Utilization of Virtual Reality Tours as Educational Media Introduction of "Bayt Al Qur'an and the Istiqlal Museum" for Students After the COVID 19 Pandemic

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Abstract

The purpose of this paper is to describe a comprehensive evaluation experiment of semi-immersive virtual reality (VR) applications from the heuristic side of application interface design to cognitive enhancement abilities, and increasing learning motivation when the application is used as a learning process. This study employs a descriptive qualitative method to comprehend the phenomena encountered by the research subjects, such as behavior, perception, motivation, and actions. Based on data analysis, the study's findings revealed that the use of Virtual Reality at the Museum was quite effective and efficient in the post-COVID19 pandemic for students. This study also discovered that virtual reality was able to increase the number of visits as well as increase interest in learning and understanding the Al-Quran Mushaf better. The conclusion is that, following the COVID-19 Pandemic, VR has become one of the educational media that is effective in helping students, so that they can present simulations like in the real world, where they can see the Istiqlal Mushaf comprehensively. The conclusion of this study was to compare knowledge retention after immersive and non-immersive skill training methods. Site visits and virtual visits can also be quantitatively and qualitatively compared to increase student engagement, motivate students, and provide interactive feedback to encourage learning.

Keywords
virtual reality, educational media, the Bayt Al Qur'an and Istiqlal Museum, students, post-pandemic

1. Introduction
Dr. H. Tarmizi Taher was the originator of the initial idea of establishing Bayt Al-Qur'an in 1994 when he served as Minister of Religion of the Republic of Indonesia while accompanying President H.M. Suharto to receive a large Qur'an gift from the Al-Asy'ariyah Islamic Boarding School, Kalibeber, Wonosobo, Central Java. President Soeharto inaugurated the Istiqlal Mushaf, which had been under construction since 1991, on the 50th anniversary of Indonesia's independence in 1995. The Istiqlal Mushaf is a large manuscript written in beautiful khat and embellished with ornaments and decorative illuminations from all of Indonesia's provinces. At the time, the idea of establishing the Bayt Al-Qur'an, or "House of the Qur'an," as a museum to collect, store, maintain, and exhibit Qur'anic manuscripts of various shapes and types which are scattered throughout the world. The Bayt Al-Qur'an and the Istiqlal Museum are intended to be two institutions with one unified whole, with their respective roles, throughout the archipelago. Both works together to increase love, understanding, and practice of the Qur'an, and they also serve as a forum for the study and development of knowledge about the Qur'an and Islamic culture.

Students' knowledge of Quranic manuscripts is becoming less and less desirable nowadays. This is due to a lack of easily accessible socialization for the younger generation, as well as a less appealing method of socialization to learn more about the manuscript. Because technological development is so rapid, many museums, particularly in Indonesia, are keeping up by incorporating technological elements into their exhibits to increase their attractiveness. The Istiqlal Mushaf museum, which is located at TMII Jakarta, is one of them.

Many innovations have resulted from technological advancements, such as Virtual Tour technology, which can place the user in the image and allows the user to increase situational awareness and significantly increase visibility, capture, and analysis power through virtual data. Most of us adapted to new habits regarding the learning system during the

pandemic period until the post-COVID19 pandemic. Learning that should have been done physically by visiting the location has been replaced by technology that represents it, namely Virtual Reality.

The Virtual Reality Tour's innovation is a microsite that is linked to the museum's main website page, making it easier to search without the need to install specific applications. It is open source, so visitors can access VR experiences directly from web browsers like Mozilla Firefox, Google Chrome, and Microsoft Edge. Interestingly, the completed VR tour can be directly shared on social media, allowing the information network to move faster and reach a wider audience. Virtual tours are a type of technology that enables users to view and analyze virtual data. This VR Tour is the best and simplest way for internet users to explore the virtual world on a budget.

The scope of this research's limitation is in the development of 3D modeling, which requires time, funds, and competent human resources. The modules used in this study are currently limited to the location of the Bayt Al-Qur'an and the Istiqlal Museum in Taman Mini Indonesia Indah (TMII), Jakarta. This is due to the fact that the museums in the TMII area are popular tourist destinations as well as educational institutions for students. While there are currently 281 museums in Indonesia with a National Registration Number.

2. Review of Literature

In English, virtual reality is a combination of two words: 'virtual' which means the virtual world, and reality which means real things that happen in life. So virtual reality is a technology that can create simulations of the real world, where we can see the atmosphere and walk around in a previously unexplored location. This media can not only provide a screen viewing experience but also allow users to 'dive' and interact in three dimensions. Virtual Reality (VR) technology can simulate a variety of senses, including sight, hearing, touch, and smell.

Virtual reality is a component of a multimedia computer that will serve as a fun and effective learning medium for converting abstract concepts such as vibrations and waves into concrete ones. According to research (Wibowo 2015), learning with virtual reality media successfully accommodates diverse student learning styles because it integrates multiple dimensions in the learning process. Culture with local wisdom should not be forgotten in this age of increasingly advanced technology and information. Local wisdom plays a critical role in changing and shaping global culture so that it is meaningful and in accordance with the social and cultural life of the community, including the world of education. VR-based educational media can provide students with unique experiences.

Before the digital age, students thought studying was tedious. So, with the availability of Virtual Reality educational media, which is an alternative media with a variety of benefits, this assumption is no longer valid. This VR media provides an interesting, educative, and simple way of learning, and students are no longer restricted to specific locations or facilities, allowing them to learn anywhere and at any time. The use of Virtual Reality can provide humans with a realistic experience that allows them to feel as if they are in that location. (Herlangga 2016)

The rapid and modern development of technology has had a significant impact on many aspects of life as well as many fields of human life. This is due to technological advancements that have resulted in numerous new innovations. Virtual Reality, abbreviated as VR, is one of the technological innovations that has been known since 2016. (Riyadi 2017). Virtual reality is extremely useful for simulating something that would be difficult to present directly in the real world (Henningtyas 2019).

Virtual Reality (VR) is a multimedia technology application that has advantages in describing a situation or an object where the visualization displayed can not only be seen from one point of view but can be seen from all angles, because it has three visual dimensions, allowing users to interact with a simulated environment via mobile phones or computers. Users can use VR technology to improve situational awareness and significantly increase their ability to see, capture, and analyze virtual data. (Tried 2015) Virtual reality can be presented using images, photos, or videos, as well as three-dimensional models. At this time, technology and media play an important role in the learning process. (Bailly 2011)

3. Methods

The descriptive qualitative research method was used. According to (Moleong 2019), descriptive qualitative research aims to understand phenomena about what research subjects experience, such as behavior, perceptions, motivations, actions, and so on, holistically and descriptively in the form of words and language, in natural contexts, and by utilizing

various natural methods. This research was carried out to comprehend and accurately describe a fact, nature, and relationship that appears in the role of using Virtual Reality in the Mushaf Museum. Contribution to further research is how to see the impact of many aspects of applications and uses that are explored in the current literature, such as the impact of VR on social experiences, as one aspect that requires further research.

3.1. Purpose and Research Questions

The main aim of this paper is to examine the perceptions, practices and experiences of museum visitors regarding the use of virtual reality. In this way we can give suggestions for the implementation of VR applications in museums. This study focuses on the following research questions:

a. How are museums currently using virtual reality technology and how to understand the role and use of virtual reality technology in museums?
b. What are the benefits and challenges of using VR technology in museums?

4. Data Collections

Various studies on the diffusion of technology and the use of Information and Communications Technology (ICT) in education have found that students have a proclivity to incorporate technology into their learning process (Simsek 2012) The use of Virtual Reality (VR) technology in education and training is an example of ICT use and is an evolution of Computer-Assisted Instruction (CAI) or Computer-based Training (CBT) that offers a more natural, appealing, and immersive interaction. Furthermore, VR is used to support learning because it can provide novel learning experiences. (Edwards 2019) In order to improve visitor engagement and education. (Yowei 2020), as well as to create an interactive, engaging, and immersive museum experience. (Pantile D. 2016) In the analysis, following a thorough qualitative methodology, the figures were considered satisfactory because the aim was not to extract statistical representations of the entire community. However, adapting to the digital era poses a significant challenge in the advancement of technological applications in museums.

Virtual reality technology has proven its positive impact in many areas of tourism, culture, education, and museums. As a result, this technology has been deployed in various museums and educational institutions, impacting the way people experience and understanding heritage and providing innovative and powerful tools to facilitate learning as virtual reality technology becomes more accessible. It has certainly created a great perspective for museums. on different levels. It is widely used to create engaging and interactive experiences in museum environments. (Shehade 2020). It has also been widely used to recreate the experience and allow students to fully immerse themselves in the experience and explore all of the museum's contents, which can give users a time travel experience and a sense of actually being there.

In addition, the use of VR technology in the children's museum is considered an effective educational tool that provides access to various information. It also provides learning opportunities that increase children's interest in knowledge and facilitate their learning experience. Additionally, virtual reality environments can have a powerful motivating impact on children's learning due to the immersive nature and sense of presence built into virtual reality applications. The sense of presence and immersion is often associated with higher levels of engagement and emotion, and more intense aspects are associated with better learning outcomes. Thus, the greater the sense of presence and emotional involvement during the experience, the easier it is for children to remember the content presented to them (Araiza-Alba et al. 2020).

The integration of VR technology in museums will increase the museum's competitive advantage, improve children's experience, and make museums more interactive. As a result, it will attract more children and promote child trafficking in tourism, especially since today's children are fascinated by technology (Fouad 2021). Applying VR technology in education will help students interact with concepts and objects, experience realistic objects and immerse themselves. It will also allow them to experience playful education, improve their cognitive development and improve memory by connecting feelings with education. Applying VR technology to museum activities can last 5-10 minutes so that children can enjoy the experience without getting bored.

5. Discussion and Results

The study of VR as an educational tool for students to replace physical visits to the Bayt Koran Museum by using digital devices through the sense of sight interactively is the result of this research. As an answer to these obstacles in obtaining new sensations due to limited space, time, and cost, particularly during the post-COVID19 pandemic.

One of the benefits of digital media is that it has provided an experience and sensation about site visits on museum tours. The media can be used in a variety of ways, including photos that can be moved or not, video, and interactive forms. Through this virtual visit, digital applications can be navigated to each content, allowing students to experience the sensation of images and spaces that run as if they were in a real location. Using Google Street View to direct visitors to the correct and more accurate location. Virtual reality is a computer simulation of an environment that creates a realistic experience in the virtual world. Virtual reality technology can be designed to solve a variety of problems. An immersive digital environment is a computer-created interaction, scene, or environment in which the user can immerse himself in the created world. (Zhang et al. 2011)

Google Street View has been available since 2018, allowing users to upload photos that can be turned into a 360 virtual tour. The Virtual Tour designer and Google Maps users who use virtual tours to improve Google Maps will both benefit from this. Google Street View will be available for free, and designers can experiment with it to meet their specific needs. How to connect the dots containing panoramic photos that have been created has been provided. The user will be directed to the panoramic photo linked at that point if he or she clicks on the arrow icon or a specific image.

In this sense, Virtual Tour Reality series 3 is an application that displays every room with 360 photos, which can be rotated 360 degrees with a touch of the hand on the Smartphone and Laptop, or by sliding the mouse on the desktop computer. If you use virtual reality glasses (VR glasses) or cardboard, everyone feels as if they are in that room and can explore every other room. VR can simulate the real world so that users can feel as if they are there and see objects (Chittaro 2018). The use of this technology appears to be capable of replacing some activities that do not need to take place physically or directly. (Bramasta 2021)

The Virtual Tour Reality Process in Stages: (Figure 1)
1. Photographic Capture
    Every 360 photo that will be used as material for a virtual tour, every data collection must be thorough and careful, producing quality images or using a special camera tool.
2. Content Information
    Text data collection that will explain each image or image that is displayed when navigation will go to the selected area.
3. Information Processing
    This process begins with stitching, editing, finishing, creating the necessary virtual Tour script, and assembling the polygon points on the street view. The goal of this process is to provide a navigation network at the destination waypoints.
4. Development and testing
    All the results from the preceding stages will be thoroughly and thoroughly tested, both the data and the digital media program, to reduce errors and obstacles when it is released to the public.
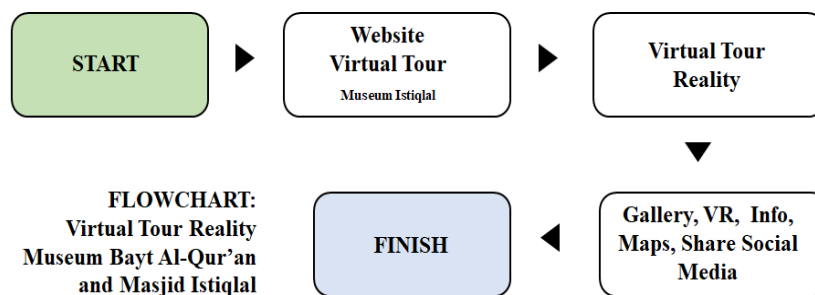

Figure 1. Flowchart VR Tour of the Bayt Al-Qur'an and the Istiqlal Museum,
Source: Imam Tobroni

On the student's monitor screen, turn on the computer or cellphone, and then navigate to the Bayt Al Quran Museum Website. (Figure 2)
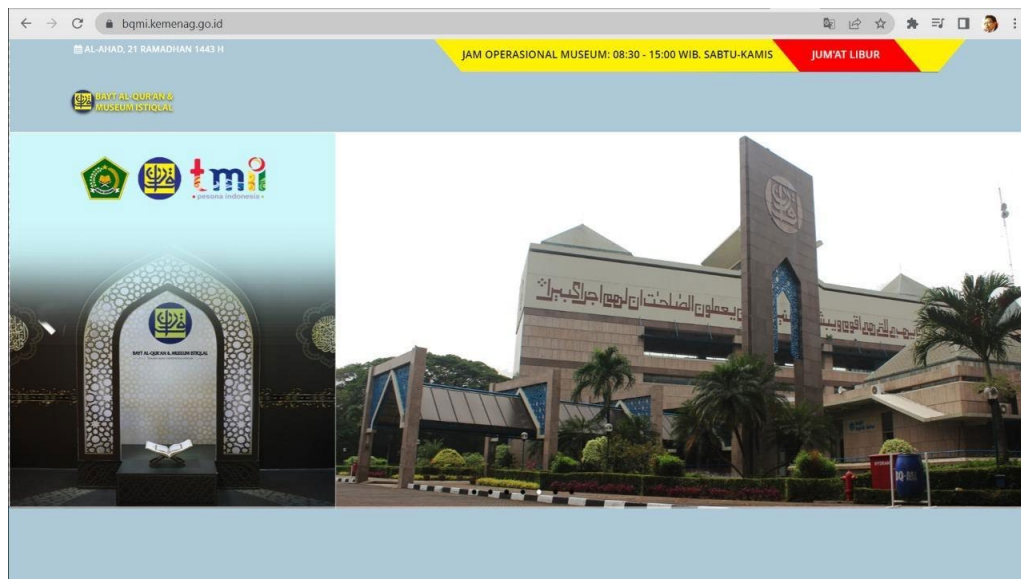
Figure 2. Depicts the visual appearance of the website for the Bayt Al-Qur'an and the Istiqlal Museum
Source: Imam Tobroni

Students will immediately see the main page, as well as the main menu, from which they can choose which images to view. (Figure 3)
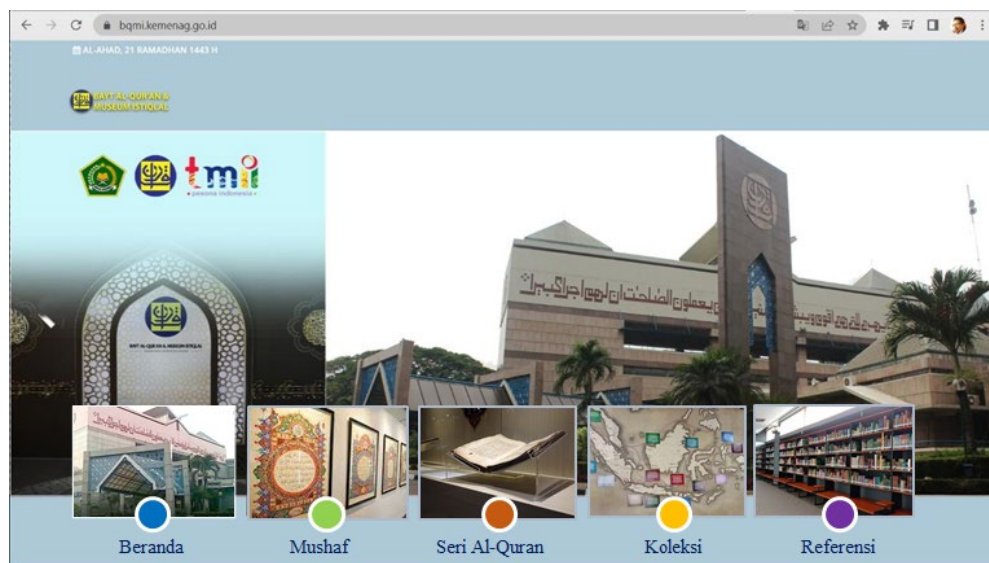

Figure 3. The main page and main menu of the Bayt Al-Qur'an and the Istiqlal Museum
Source: Imam Tobroni

The next step is for students to click on the buttons below to see what content is contained in each one. Fullscreen: full layer view, for a more dramatic effect Virtual reality: students can use Cardboard to see the entire, gallery: information about the photos in each section, See the text in the form of text or complete descriptions for more information. Maps: shows a floor plan of the section being visited. Students can use the Share button to share links to social media sites such as Instagram, Twitter, and Facebook.(Figure 4-5)
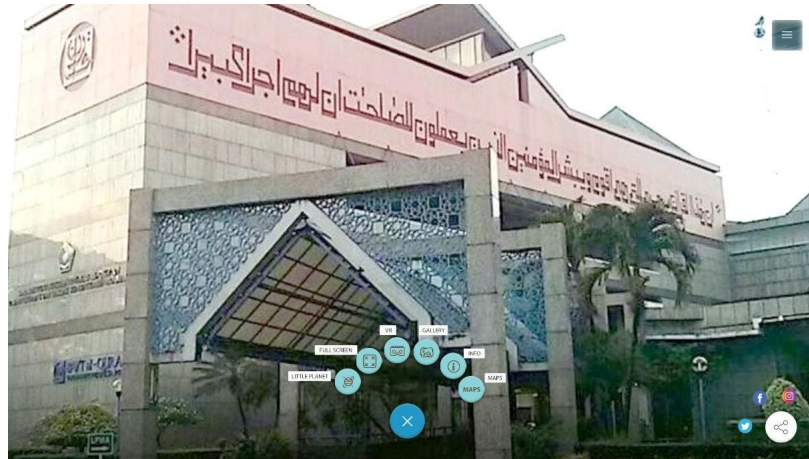
Figure 4. Icon buttons display of the Bayt Al-Qur'an and the Istiqlal Museum
Source: Imam Tobroni

Figure 5. VR View-Cardboard of the Bayt Al-Qur'an and the Istiqlal Museum.
Source: Imam Tobroni

The next step is for students to select the Gallery icon button, which contains a sub-section of the content explanation in the form of photo image data via a slide show. (Figure 6)
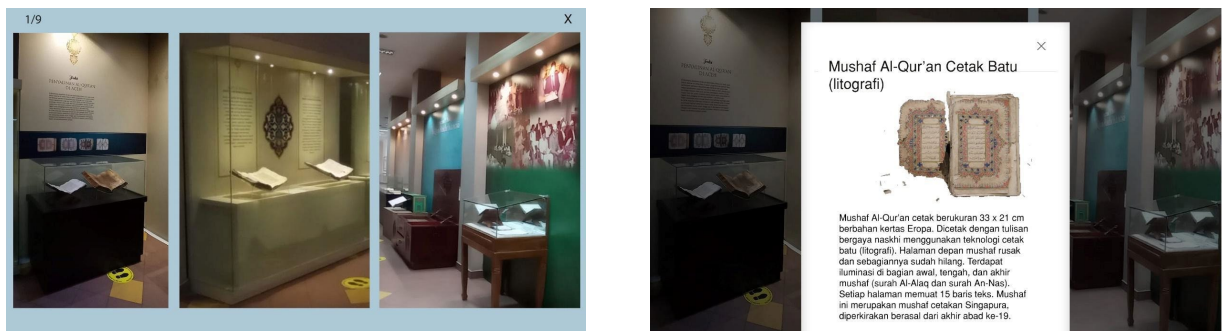

Figure 6. The gallery icon selection button, which includes a slide show of images/photos and scripts, of the Bayt Al-Qur'an and the Istiqlal Museum.
Source: Imam Tobroni

The steps involved in selecting the Maps button, which displays a floor plan of the overall location of the Bayt Al-Qur'an Museum and the Istiqlal Mosque. Each location area will be visited where there is a selectable location pointer icon. (Figure 7)
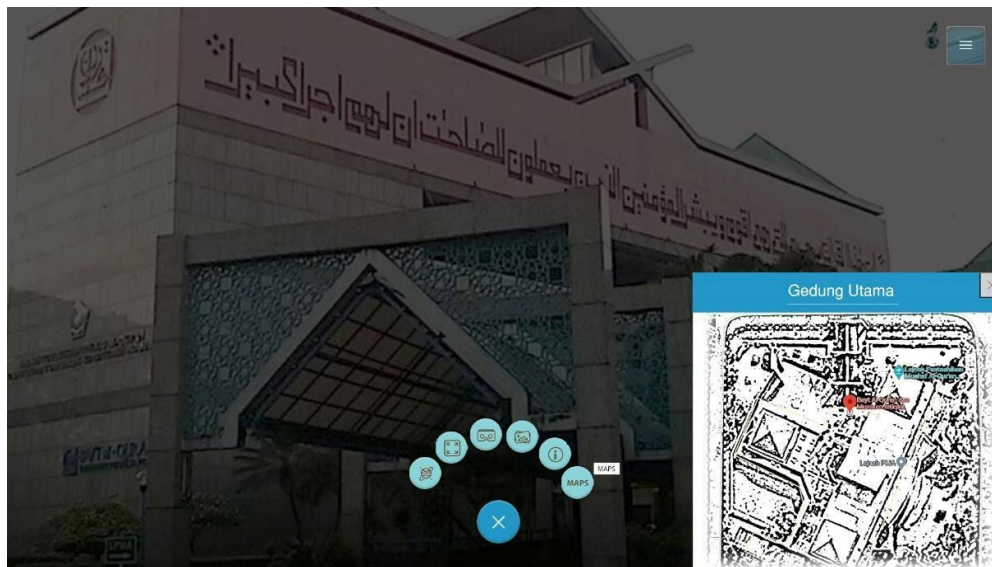

Figure 7. Display the Maps button for the full location of the Bayt Al-Qur'an Museum and the Istiqlal Mosque, Source: Imam Tobroni

After knowing the stations briefly, you can determine the steps from photography, data editing, publishing with digital data, ready for distribution and extensively tested to allow students or visitors to virtually navigate the reality tour and virtually enjoy its benefits.

5.1. Research Design
In the context of this study, as described above, the authors followed sampling rather than statistical sampling. With the limitations of the author, this research is limited to verifying and understanding the experiences of visitors, especially student, and is known as VR technology with a level of knowledge and familiarity through VR tours and also other new technologies that based on the respective background visitor.

5.2 Website User Visit Data Table
Data on visits to Museum locations were analyzed as research material to show changes in numbers, both from 7-10 years old, 11-14 years old, and 15-18 years old, based on gender: Male and Female, and based on Visitor Classification: Students, the general public, and foreign tourists. Apart from the COVID-19 pandemic, this downward trend is also due to a lack of information and ways to promote the Museum, both of which need to be improved through a VR Tour, which is expected to increase visits and provide a different experience. As previously stated, the VR Tour gives the impression that you are in a room and can explore every other room. The use of VR Tour technology appears to be capable of replacing some activities without the need for physical presence. (Table 1)

Table 1. Total Annual Visits to Museum Bayt Al-Qur'an dan Museum Istiqlal on Location,
Source: Bayt Al-Qur'an dan Museum Istiqlal

Information	Tahun			
	2018	2019	2020	2021
Ages				
7 - 10 years old	98.859	92.756	37.214	25.304
11 - 14 years old	173.003	162.324	65.124	44.283
15 - 18 years old	222.432	208.702	83.731	56.935
Total	494.293	463.782	186.069	126.522
Gender				
Man	296.576	278.269	111.641	75.913
Woman	118.630	111.308	44.657	30.365
Visitor Classification				
Students	494.293	463.782	186.069	126.522
General	42.547	45.557	22.064	14.526
Foreign	3.517	3.516	859	569
Total	**540.357**	**512.855**	**208.992**	**141.617**

Table 2. Visits Annual Bayt Al-Qur'an and Museum Istiqlal Website online,
Source: Bayt Al-Qur'an dan Museum Istiqlal

Information	Year			
	2018	2019	2020	2021
Age 7 - 18 years	75.692	54.850	269.752	255.320
Gender				
Man / Woman	75.692	54.850	269.752	255.320
Visitor Classification				
Student	45.415	32.910	161.851	153.192
General	22.708	16.455	80.926	76.596
Foreign	7.569	5.485	26.975	25.532
Total	75.692	54.850	269.752	255.320

According to the results of the review in the Table 1 and Table 2, the majority of students or children, both men and women, have never directly visited the Bayt Al-Quran Museum and the Istiqlal Museum. The purpose of visiting museums, particularly religious museums, is to gain insight into information. They stated that visiting the Museum was their choice with the teacher's recommendation as a school task, and that activities during the visit were expected to be comfortable and allow them to socialize with other people. The majority of students are aware of VR technology and have used it and its features during virtual visits. However, most people still use VR for entertainment and games, and students use it very little in school.

6. Conclusions
Based on the findings of research and data analysis in general, it is possible to conclude that the use of Education-based Virtual Reality media can address these challenges by demonstrating virtually and completely how students can interact without physically being present at the location. Students and visitors can create a simulation sensation with

the Virtual Reality Tour media to add insight and understanding of the Al-Quran Mushaf in a new way. As a result of the COVID-19 Pandemic, VR has become one of the educational media, which is very helpful for students in particular, so that they can present simulations like in the real world, where they can see the Istiqlal Mushaf comprehensively through VR media, not only being able to provide a sensational experience and unique through the screen, but can also 'dive' and interact in three dimensions, simulating many senses, sight, hearing, and touch. Furthermore, the virtual experience can be widely shared via social media accounts.

Further research can be based on learning media via Virtual Tours, in addition to museums, on other tourist objects in Indonesia. Using the AR-Augmented Reality platform, the content of objects can be in 3D. Can be done virtually online. VR Tour can help spread the word about the role of virtual reality in education in general in Indonesia, from elementary to upper secondary levels. While many aspects of its application and use are explored in the current literature, some important aspects, such as the impact of VR on its social experience, remain to be researched and studied. (Parker 2020)

Moreover, because the museum in TMII has very special material as well as a wide variety of insights about Indonesia, this research can be developed and applied to other museums in TMII. Other than museums, it is possible that this VR technology will be adopted by places related to tourism and education.

Acknowledgment

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Biographies

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