



Virtual Reality Video for Exhibition Design in Response to The Covid Pandemic

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ABSTRACT

Covid-19 pandemic does not become an obstacle for the artist to continue to innovate both creating and exhibiting their work. One of the innovations in organizing art activities is to switch the format from physical exhibitions to virtual exhibitions during the pandemic. The creation of the 360 video-based virtual exhibition “Estetika Sanggit” using 3D animation as a response to the pandemic is based on the concept of User-Centered Design. This research uses a descriptive-qualitative method with a phenomenological approach. The use of this methodology is to discuss the designer’s subjective experience in integrating multiplatform technology (3D animation, 360° video, and Virtual Reality) in designing a virtual exhibition that is “friendly” to visitors. The results of this research show that the designer succeeded in creating a 360° video virtual exhibition that greatly facilitates users in accessing and enjoying the virtual exhibition as if enjoying a physical exhibition. This is evident in the presentation of the virtual exhibition and is obtained from the positive impressions of visitors to this virtual video. These positive impressions demonstrate IDE Studio’s success in designing products that meet user needs.

Keywords: exhibition; virtual reality; 360° video; pandemic

ABSTRAK

Pandemi Covid-19 tidak menjadi penghambat bagi seniman untuk terus berinovasi baik berkarya maupun memamerkan hasil karyanya. Salah satu inovasi dalam menyelenggarakan kegiatan kesenian adalah beralih formatnya pameran fisik ke pameran virtual di masa pandemi. Penciptaan pameran virtual “Estetika Sanggit” berbasis video 360 dengan menggunakan animasi 3D sebagai respon menghadapi pandemi didasarkan pada konsep *User-Centered Design*. Penelitian ini menggunakan metode deskriptif-kualitatif dengan pendekatan fenomenologi. Penggunaan metodologi ini untuk membahas pengalaman subjektif desainer dalam mengintegrasikan teknologi *multiplatform (3D animation, 360° video, dan Virtual Reality)* pada perancangan pameran virtual yang “ramah” terhadap pengunjung. Hasil dari penelitian ini menunjukkan bahwa desainer berhasil menciptakan pameran virtual video 360 yang sangat memudahkan pengguna dalam mengakses serta menikmati pameran virtual tersebut layaknya menikmati pameran fisik. Hal ini tampak pada sajian pameran virtualnya dan didapatkan dari kesan positif para pengunjung video virtual ini. Kesan positif tersebut menunjukkan keberhasilan IDE Studio dalam merancang produk yang sesuai dengan kebutuhan pengguna.

Kata kunci: pameran; virtual reality; video 360°; pandemi



1. Introduction

Dealing with the Covid-19 pandemic that happens in Indonesia, many policies have been made by the government to limit the movement of the community in public activities. This situation requires organizers to be able to respond to existing policies and adapt to changing social conditions where there are restrictions on social activities and community activities. Of course, this greatly affects art activities that generally take place offline. To respond to this condition, various arts organizers modify the structure of activities by utilizing alternative and digital media. The concept of online exhibitions has been widely practiced, especially during the pandemic era in 2019-2021, many virtual exhibitions were held (Ulva, 2022). In this case, the pandemic is a point of cultural change when things that are generally done in the real world can also be realized in the virtual world. Of course, this change is supported by the rapid advancement of industrial technology where there is a shift in people's lives towards a digital lifestyle, accelerating the emergence of digital culture in society.

Despite the success of virtual reality art exhibitions as a new breakthrough during the pandemic, there are many drawbacks in that the exhibitions are closed and can only be accessed by certain people. In addition, elderly people have difficulty navigating the website or application for virtual reality art exhibitions due to their lack of understanding of technology. This is an obstacle for everyone who wants to get a new experience in enjoying the works of artists in virtual exhibitions. The capabilities of devices such as computers must also be qualified in order to access website-based virtual exhibitions and applications with good quality for an eye-pleasing experience. Rahmasari (2021) said that the effort to enter the virtual exhibition requires a fairly long loading time until the VR simulation can open 100%. This is reinforced by the research results that the use of two devices to access the virtual exhibition portal is included in the middle-class specifications, indicating that artsteps.com requires a qualified device because the operation is quite heavy. Another obstacle in running a web-based virtual exhibition is technical problems such as slow internet connection, network interference, and other technical problems. This can disrupt the smooth running of the event and make visitors feel uncomfortable (Simhive, 2023).

Based on the explanation above, in creating a virtual reality exhibition that is easily accessible to any audience, of course, we must pay attention to the exhibition format. In this case, researchers have seen many website-based virtual reality exhibitions or applications as an exhibition site that uses virtual reality 360. Some of these website-based virtual art exhibitions certainly cannot be accessed anymore in the present because the time of the exhibition has passed, even the website is only known by certain people. When viewed from the various shortcomings that arise from the use of websites and applications as sites to access virtual reality exhibitions, it seems that IDE Studio is able to present a virtual reality art exhibition with a different format than usual. IDE Studio, a teaching factory engaged in digital imagery and effects, has created a virtual art exhibition called "Estetika Sanggit" Virtual Exhibition based on animated videos uploaded on the YouTube platform. This is a breath of fresh air for connoisseurs of virtual reality exhibitions because this exhibition is more accessible and searchable just by looking for it on the famous platform, YouTube.

The ease of access offered by IDE Studio to the audience is able to facilitate the enjoyment of each work on display without being limited by time and distance, only with the internet. Visitors from all over the world can easily access virtual art exhibitions uploaded through YouTube. In addition, visitors can view the works on display without the need to be present in person at the venue of the exhibition. Just by staring at the screen and under any conditions, audiences can explore the exhibition space as freely as enjoying a physical exhibition. The many conveniences obtained from virtual exhibitions apart from physical exhibitions are worthy of research on the strategies used in designing virtual reality videos for art exhibitions in response to the Covid-19 pandemic and the responses given by visitors to the exhibition.

2. Literature Review

2.1. Virtual Reality Video

360° video or virtual reality video is a panoramic video that allows for a full 360° horizontal and 180° vertical view. Often, when it is told about panoramic video, it refers to the so-called 360-degree video. The 360-degree panorama, in turn, can be divided into a cylindrical panorama and a spherical panorama (Petrov et al., 2018). Video VR includes two technologies, namely video and virtual reality. Video can capture the dynamic appearance of the real world in a way no other technology does; virtual reality technology, on the other hand, enables the display of dynamic visual content with unparalleled realism and immersion (Richardt et al., 2017). The combination of the two technologies makes it possible to provide an interesting photo-realistic experience for the audience.

Currently, 360° videos can be enjoyed on Facebook and YouTube which are easily accessible to many people. In addition, it has been researched by a few people, including Ismail (2022) examining the effects of virtual reality (VR) video whose results show that it is better at improving student learning outcomes when compared to traditional face-to-face (expository) learning. In addition, Feng Li et al. (2023) examined the effects of spherical video-based virtual reality (SVVR) and conventional video (CV), which showed that the improvement of writing expectations in the CV group was significantly higher than that of the SVVR group. Several VR video creations have been carried out by researchers before, most of them are aimed at learning, such as the development of virtual reality-based learning videos in elementary schools (Ramdhan Dwi Ratriana, 2017), the development of learning videos for making virtual reality fashion for vocational school students (Purnawirawan et al., 2022), and the development of virtual reality video media for dance learning (Pranoto et al., 2022). However, the development of VR videos for museums such as research objects is still rare.

2.2. Online Exhibition

Traditionally art exhibition is understood as an event. It is the space in which art objects meet an audience (Christou, 2016). However, what about online exhibitions, it raises confusion about the definition or limitations of online art exhibitions, who is involved, and where and when the exhibitions take place. The terms of this type of exhibition are quite diverse, such as online art exhibitions, online virtual exhibitions, immersive art exhibitions, and so on. Online virtual exhibitions (VE) are acknowledged as important complimentary counterparts to physical exhibitions (Foo, 2008). Virtual exhibition is defined as an online web-based hyper-textual dynamic collections devoted to a specific theme, topic, concept or idea (Silver, 1997). Conventional art exhibitions, such as sculptures and paintings, can apply digital technology (virtual reality) to create an immersive experience, namely online art exhibitions, especially through virtual reality galleries. The current immersive art exhibitions can be roughly divided into two types: one is traditional exhibitions that apply contemporary digital technologies and new media technologies to display vividly traditional artwork, in an attempt to create an immersive atmosphere (Gao, 2021). The object studied is the second type of cast.

Online exhibitions began to grow during the Covid pandemic, including studies on those types of exhibitions that have accompanied them. Jing Gao (2021) examined art exhibitions in the era of immersive media, the result of his research is the transition of art exhibitions in the era of immersive media from three aspects: the way of display, the form of information communication, and the aesthetic experience. Ratna Cahaya and Rani Widjono (2023) examined online art exhibitions with the finding that the importance of dialogue for the existence of artists by building relationships with visitors. Research by Khairunnisa et al. (2021) revealed that the virtual exhibition is then further developed into three dimensional (3D) technology. What distinguishes this research is how the ideas and creations of artists in designing virtual reality exhibitions are the focus.

3. Methods

The virtual exhibition that the author researched was Eyang Dharso's 70th Retrospective Exhibition "Estetika Sanggit". - An International Fine Art Virtual Exhibition with the theme of the Encounter of Tradition and Modernity in the Art Work Paradigm. This is based on the idea of "Estetika Sanggit" which provides art creations with a strong local cultural foundation to support cultural identity in the context of global flows. This virtual exhibition is based on a video produced by IDE Studio, FTV Indonesian Institute of the Arts Surakarta and uploaded on YouTube on September 3, 2021. The exhibition held from August 1 to December 1, 2021, however, the videos from this exhibition can still be accessed at any time. The works presented in the virtual space are divided into 3, namely traditional works, traditional works with a modern touch, and contemporary works. There are 76 works on display at the virtual exhibition of FSRD Institute of the Arts Surakarta consisting of works by artists from various countries such as Indonesia, Malaysia, Grenada, Korea, Morocco, and Bangladesh.

This research uses a descriptive-qualitative method with a phenomenological approach. Phenomenological studies describe the common meaning of a number of individuals to their various life experiences related to concepts or phenomena (Creswell, 2023). This methodology is used to discuss the overall subjective experience regarding the convenience of using multiplatform technology (3D animation, 360° video, and Virtual Reality) in the design of virtual exhibitions that consider the needs of visitors. In order to create a virtual exhibition as a new experience for visitors, the concept of virtual exhibition design and development is based on User-Centered Design. This approach is used as a perspective in examining the experience of the designer and his work as well as the perceptions of visitors who have experienced first-hand the use of virtual technology in virtual exhibitions.

There are two data sources in this research, namely primary data and secondary data. Primary data is obtained directly from the source or research subject through interviews with resource persons. The main source is Koko Is Prayogo as the animator of the video-based virtual reality exhibition. The second resource person is R. A. Sugihartono as the leader of IDE Studio. Meanwhile, secondary data is obtained through the virtual exhibition video "Estetika Sanggit" uploaded on the IDE YouTube account: Image Digital Effect with the link https://youtu.be/4XVAWR5kII4?si=9V68MvnpAs4fl_cp. In addition, additional information was obtained through mass media sites and official institutions that contain news about the international art virtual exhibition "Estetika Sanggit".

Data collection in this research was conducted using interviews, observations, and literature studies. The purpose of this interview is to obtain accurate, in-depth, and direct information from the designer. The questions asked through direct interviews with the interviewees were about the strategy of designing video-based virtual reality art exhibitions that have been carried out by them. In the observation stage, observation of the object is carried out by viewing the results of a virtual reality art exhibition video called Virtual Exhibition "Estetika Sanggit" uploaded on the YouTube digital platform. Data collection is also carried out through literature studies related to information about IDE Studio and Koko Is Prayogo contained in catalogs or websites.

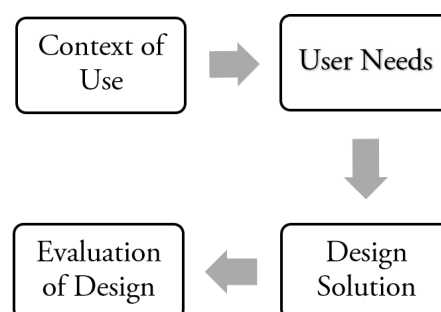


Figure 1: User-centered design (UCD) model for virtual exhibitions (Source: Adapted from Robinson, 2021)

Data reduction in this research uses data results from observation techniques, interviews with informants, and literature studies from video-based virtual reality exhibitions. The data obtained when researching the design strategy of art exhibitions using 360° virtual reality technology will be selected and chosen by taking important points. At this stage, the researcher develops a description of the information arranged to present the research findings, so that it is easy to understand in the form of images from the screenshots of the virtual exhibition “Estetika Sanggit”, and narrative written data exposure both quotations of resource persons’ statements and exhibition visitors’ responses. In the last stage, the researcher draws conclusions by compiling research findings in the form of statements which are then verified with the formulation of the problem/research objectives and data presentation that has been presented previously, and finally compiles recommendations or suggestions.

4. Results

When Indonesia was struck by the Covid-19 epidemic, many art galleries and museums were closed by government policy to contain the spread of Covid-19 infection. This is an obstacle for artists to showcase their work through exhibitions. Therefore, Eyang Dharso’s 70th Retrospective Exhibition “Estetika Sanggit” - The International Fine Art Virtual Exhibition with the theme of the Encounter of Tradition and Modernity in the Art Work Paradigm is presented to be one of the solutions in the midst of a pandemic. In its development, the art exhibition “Estetika Sanggit” uses audiovisual elements, 360° visual display, interactive art, and virtual reality to create the impression to visitors that they are in a real gallery. In this virtual exhibition space, various types of art are presented, including painting, sculpture, graphic design, photograph, video, and animation.

4.1. Concept

Starting from the Covid-19 pandemic situation that still occurred in 2021, it forced exhibition organizers to hold virtual exhibitions. Most virtual exhibitions that are held are created using websites such as Artsteps or applications. Prayogo (Interview, December 18, 2023) considers that the use of the Artsteps website for virtual art exhibitions is not accessible to everyone due to the heavy operation for low-capability devices. When opening the Artsteps website or other applications that contain data, it relies heavily on the device to run the programming. In addition, the results obtained tend to be less stable in terms of the quality of the visual display. When compared to making an exhibition with an output in the form of a VR video, of course, the visual appearance of a virtual reality exhibition can be maximized because rendering is done on the animation with a 4K size setting. As a result, the 360 virtual exhibition video can be enjoyed by all audiences with internet access without the need to adjust the capabilities of the devices owned.

Koko Is Prayogo (interview, December 18, 2023) revealed that the idea of making a 360° video exhibition for the virtual exhibition “Estetika Sanggit” was 100% done using a computer with full animation, even at that time no one had done it in Indonesia except abroad. The challenge was the difficult rendering process. A total of 8000 JPEG image files were processed using 30 computers where the rendering process of 1 image took 25 minutes. The 360° video was chosen as the media format for the virtual exhibition because the video can be played through mobile phone, laptop, computer, tablet, including VR glasses. Another consideration that became the basis for designing the virtual exhibition video was mentioned by Prayogo in an interview that:

“Normalnya Artsteps atau aplikasi memungkinkan pengunjung bisa berjalan-jalan layaknya game. Namun bikin bingung bagi orang yang sudah tua, apalagi kebanyakan kolega dari Prof. Dharsono sudah sepuh. Solusi paling tepat waktu itu ya video, tinggal play. Paling interaktifnya hanya bisa nengok ke kiri dan ke kanan ataupun dimajukan durasinya.” [Normally Artsteps or the app allows visitors

to walk around like a game. But it is confusing for older people, especially since most of Prof. Dharsono's colleagues are elderly. The most appropriate solution at that time was video, just play. The most interactive part is only being able to look left and right or advance the duration] (Koko Is Prayogo, interview, December 18, 2023).

From the sentence expressed by Koko, it is clear that the creation of this virtual exhibition is very friendly to people who are old or have experienced virtual exhibitions for the first time, so that it does not confuse users in accessing it.

4.2. Virtual Exhibition Form

In the 360° video virtual exhibition “Estetika Sanggit” that can be viewed through the YouTube platform, there are 2 types of versions, namely version 1 and version 2 (4K). The 4K resolution certainly produces a visual display quality like coming directly to the exhibition. Supporting features are also implemented in this video to facilitate visitors in accessing and viewing artworks online, such as the zoom in, zoom out feature, rotating the 360° visual display by sliding the screen using a finger or mouse to the right, left, up, and down, even tilting the phone. This also applies when using VR glasses or VR Goggles where the visual reality is even more beautiful to enjoy. In addition to the features added as visual elements in the 360° video, there are also audio elements which form the drama in this exhibition. There are 2 voices where the female voice acts as a guide to the virtual exhibition “Estetika Sanggit”, while the other voice is audio from gamelan instruments as a backsound in the video. This video is also presented with English subtitles as a supporting language to facilitate foreigners when playing this virtual exhibition video. The following is a description of the form of the virtual exhibition and the features presented to facilitate exhibition visitors in enjoying the 360° video-based virtual exhibition.

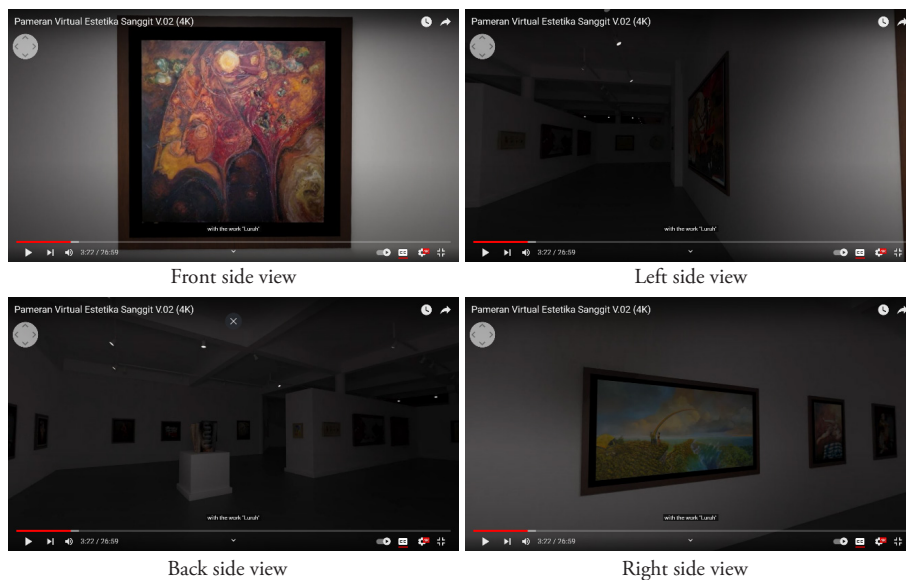


Figure 2: Painting by Nurul Hidayati titled Luruh

(Source: YouTube Virtual Exhibition of Sanggit Aesthetics V. 02 (4K), 2021, timecode: 00.03.22)

Figure 2 shows the features provided in this virtual exhibition in the form of a button to rotate the image display where the button is placed in the upper left corner. This gives the impression that this virtual exhibition runs like an offline exhibition. Visitors can see the surroundings of the room in addition to seeing the artworks being described by the exhibition guide. During the description of the artworks, the light source is focused on only one artwork that is being narrated. This is so that the attention of visitors to the exhibition is not easily distracted by other artworks around them. Visitors can still see the back and sides, but the lighting is automatically dimmed. When the narrator has finished explaining the artwork, the lights throughout the exhibition are turned back on.

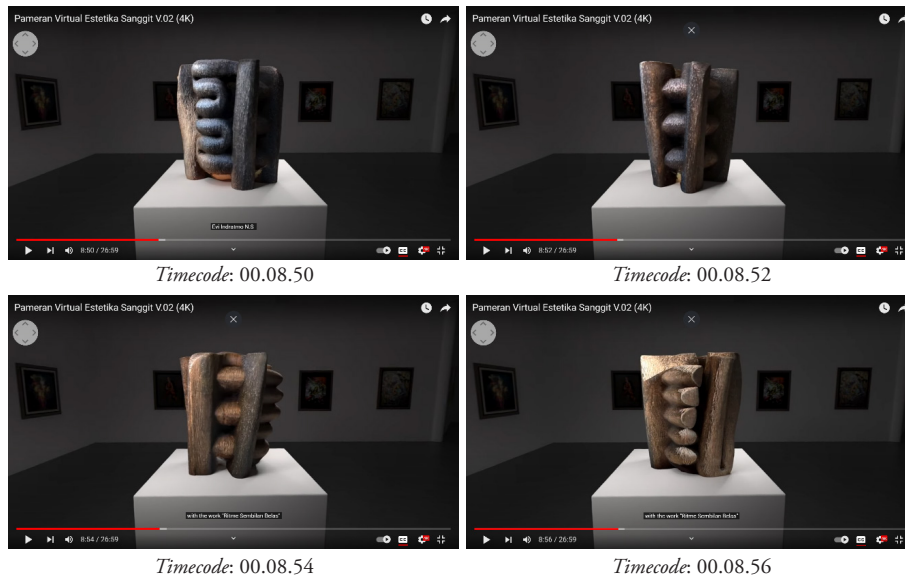


Figure 3: Evi Indratmo N. S.'s sculpture with the title Nineteen Rhythms (Source: YouTube Virtual Exhibition of Sanggit Aesthetics V. 02 (4K), 2021)

Figure 3 is a screenshot showing the animated movement applied to the sculpture. The sculpture is titled Nineteen Rhythms and is the artwork of artist Evi Indratmo. Especially for 3D artworks, when the video playback is running, only the artwork is animated with a clockwise rotating motion. The design of the 3D artwork is made in such a way that it is easy for visitors to see the 3D artwork from 1 direction without the need to rotate around the artwork. In figure 4, a visual display of using the zoom in or zoom out feature on the virtual exhibition video. This allows visitors to see the artwork more clearly and closely as if they were seeing a live exhibition. One example of its application is to enlarge the screen (zoom in) of the artwork of Dr. Ponimin M. Hum to be able to see the details of the carvings in his artwork.

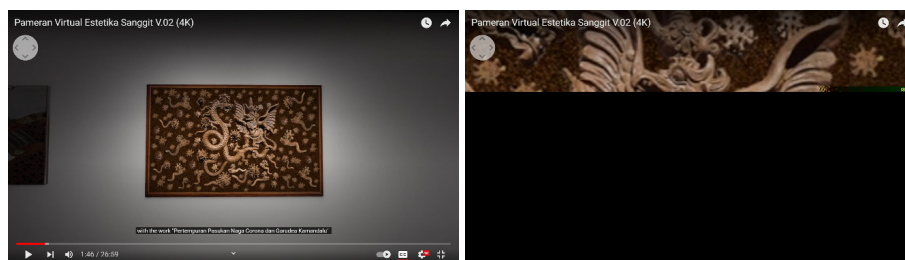


Figure 4: The artwork of Dr. Ponimin M. Hum with the title Battle of Corona Dragon Troops and Garuda Kamandalu (Source: YouTube Virtual Exhibition of Sanggit Aesthetics V. 02 (4K), 2021, timecode: 00.01.46)

Figure 5 show a visual display in presenting video artwork in the virtual exhibition. The videography artwork was made by Nurul Hidayati with the title Kebaya Sulam Malangan. The thumbnails of the artwork displayed in this virtual exhibition are made like YouTube video thumbnails. Visitors can directly enjoy the artworks that are played directly without the need to press anything on this virtual exhibition video. This video art work lasts 1 minute 32 seconds.



Figure 5: Nurul Hidayati's videography artwork entitled Kebaya Sulam Malangan (Source: YouTube Virtual Exhibition of Sanggit Aesthetics V. 02 (4K), 2021, timecode: 00.13.15)

4.3 Visitor Response to the Exhibition

Although the exhibition was held online, visitors were still able to interact with it by expressing their appreciation and impressions in the comments section. Almost all of the visitors' responses express the convenience of this virtual exhibition. Here are 4 positive responses that represent the overall comments from visitors to the virtual art exhibition who left their mark in the YouTube comment section.

Table 1: Comments of visitors to the virtual exhibition "Estetika Sanggit"

Visitor	Comment	Description
Ahmad Thoyyib - Bekasi	<i>"Mantap! Inovasi seperti ini bisa menjadi daya tarik sendiri, dengan campuran teknologi bisa membuat banyak orang dapat menikmati karya seni dari layar komputer maupun HP semoga semakin maju untuk pameran seni. [Great! Innovations like this can be an attraction in itself, with the combination of technology can make many people enjoy art from a computer screen or cellphone, hopefully in the future it will be more advanced for art exhibitions]"</i>	The comment given by Ahmad shows that in addition to being easily accessible via mobile phone or computer screen, video-based virtual art exhibitions do not require visitors to have a qualified device to play video of the exhibition. Any type of device can access it as long as it has a stable internet connection.
Rayza Teguh Prastiyo - Kebumen	<i>"Dengan adanya Pameran Karya Virtual ini, menghadirkan wajah baru di dunia kesenian dan merupakan hal yang baru juga bagi sebagian orang. Pameran ini mempunyai konsep yang sangat luar biasa yaitu dengan menggunakan dan memaksimalkan teknologi yang sudah sangat berkembang pada zaman ini. Dengan adanya pameran seperti ini pula kita semua bisa mengakses secara fleksibel tanpa terbatas ruang dan waktu, selain itu semakin mudah untuk memahami setiap karya yang ditampilkan dengan adanya fitur VR atau 360° seperti ini. Karena pandemi belum berakhir, pameran virtual seperti ini sangat efektif terutama agar penikmat seni tetap aman dengan mengakses lewat platform youtube dari rumah masing-masing. [With this Virtual Art Exhibition, it presents a new face in the world of art and is also a new thing for some people. This exhibition has a very extraordinary concept which uses and maximizes the technology that has developed in this era. With an exhibition like this, we can all access it flexibly without being limited by space and time, besides that it is easier to understand each artwork displayed with the VR or 360° feature like this. Since the pandemic is not over yet, virtual exhibitions like this are very effective, especially for art lovers to stay safe by accessing via the YouTube platform from home]"</i>	Rayza's comment explained that the convenience of video-based virtual art exhibitions can be accessed by anyone, anytime, and anywhere. This is based on the reason that the virtual exhibition is not limited by time, space, and visitor capacity.
Yohanes Christian Santosa - Surakarta	<i>"Sebuah Inovasi yang sangat bermanfaat bagi seniman untuk mendapatkan wadah menunjukkan karya dan bagi masyarakat sangat mudah untuk mengaksesnya juga sangat aman untuk tidak bertemu orang banyak sehingga pameran ini sangat patut untuk diapresiasi. [An innovation that is very useful for artists to get a place to show their artworks and for the community it is very easy to access it and it is also very safe not to meet many people so this exhibition is very worthy of appreciation]"</i>	Yohanes' comments explain the ease with which visitors can access the virtual exhibition by simply viewing the artists' artworks through YouTube videos. Visitors do not need to come to the exhibition as part of complying with health protocols during the pandemic.
Novenia Theryani - Surakarta	<i>"Pameran Virtual Estetika Sanggit ini menyajikan pameran yang dapat membuat penonton merasa seperti datang langsung ke dalam museum. Pemaparan nama karya dan penciptanya disampaikan secara jelas dan lugas sehingga kami dapat menerima informasi yang disampaikan dengan baik. Pengambilan gambarnya juga sangat bagus dan tidak membuat penonton merasa bingung karena belum terbiasa dengan fitur 360 derajat seperti yang disajikan di pameran virtual ini. [The Sanggit Aesthetic Virtual Exhibition presents an exhibition that can make the audience feel like coming directly to the museum. The explanation of the name of the artworks and its creator is conveyed clearly and straightforwardly so that we can receive the information conveyed well. The shooting is also very good and does not make the audience feel confused because they are not used to the 360-degree feature as presented in this virtual exhibition]"</i>	Novenia's comment shows that the features in the exhibition have been directed automatically both from the screen movements and the narration like a tour guide that guides visitors in viewing and traveling around the exhibition, so that visitors are not confused in enjoying the works on display. Video-based virtual art exhibitions are also very friendly to old or young people, as they do not require complex knowledge to operate the available features.

From the four comments, it appears that visitors do not only come from within the city, namely Surakarta City as the organizer of the virtual art exhibition, but visitors come from other cities such as Bekasi City and Kebumen City. In fact, even international audiences can participate only with the internet and devices such as computers and cellphones. It is clear that the reach that can be achieved in attracting art lovers to visit virtual exhibitions in the form of 3D virtual reality 360° videos is very broad. Visitors who are in any part of the world can also access it without age restrictions. This makes it easy for anyone who wants to experience new perspectives and experiences in enjoying artworks digitally.

5. Discussions

The various positive responses received show that the continuity of this video-based virtual exhibition is successful to the extent that it can replace physical exhibitions during the pandemic. Therefore, the positive response shows that the video-based virtual exhibition created by IDE Studio is no less interesting than other virtual exhibitions. Not only using the web and applications in making virtual exhibitions, but virtual exhibitions are carried out with recordings on physical exhibitions where shooting using a 360° camera on each artwork in the physical exhibition, then the results are edited using Adobe Premiere. Out of the many virtual exhibitions, the organizers did not maximize technology in the field of 3D animation. Of course, the creation of IDE Studio, which applies full animation to the creation of virtual exhibitions, can be a lesson for the younger generation who pursue animation. In addition, apart from the lack of understanding of computer science in creating a web or application for art practitioners who only work in the realm of art, of course the use of full animation can be an option for organizers of art activities without the need to learn things outside their realm.

A consideration when creating web-based virtual exhibitions such as Arsteps is the difficulty experienced by art lovers who have difficulty accessing web-based virtual exhibitions or applications when their devices have limited capabilities. The inability of the device to perform the operation of opening a web-based virtual art exhibition or applications to its full potential greatly affects the quality of the images produced. This certainly affects the experience felt by visitors when the quality is low and not clear, visitors cannot feel the experience like visiting a physical exhibition. Not only that, it is very easy for the elderly who are mostly less able to operate technology with the existence of video-based virtual exhibitions. As visitors, they only need to play the virtual exhibition as if they were watching a video in general on YouTube. They can enjoy the offerings provided without worrying about and avoiding missed artworks when walking around. From the convenience that can be felt by visitors, this shows that the design of a product needs to consider the needs and desires of users. In accordance with the concept promoted by Donald A. Norman (1988: 188) in the book *The Design of Everyday Things* where he emphasizes systems that can adopt user needs and systems that can simplify user needs so that confusion and difficulties felt by users can be minimized.

The innovation and adaptation of an art exhibition that was originally a physical exhibition and then transformed into a virtual exhibition is the application of technology to an event as a utilization of technology. In the future, the development of 3D 360° video animation applied to virtual exhibitions must continue considering the development of increasingly sophisticated technology, so as to maximize 360° video animation that is more vivid and immersive, and can provide an interesting and satisfying experience for the audience. With the sophistication of technology in the present and future, it is necessary to realize the importance of animation development in Indonesia, one example is 3D 360° video animation applied to virtual exhibitions. This can be a step to advance and develop the field of animation in Indonesia as part of science and technology.

6. Conclusions

IDE Studio designed a virtual art exhibition “Estetika Sanggit” which was realized using 360° video 3D animation by presenting a comfortable virtual exhibition for visitors. The design of 360° video-based virtual exhibitions by IDE Studio can be felt by visitors who leave positive impressions and messages about virtual exhibitions in the YouTube comments column. Of course, this is a success for IDE Studio in designing product that suit user needs.

From this research, it was concluded that the design of the video-based virtual exhibition “Estetika Sanggit” was created based on user needs. The user needs include the need for a virtual exhibition that is easily accessible, a virtual exhibition whose visual appearance does not confuse users, a virtual exhibition that does not rely on device performance in its operation, and a virtual exhibition with features that make it easy for visitors to enjoy the exhibition like visiting a physical exhibition. Of course, this video animation-based virtual exhibition is aimed at a wide range of ages, so that not only the tech-savvy younger generation can access it.

From this research, it is hoped that it can be a lesson for designing a product which is tailored to user needs. Not only that, through the creation of virtual exhibitions using 3D animation based on animated videos, it can be used as a reference for practitioners who work in the field of animation. Therefore, in its creation still requires a lot of development, it is hoped that the 360° video-based virtual reality exhibition initiated by IDE Studio by utilizing 3D animation can be the basis for product development on the use of animation which is certainly better and more immersive in the future. The more sophisticated technology does not rule out the possibility of greater changes in the animation industry in Indonesia in the future.

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