the protection of cultural heritage.

A virtual museum is a museum that uses modern information and communication technologies to present museum collections. A virtual museum has also been defined as "an integrated cognitive system, i.e. a generally available interactive collection of comprehensive 3D representations or copies of monuments created using computer methods" (Bentkowska-Kafel, 2012). A virtual museum "is a digital unit that shows the features of a museum to complement, improve or extend the museum's experience through personalization, interactivity and richness of content" (Hazan, Hermon, Turra, Pedrazzi, Franchi, Wallergard, 2019).

We can distinguish two types of virtual museums:

- virtual museums available only online,
- virtual museums operating online but expanding the offer of a traditional museum.

In museums that are only virtual, we can collect exhibits from various places and different museums, and we can build exhibitions that most likely would have never been created in the traditional form. A virtual museum can consist of exhibitions created from scratch or be designed around one strictly defined topic or object.

"Closer to culture. The digitization of representative collections of one of the oldest and largest museums in Poland – the National Museum in Cracow for e-culture and e-education" is the full name of the project implemented by the National Museum in Cracow, with the help of European Funds (Digital Poland and the European Regional Development Fund). The aim of the project was to provide digitized collections online. The project implementation cost was PLN 9 million, and the implementation period was three years. The implementation period was from October 2016 to the end of September 2019. This museum is a representative example of a Virtual Museum expanding the offer of a traditional museum. NMC hopes to achieve long-term benefits such as increasing the knowledge on resources of users who are not able to view exhibitions at a stationary museum; increasing the access to NMC's collections; providing collections that are not presented in a traditional museum; promoting Polish cultural heritage in the country and abroad; developing the tourist and educational industry. Digitised exhibits include high resolution photos, exhibits' names, dates and places of creation, dimensions, and information on techniques and methods of creation, depending on type.

Google Arts & Culture is a project that provides online access to high-quality photos, 360-degree panoramas and virtual walks presenting works of art of partner museums. Google Arts & Culture presents, among others, museums such as MoMA The Museum of Modern Art, New York, United States; British Museum, London, United Kingdom; Van Gogh Museum, Amsterdam, Netherlands. Thanks to Google Arts & Culture, in Poland we can watch works, from museum including the National Museum in Cracow, the Jewish Museum in Oświęcim, the National Museum in Warsaw, and the Warsaw Uprising Museum. In total, thirty objects are presented in Poland using Google Arts & Culture, ninety six in Germany, eighty in France, zero in Iran and Iraq.

Following the traces of the *European identity of Krakow. The Underground of the Main Square of the Cloth Hall* is a tourist route through the underground of the Main Square in Krakow, financed by the Office of the Municipality of the City of Krakow and the European Union. The underground exhibition is open to the public and presents knowledge about Krakow and its buildings as well as the everyday life of its inhabitants. The project of the Underground Market in Krakow also presents virtual reconstructions of Krakow's monuments. „The educational films based on the results of scientific research, digitization of collections allowing direct access to sources, and in situ exhibition with the audiovisual system presenting authentic monuments have become an example of the integration of the «old», found world shown in the «new» space using the latest technology" (Kadłuczka, 2015). The museum is located underground. While creating the project, presenting monuments and artifacts of the past was the priority, not the form of the museum itself as a building. Illumination plays an important role as it highlights the most important elements of the exhibition, including relics. The creation of the interior of the museum allows the user to delve into the history of the oldest Krakow. Above the exhibition, there is a stretched "barissol" ceiling which, thanks to its mirror image, shows artifacts from several different planes. The space filled with darkness is lit up by illumination, presenting authentic fragments of medieval architecture and archaeological objects of everyday use. The exhibition is supplemented with multimedia devices for the projection and presentation of virtual reconstructions (Kadłuczka, 2015).

The American Museum of Natural History (AMNH) is the world's largest museum of natural history. The museum complex is located in Theodore Roosevelt Park, New York. It consists of twenty-eight interconnected buildings, forty-five permanent exhibition halls, a planetarium and a library. The museum collections contain thirty-three million specimens of plants, animals, meteors, fossils, human remains and cultural artefacts. These collections are so numerous and only part of them is presented in exhibition halls. AMNH also presents its exhibitions in the form of virtual paths thanks to which we can go through the museum's exhibition halls. In 2019, The exhibition entitled *T.Rex The Ultimate Predator* was created. Museum visitors can see this exhibition using virtual reality. The project was created by the museum's science visualization, Vive Studio and Warsaw VR/AR Studio Immersion. In the application, three person teams build the T.Rex skeleton bone by bone, after completing the task, the dinosaur transforms into a virtual beast. The T.Rex Skeleton Crew exhibition was launched in the summer of 2019. It is available online outside the museum using viewport by the global company named HTC Vive. This museum is one of the most modern examples of traditional museums, offering presentations of online exhibitions in the form of virtual tracks and applications using virtual reality.

Hintze Hall, NHM (Natural History Museum) London is a natural history museum with collections of great historical and scientific value. These collections include a total of about eighty million items from five main collections: botany, entomology, mineralogy, palaeontology and zoology. ‚Hold the world', a project made by Sky VR Studio, presents the most important museum collections, including those not available to visitors on a daily basis. Your guide during

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the virtual tour is Sir David Attenborough. The virtual exhibition can be viewed using VR goggles and controllers. Sir David Attenborough has been digitally reproduced and is presented as a realistic 3D hologram. The museum specimens have been scanned in high resolution, 3D models and animations with which the user can see the object up close, manipulate it and see its movement, have also been prepared. This exhibition is very popular among visitors of all ages.

The interior of the museum is also available online, outside the museum, at Sketchfab.com. The author of the scan and the 3D model of the museum is Thomas Flynn. You can download the museum's 3D model from the site, this is an unofficial scan, not authorized by the museum. An older version of the museum is also available at Google Arts & Culture.

"Virtual museums – despite using a «meta-object», or rather its digital reproduction, sometimes even digital objects created for their own purposes – can fulfil all the functions listed in the definition of museums cited above. [...] digital objects have also become collector's, scientific and educational materials, and what is more – they require conservation, only based on other technologies" (Folga-Januszewska, 2008).

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