

Aesthetics of Virtual: The Development Opportunities of Virtual Museums in Indonesia

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Abstract

The Covid-19 pandemic requires us to carry out physical and social distancing. It is undeniable, this also has an impact on government policy to close tourist destinations, including museums. Currently, the sophisticated 3D visualization technology provides the potential for the development of virtual museums. The virtual museums were developed for giving experience of the visiting museum in digital world as a distance learning. This application can provide immersion through interactivity while exploring virtual museums. Basically, this article explains the aesthetic investigations in some virtual museums. The researchers describe the aesthetic of each sampled virtual museums projects. The literature synthesis of several virtual museums projects is expected to be able to give an idea of the potential development of virtual museums in Indonesia. The aesthetics of virtual elements could be used as recommendation for museum conservator for development of prospective Indonesian virtual museums. Furthermore, the aesthetics of virtual in digital museums provide opportunities to present virtual museums exploration experiences.

Keywords: *virtual museums, aesthetics of virtual, Indonesian museum, virtual experiences*

INTRODUCTION

Indonesia has a variety of historical and cultural heritages to be proud of. A means is needed to store historical or cultural heritage so that the nation's future generations can inherit it. Museum is one of the tourist objects to add insight and knowledge in which there are objects of cultural heritage of the past. The function of the museum is to collect, record, maintain, and exhibit collections for the purpose of developing insight, knowledge, education, and research sources for the general public (Direktorat Museum, 2009). Conventional museums require visitors to come directly to the museum in order to explore cultural relics of the past. The presence of visitors is an important point to feel the aesthetics when exploring the museum to bring memories of the past.

The outbreak of the Covid-19 outbreak in Indonesia has brought many changes to people's behavior. Previously, the community was free to carry out activities outside the home, but with this pandemic, people are in a condition of physical distancing in accordance with recommendations from the government. This has become a new life activity in the community by getting used to doing online activities. In addition, the covid-19 pandemic resulted in the closure of tourist attractions in Indonesia by the government, including museums. Of course this is a challenge for museum management to overcome this problem if this pandemic runs for a long time. One of the most relevant solutions is to utilize technology so that people can still enjoy museum exploration even though they are in their respective homes.

Technological developments through increasingly sophisticated 3D visualization provide the potential for the development of virtual museums, especially in Indonesia. In foreign countries, many virtual museums have been developed. The objectives of developing a virtual museums vary, according to the needs of the museum. One museum in Germany that has developed a virtual museums is The Imperial Cathedral in Königslutter. This museum creates virtual reality using 360° 3D visualization with the concept of Panoramic Photography to provide deeper interactivity facilities for users to explore real spaces in the virtual world (Walmsley & Kersten, 2020).

Based on some literature, the development of virtual museums abroad focuses on artifacts and the integrity of the museum both in terms of visitor experience and exhibitions. Previtali (2019) shows one example of a virtual museums development that focuses on artifacts, namely The San Clemente Site In Albenga (Italy). The virtual museums developed by the museum manager aims to increase awareness of the vulnerability of archaeological sites. The concept used by this museum is the development of virtual notebooks, which can be used by experts and tourists to access virtual site information.

In an art museum, the development of the digital world is able to change the perspective of artists to express their art forms through exhibitions in new ways in accordance with the development of the digital world. Some museums have designed virtual exhibits to make visitor reach wider and more accessible. By leveraging technology, works of art are starting to take advantage of artificial intelligence (AI) in facing new challenges in the future by presenting new ways to view art (Giannini & Bowen, 2019). Virtual museums are able to overcome the limitations of physical space in exhibiting museum objects. Empler (2018) said that virtual museums are able to present exhibition spaces with deeper routes, content and approaches through virtual spaces that have been designed.

Virtual museums in its application can take advantage of augmented reality technology. Augmented reality is used to create an augmented heritage designed in the form of a video that is applied to classical performance spaces. This concept brings back cultural heritage that is considered classic using technology so that it can attract the attention of the younger generation (Maniello, 2016). The aim of this design is to explore the potential for debate between space, technology and narrative structure. The visual structure supports sound and vice versa, where "a plurality of technological and communication devices is available". Augmented reality presents a new experience for users to still enjoy museum objects even though they don't have to be in direct contact. This is able to generate immersion for each visitor to present a new meaning for each individual.

Technology is able to make it easier for the next generation to obtain information and enhance cultural experiences regarding past objects that become cultural heritage. One of the basics of developing a virtual museums is the physical limitations in accessing information about objects. The presence of a virtual museums using the concept of virtual reality is able to provide users with real experiences regarding the historical experience they want to see. This concept invites visitors to enter into a virtual world and create their own interactive stories. Hereniko (2018) emphasizes that the focus of the virtual museums is not on the object but rather on the created of memories, feelings, and emotions. The development of virtual museums does not mean eliminating physical museums because basically the presence of virtual museums is not a competitor for physical museums. However their presence can complement each other, things that cannot be realized in a physical museum could be exhibited in a virtual museums and vice versa (Gutowski, 2019). Some museums design virtual museums to attract visitors. The need for information on historical artifacts cannot be fulfilled in a physical museum. With the virtual museums, information about historical artifacts can be described in more detail so that it can meet the information needs needed by visitors. The interaction made by visitors will leave a deep experience of the museum.

MATERIALS AND METHOD

This study employs literatures review and existing projects interpretation uses MDA approach (Hunicke, LeBlanc, & Zubek, 2004); (LeBlanc, 2004). According to MDA approach, the authors will describe each component, such as mechanics, dynamics, and aesthetics for existing projects. The mechanics describes tool requirement (hardware and software). The dynamics explains interaction and play experiences. The last, the aesthetics depicts sensation that users felt by their sensory and kinesthetic trigger. By observing the existing virtual museum projects, the

authors make a list of MDA approach for each project. The following step, the authors conduct synthesis as a figure out for investigating potential opportunities for virtual museums development in Indonesia.

FINDINGS

There are five virtual museums (VMs) projects that used for interpretation. Those projects were developed in Germany, Italy, Netherlands, and England. Table 1. below indicates the MDA approach through five VMs projects.

No	Name of project	Mechanics	Dynamics	Aesthetics
1	The Imperial Cathedral in Königslutter, (Walmsley & Kersten, 2020)	- 360° panoramic images generator (PTGui) - Riegl VZ-400, Zoller + Fröhlich IMAGER 5006 laser scanner - AutoCAD, Autodesk Maya, UE4 game engine - HTC Vive Pro (VR headset)	- Interactivity environment, switching between digitized environment and captured real environment - Freedom to make exploration - Scenario: explore the cathedral - https://www.koenigslutter-kaiserdome.de/virtuelleTour/tour.html	- Realistic 3D visualization - Free to move - Feel inside the cathedral
2	The San Clemente Site In Albenga (Italy), (Previtali, 2019)	- 360° panoramic images generator - TLS and UAV equipment - WebGL, OpenGL - Oculus Rift, HTC Vive	- Various combinations of photographs and 3D visualization with informative contents - Scenario: explore the site - Archaeologists and practitioners → interactivity in Web (Desktop) - Tourists and citizens → interactivity in Web (mobile)	- Realistic 3D visualization - Get historical information
3	Batavia 1627 in Virtual Reality (Westfries Museum Netherlands, https://wfm.nl/batavia-1627vr)	- VR headset - 3D Blender software	- The narrative is linear - Scenario: explore the surrounding environment of Batavia in 1627 (Sergeant, 2020) - Intersections between pedagogy, art, and technology, and influences socially and politically - Interactivity using VR headset	- Realistic 3D visualization - Feel flying

4	Viking VR, (Schofield et al., 2018)	- Android smartphone with handmade VR cardboard, including plastic lenses - 3D Blender software	- Scenario: designing a VR experience to form part of Viking's life - Engaging with a particular historical event in Torksey	- Realistic 3D visualization - Capturing the harshness of the climate, its effect on the culture and lifestyle of the period
5	Geguti Palace in Kutaisi, Georgia, (Ferrari & Medici, 2017)	- Geomax Zoom 300, NCTech iStar 360, Samsung WB690 - X-PAD Office FUSION by Geomax, - 360° panoramic images generator - Portable HMD - Android smartphone with handmade VR cardboard, including plastic lenses - Affinity software	- The narrative is linear - Scenario: explore the site - 360° navigable	- Realistic 360° 3D visualization - Get historical information (UI & text)

Table 1. MDA Approach of Existing Virtual Museums Projects

The five VMs projects as listed in Table 1., mostly, digitized archeological site and reconstruct life environment of historical event. Mechanically, all VMs use manufactured product of head mounted displays (HMD) or handmade HMD, cardboard for instance (as shown in Figure 1.), and including android OS based. The five projects conducted using by 3D software and some of them add 360° panoramic photographs/images as supplement. Moreover, two projects engage laser scanner for generating 3D assets.

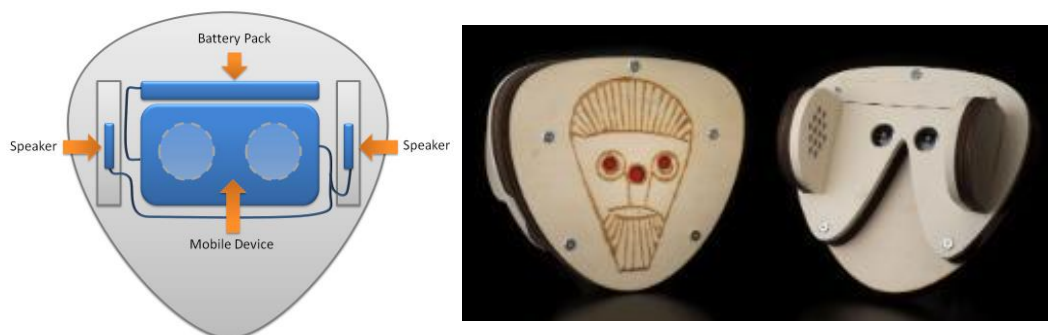


Figure 1. VR Cardboard Headset of Viking VR (Schofield et al., 2018)

As dynamics approach, the half of the projects employ linear narrative and interaction, which are Batavia 1627 in Virtual Reality and Geguti Palace in Kutaisi. The rest more dynamics interaction, such as the projects of The Imperial Cathedral in Königslutter, The San Clemente Site In Albenga, and Viking VR. According to the Table 1., generally, all projects are exploring the archeological site. In addition, the projects of Batavia 1627 in Virtual Reality and Viking VR given experience of life environment of particular historical event.

The last approach, the aesthetics are showed by sense of 3D realistic visualization. The 3D environment are developed to resemble estimates of original conditions in the past. The interpretation based on visual references and the ruins of historical buildings. As the results, most of the projects present the conditon of immersion. The users feel that they inside the virtual archeological building. On the other hand, the Batavia 1627 project given sensation of flying due to camera perspective of bird eyes (as shown in Figure 2.). Despite of visual sensation that user felt, there are also given historical information about the archeological site in 2D text user interface.

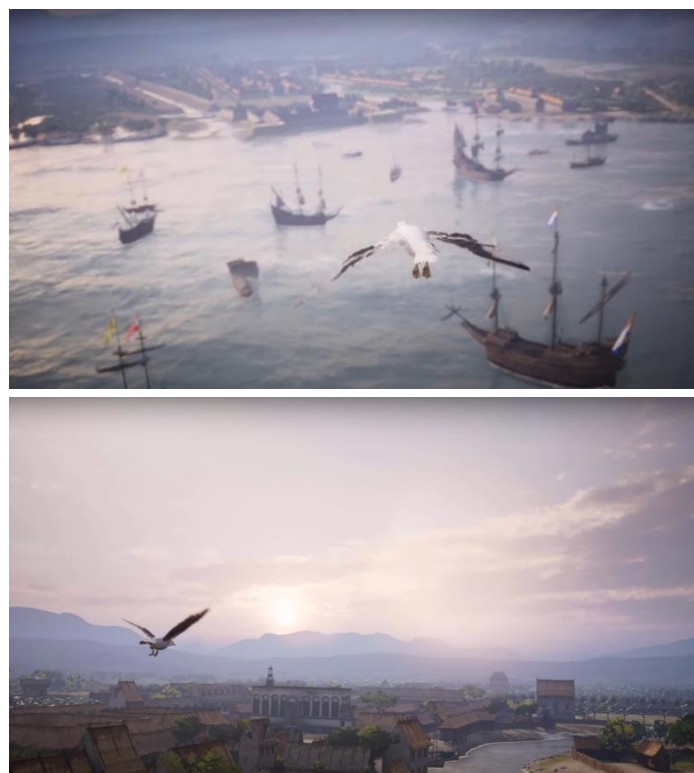


Figure 2. Trailer of Batavia 1627 VR
(Westfries Museum, 2020 - <https://www.youtube.com/watch?v=EGQiYHrNj7o>)

DISCUSSION

In digital era, Kaun & Uldam (2018) state that there is change of artistic performing as artists consider the changing environment. They offer alternative ways to understanding the aesthetics of artwork and cultural artefacts. In digital world, everyone is interacted with the artwork and included in the discussion of the artwork, especially in visiting of virtual museums. Bowen and Giannini (2014) emphasize that the reality of digital life now has no boundaries, real and virtual overlap each other where everyone is connected to internet technology and the interface of several applications.

This technological development provides an advantage to develop a virtual museum. Sylaiou et al. (2005) add that the emerging tools and technologies help museum curators to conduct digital exhibition. The benefits of virtual exhibition are innovative, cost effective, and interested for prospective visitors, especially from far way from the museum itself. Virtual museum visitors can interact with museum artifacts without any acts of vandalism. In other words, they can virtually touch historical works of art. Visitors can also explore the virtual museum at their convenience and get information visually, auditory, and text when they interact with these artifacts. The virtual museums' visitors experience the past with regard to artifacts and historical events. They are immersed in the scenarios that developed by virtual museums conservators. This interaction can be done both inside the museum (provided with equipment to try out the virtual museums) or online from each visitor's home. However, online virtual museums have the consequence that there is a change in behavior in visiting museums.

According to the MDA approach of five existing projects as shown in Table 1. above, there are some points that can be use for recommendation of VMs development in Indonesia. Table 2. describes the recommendation for VMs Development in Indonesia.

No	Item	Recommendation
1	Technology	- Manufactured product of HMD (ex. Oculus Rift, HTC Vive) - VR Glasses with smartphone (ex. Samsung VR Gear) - Handmade Cardboard VR with smartphone
2	Deployment	- Inside the museum (On site VMs) - Online VMs (WebGL, application)
3	Content	- Historical artifacts exhibition - Reconstruction of historical event
4	Scenario	- Linear (nodal plot) (Tomaszewski, 2005) - Dynamics (modulated & open plot) (Tomaszewski, 2005)
5	Artistics	- 3D visualization

		- 360° panoramic photographs
		- Interactive sound design
		- Information: user interface and text
6	Interaction	- Immersive site exploration
		- Depth & detail of artifact information
7	Object	- Open museum (ex. Borobudur Temple)
		- Historical architecture/ building (ex. Fatahilah Building)
		- Cultural Heritages (ex. Bena village, Flores)
		- Art artefacts

Table 2. Recommendation for VMs Development in Indonesia

This recommendation is supposed support the museum curators/ conservators to get pre elementary information to develop VMs concepts. They as conceptors can cooperate with programmers and artists to develop VMs.

The virtual museums can be produced by providing gamification so that they are more attractive to users. This means that it is not only beneficial for learning and disseminating historical information, but also fun in exploring the virtual museums. Doukianou et al. (2020) state that the serious game is a game genre that can be adapted for the development of a virtual museum, both as a medium of learning and the spreading of historical information.

CONCLUSION

Virtual museums in Indonesia have the potential to be developed, especially because of the country's geography which is an archipelago. In addition, virtual museums can respond to visitor needs in various ways, for example using VR and WebGL (website-based interactive 3D visualization). This virtual museums provides an entertaining and educational experience, especially with Indonesian cultural and historical contents. In addition, the virtual museums enriches the museum exploration experience by allowing intuitive interactions with artifacts, especially for Indonesians who live on remote islands without coming to the museum.

Current technological developments in Indonesia (although not evenly distributed across regions) have accommodated the development of virtual museums. The infrastructure of the internet in Indonesia has been developed to most of remote area. Some universities and creative industries pay attention for developing educational learning interactive media, such as virtual museums. It means, Indonesia has human resources that can support development of virtual museums.

They need to collaborate across disciplines between the museum curator and other related parties to produce a virtual museum.

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