

## National Museum of Indonesia : Virtual Tour Experience

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**Abstract.** This article aims to discuss the implementation of exhibition spaces in virtual tour museums in Indonesia. The case study taken is the National Museum of Indonesia, the largest museum in Indonesia and has many collections. In 2020 the Covid-19 pandemic occurred globally, including in Indonesia, which limited activities in public facilities. One of the effects of this incident was the closure of museum facilities. The National Museum of Indonesia is one of the museums that has finally opened an online virtual tour facility to deal with the ongoing Covid-19 pandemic problem. In the exhibition interior design science, there are several elements and design systems applied to get the things they want when visiting an exhibition, including getting clear information and education and experiencing the recreation obtained from space's activities and atmosphere. The virtual exhibition space will undoubtedly be different from the conventional exhibition space. The research carried out a method by collecting data based on a survey of 121 respondents, who conducted a virtual tour of the museum directly and assessed the room's situation and the clarity of the information obtained. This study's results are in the form of experiences experienced and felt by visitors, which can be used as input for the improvement of the virtual tour of the National Museum of Indonesia in particular, and museums in Indonesia in general.

### 1. Introduction

User experience is an essential element in a design, which their opinion can be used to make improvements and optimizations. A design that makes the user a primary consideration in designing will make the design successful in providing satisfaction and a meaningful experience for users. So, this article discusses the museum tour virtual interface in terms of visual design and user experience. In this study, users directly take a virtual tour of the National Museum of Indonesia.

The virtual tour museum is one of the methods used by museums in the world in recent years. The purpose of holding a virtual museum tour is to facilitate people who have not had the opportunity to visit the museum. In 2020, the Covid-19 pandemic caused almost all museums in the world to be closed to minimize the spread of the virus, as reported on ICOM (International Council of Museums) official website in 2020. This condition has resulted in many museums in Indonesia that previously did not have visual tour facilities—finally made this facility, so that information services and visits continue. Limited visits to this museum have caused almost all museums to continue providing services to visitors in various ways, holding a virtual tour of the museum with internet facilities via websites or social media.

The National Museum of Indonesia conducts a visual tour through its official website using an interface of 360 ° views.

Virtual tours in the form of 360 ° views are not new, but the trend is increasing lately because many museums use this method as their virtual exhibition space. There are several studies regarding virtual tour museums that have been done before, either using the 360 ° views interface method or using other methods. Research that discusses museums and virtual exhibition spaces includes research from Sylaiou S. et al which discusses the use of Augmented Reality and 3D Graphic technology on a Virtual Museum Tour in England. Sylaiou S. et al conducted an exploratory study of the participants' feeling of being there and the enjoyment of being faced with a virtual museum exhibition. [1]. In another article, Sylaiou S. et al discuss the digitization of museums as an effort to make the museum can be enjoyed by a wide user and does not build space and time. Sylaiou S. et al stated that several technologies can be used as a Virtual Museum method, among VR, AR, and Web3D, but these technologies are quite a time consuming and costly for users, QuickTime Virtual Reality and panoramas that allow animation and provide dynamics and 360 ° view continuously can be an alternative solution [2]. Bastanlar (2007) has investigated user behavior by testing a Web-based virtual tour application that uses 360 ° panoramic images. The results of this study are the user's preferences for tool choices in the virtual museum such as navigation menu options, audio options. The results showed that using a floor plan was the most preferred way to change locations and a pull-down menu was the least preferred. Another finding is that the mouse is the most preferred way to control functions compared to using a keyboard [3]. Maulina R. et al conducted research on online exhibition galleries for works of art. The results of the research show that galleries can be used as an alternative space for exhibiting online, making it easier for visitors to get information about these works of art, even though online galleries cannot replace the more real experiences that conventional galleries have [4]. Christal M & Roy, L researched the use of QR Virtual reality, in the form of a 360 ° panorama for school children in America, the results showed that the virtual museum model is a technology that is used to deal with cultural responsive education, cultural collaboration, and cultural revitalization [5]. Previously, research had also been carried out on the development of the virtual tour museum model concept based on user interactive issues, using the image base model by Rahim N. et al (2007) with the Trengganu Museum case study and to validate the conceptual model of its development, the factors considered include such as ease of use, efficiency, and satisfaction are used as benchmarks for usability factors in virtual museums [6]. Besides, Zhao has researched the design of a Virtual Museum that uses the VRT (Virtual Reality Technique) method based on Web3d. [7]. Previous studies have more to do with information technology science, and this research is more about visual interface design and visual virtual space. And this research specifically discusses the virtual tour of the Indonesian National Museum in terms of Indonesian users' experience.

The experience and perceptions of users in conducting a virtual tour of the National Museum of Indonesia can be useful as a consideration, input, and evaluation as materials for optimizing the interface design of virtual exhibition spaces, especially virtual museum tours in Indonesia to make it even better and can be used as a reference in the development of the next virtual museum designs.

## **2. Method**

This article discusses the visual tour of the National Museum of Indonesia, Jakarta, in terms of the interface facilities offered and the possibility of a user experience. Through observations of the virtual tour of the National Museum of Indonesia, which comes from its official website at <https://museumnasional.iheritage.id/>, it will be discussed based on the stimulus presented by the virtual tour whether it meets the objectives and needs of the current Museum. The method used in this research is descriptive qualitative. To support the discussion, a survey was also conducted of 121 respondents aged 15-30 years, who were students and university students, who had been asked to take a virtual tour of the National Museum of Indonesia, then they filled out a questionnaire containing questions related to expectations, experience, their opinion about the Virtual Tour of the National Museum of Indonesia. The results of user opinions regarding their direct experience when doing a virtual tour of the National

Museum of Indonesia can be used as input and consideration to optimize the next virtual museum interface design in Indonesia.

### 3. Result and Discussion

The web-based virtual tour museum application in the form of QTVR or 360 ° panoramic image is an application that is widely used in various museums in the world. In a virtual tour of the museum with the 360 ° panoramic image method, users will see an image of an environment through a window and can control based on navigation tools. The initial function of the visual tour 360 ° panoramic image is to enhance the visual of the presentation, such as for promotional purposes. But at this time, in addition to promotion, it is also to expand visiting services [3]. According to Zhao, a virtual museum can be made to create as if a real-world and store everything, and in theory, anyone can visit any exhibition anytime and from anywhere [7].

According to the International Council of Museums (ICOM), the definition of a museum is a non-profit organization that serves the community and in its development, is open to the public, has the task of collecting, preserving, researching, communicating, and exhibiting tangible and intangible human heritage, and their environment. for educational, research and entertainment purposes. The museum is expected not only to become an institution for community education activities but also as a place for recreation for the community [8]. The most important thing in conveying information from a museum is the completeness of the collection objects and information about the collection objects can be conveyed clearly and in detail, besides that it can also provide entertainment for the community.

The National Museum of Indonesia when using a virtual tour application with the 360 ° panoramic view image and QRVR methods. We can get this Virtual Tour of the Indonesian National Museum through the official website at <https://museumnasional.iheritage.id/>. With this 360 ° panoramic view image method, visitors are taken as if they were in the actual museum location. Visitors can rotate 360 ° both horizontally and vertically, using a keyboard, mouse, or touch screen layer. Also, you can also zoom out-zoom in as if forward and backward.



**Figure 1** Screen shoot of 1<sup>st</sup> Slide in Museum National Indonesia Virtual Tour (<https://museumnasional.iheritage.id/>)

In figure 1, the user can see the features used, including the profile (in the form of written narrative), panoramic list (used if the user wants to jump the area), location (contains the address of this museum, floor plan (contains a picture of the overall plan but is not interactive), and the museum collection (there are 55 collectibles listed there). The control features that users can use are the keyboard, functions to

move left and right only, and assisted by the mouse, which functions to scroll, scroll, and click. This control feature is used by the user and gives the impression that the user's eyes can see the desired direction, and the user seems to be walking and going to the object as he wishes. The zoom-in feature's ability is crucial to get the details of the selected space or collection object.

The National Museum of Indonesia is an institution that serves as a place for storing cultural heritage, safeguarding, maintaining, and utilizing material evidence of human culture as well as nature and the environment, as a container used to support efforts to protect and preserve the cultural wealth of the Indonesian people. Until now, the number of collections managed is 140,000 items, consisting of 7 categories of collection types [9]. The number of collection objects which are quite large and very unique needs to be conveyed in detail to the Indonesian people, especially those who have an interest in finding out about the collection objects in this museum. To see the detail of the collection objects, several ways can be done on the virtual tour, the first is to zoom in the image until it is as close as possible until the details and writings on the collection objects are visible (Figure 2)

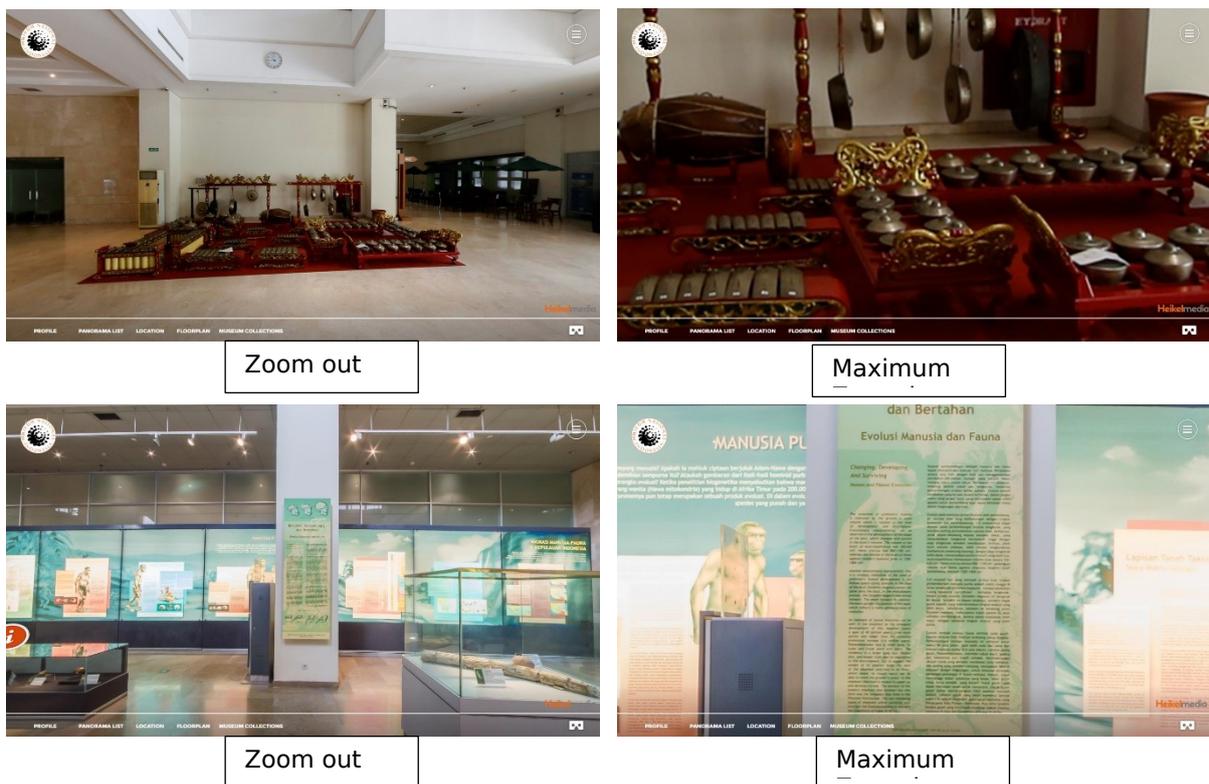
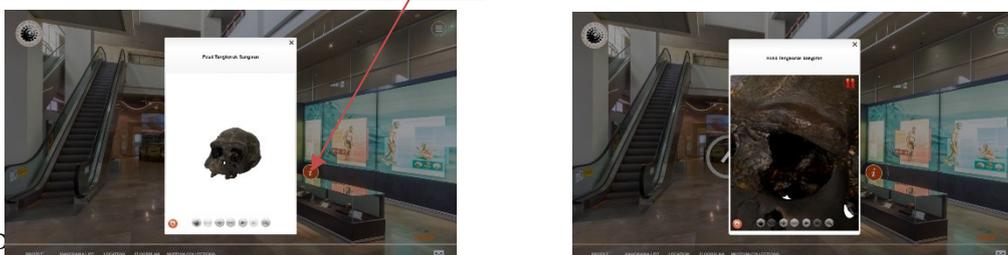
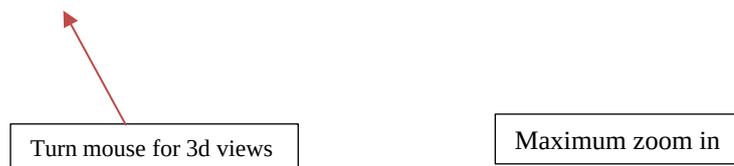


Figure 2 The application zoom out and maximum zoom in (<https://museumnasional.iheritage.id/>)

From the observations made, the ability to zoom in virtual is limited even though it has reached the maximum limit, so that many collection objects and information in the form of writing do not look too detailed (Figure 2). So the solution is that visitors can click on the desired object, and a 360° view will appear and is equipped with an audio narration (Figure 3). However, on a virtual tour in this museum, not all collectibles can be clicked and have a narrative. Of the 140,000 collectibles, only 55 items are in complete detail.

Klik (i) button





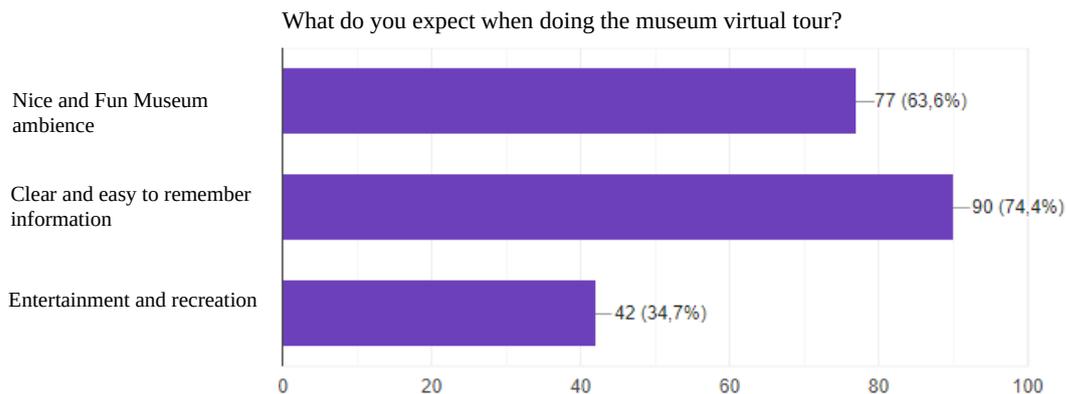
**Figure 3** The detail of collection (example)

(<https://museumnasional.iheritage.id/>)

Some information is a question for visitors and needs to be conveyed, in detail, and completely. In Christa M. & Roy L., some questions are usually asked by students, including "Who created this artifact?", "What was the object's purpose?" "Where did these people live?" "Why was it created?" "What was it created from?" "How was it created?" "Why did I select this object for the tour? ", " How is this object connected or not connected to my culture?"[5] so that even if the visit is done in the form of a virtual tour, these information points must be answered.

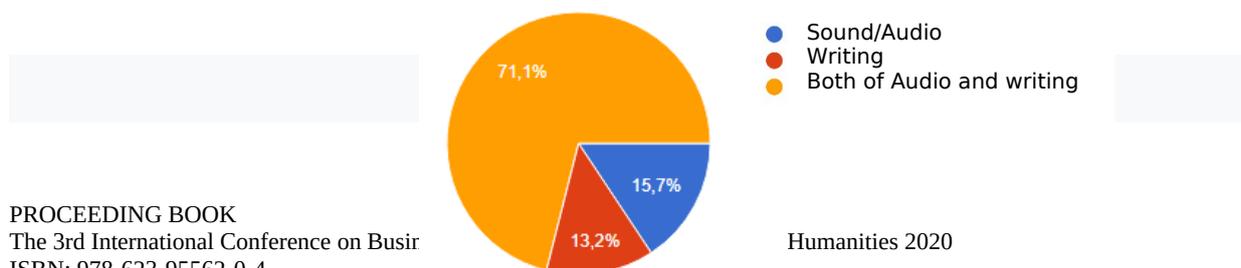
User experience is defined as the response and perception of a person resulting from the use of a product, system, or service, including the interface design of a visual tour of a museum. User experience includes emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors, and user achievements that occur before, during, and after use. The experiences they experience can be in the form of technical matters or responses to visual aesthetics, in this case, a virtual museum space. [10]. And Rahim, et al found that the elements of user interaction are needed in developing virtual museum [6].

Before doing the virtual tour, all respondents were asked questions about their expectations when doing the virtual tour, the results obtained were that more than 50% of users expected a pleasant and fun museum ambience and got straightforward and easy to remember information, and some users expected get entertainment and recreation when doing the tour (figure 4).



**Figure 4** Museum Virtual Tour User Expectation (2020)

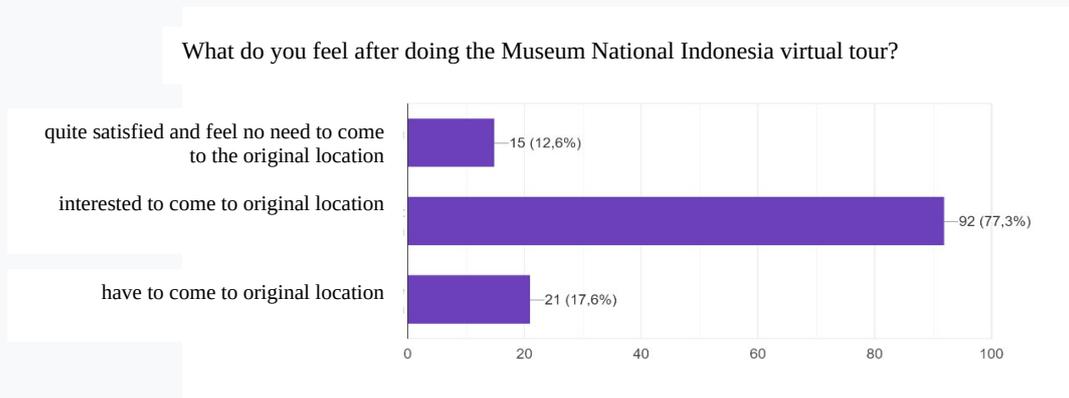
Based on the survey conducted, 85,1% of respondents stated that the information presented by this tour was quite clear, and 61,2% of respondents stated that the collection of objects presented was quite clear and detailed. However, if a more comprehensive observation is carried out, only 0.04% (i.e. 55 objects of 140,000 different) items are detailed with complete writing and audio narration. So it needs to be completed if the purpose of this museum is to provide clear and comprehensive information and education to the public.



**Figure 5** Information method about collections Preferences

In this virtual tour, the information feature that is conveyed to users is in writing and voice. Users can choose whether to listen to audio or only view written information. From the survey conducted, the preferences of users are to prefer a combination of voice and writing rather than just voice or writing. (Figure 5).

The development of the museum has now reached the stage of providing a stimulus in the form of museum information that involves all the senses not only in visual form but also, namely touch, smell, sound, memory, and space, which is known as a multisensory museum. The stimulus in the form of information on collections and exhibitions must be accessible and meaningful to a wide variety of visitors. The end result might be learning, wonder, reflection and relaxation, sensory stimulation, and creation lasting memories. Therefore, museums need to consider complex combinations and interactions between visual, auditory, olfactory, spatial, and other aspects of the experience [11]. To be able to achieve multisensory stimulation on a virtual tour is rather difficult to do, the only sensations that can occur are visual and audio, while for touch, taste, and smell, it cannot be achieved. So even though a virtual museum tour has been held, users still feel the need to come directly to the actual location. (Figure 6).



**Figure 6** User preferences after doing the museum virtual tour

Maulina, R. et al. stated in her research article on online galleries that visitors still need to come to the original location, because an online exhibition cannot provide a more real experience than visiting the original exhibition because it does not have a touch and taste sensation. However, online exhibitions also have many advantages including repeated visits, visitors can get information more quickly and can be recorded. [4]

To optimize this virtual tour, it is also necessary to consider choosing the right background audio, because according to the survey, 89.7% of respondents stated that background music is one of the elements considered necessary to shape the atmosphere when doing this virtual tour. However, it is considered unnecessary to consider background noise as in actual location (such as the voice of a person speaking or footsteps). Most respondents (88.2%) also deemed more interactive features, such as clicking objects and being able to rotate the collection objects to get more detailed visuals. In a previous study, Chen et al. Stated that the background music played in a museum had both emotional and cognitive influences on visitor experiences. Music can give a warm and relaxed feeling. Even if the right song fits the museum concept's context, it can arouse other nostalgia and curiosity. [12].

Besides, it provides a tool in the form of an interactive floor plan, which can help users to find out the position and orientation. This floor plan can help the user to go through one environment and into another. [3]. Based on the survey, some respondents felt confused and lost their spatial orientation when running this virtual tour. So that 93.3% of respondents think that having an interactive floor plan feature can help them find spatial orientation.

The current virtual museum technology is expected to convey information, but it is hoped that it can be enjoyed by people with special needs as well, who have limited access, and can also function as entertainment. So that virtual museums in Indonesia, in particular, also have to keep up with technological developments. In other words, it must improve the experience of museum visitors by providing access to additional material for review and deepening of knowledge both before or after the actual visit, so that it has added value, for example adding interactive virtual reality features and games. [13]. According to Mortara et al., the form of play applied to museums can create entertaining experiences and is more appropriate for more effective heritage and cultural learning [14]. Pivec et al. also stated that the display of virtual technology-based content to create a unique and individual visitor experience, such as adding applications and games that can be accessed by the younger generation, especially students, which can be enjoyed directly at home or in class, without the need to make a real visit [15].

#### 4. Conclusion

Virtual tour of the Museum is one solution to provide service visits to the Museum that are not limited by time and distance. However, the aim of the Museum as a forum to provide detailed information and education must be carried out, especially for the Indonesian National Museum, so that the objectives of the virtual Museum can still be achieved. Several elements can be added, such as more interactive features, a sound background that is more suitable to support the atmosphere, and interactive floor plans as an aid to overcome disorientation when doing a tour. Although virtual museum tours have limited stimulus, virtual museums also have potential advantages that can be improved, such as holding more detailed collection information.

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