


# Study of Image Resolution in Virtual Reality Panorama Technology 360 In Comfort of Interior Visualization

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## ABSTRACT

Utilizing virtual reality technology is used as a method of interacting virtually. With the many uses of virtual reality today, it certainly affects the lives of users of these technologies. In the field of interior design itself, virtual reality technology is also often used, the application of VR technology for design interior are often used as a means of design presentation. This study is aimed at testing the visual comfort of virtual reality panorama 360 which is used as a medium for virtual interaction of interior design to interior design users. The analysis process in taking data by questionnaire and followed by several stages of observation and the last stage is the experimental stage to take research data related to case studies. The results obtained from this study are knowing visual comfort when interacting directly using virtual reality technology. It is hoped that with the testing of the visual resolution used in interior virtual reality, it can later be used as a reference in the selection of visual media in the future.

**Keywords:** experimental, virtual reality, panorama 360



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## 1 Introduction

Virtual reality is an immersive, interactive system based on computable data that is growing daily in the field of applied science [1]. However, virtual reality has gained popularity mostly because of the videogame industry and more affordable gadgets [2]. Virtual reality (VR) or Technology called virtual reality enables people to engage with a computer-simulated environment, an imitation of the real world, or a world that only exists in their minds. The 360-degree panorama conditions were determined to be more realistic than the VR ones, although experts saw no difference between them [3] However, some simulations also include extra sensory data, such as sound through speakers or headphones and visualization. Current virtual reality environments often offer a visual experience, which is exhibited on a computer screen or through a smart phone device. Researchers discovered that while amateurs thought the VR circumstances were more realistic, pros saw no difference between the two [4]. Technology called virtual reality (VR) can make humans feel as if they are in another reality world, where these humans will experience the unreal reality environment, even though in physical reality the humans are not there [5]. This technique primarily simulates an actual scene to depict how objects change in shape [6]. Compared to VR circumstances, 360-degree panorama conditions are more realistic [7]. The development of software and hardware virtual reality tools demonstrates the great

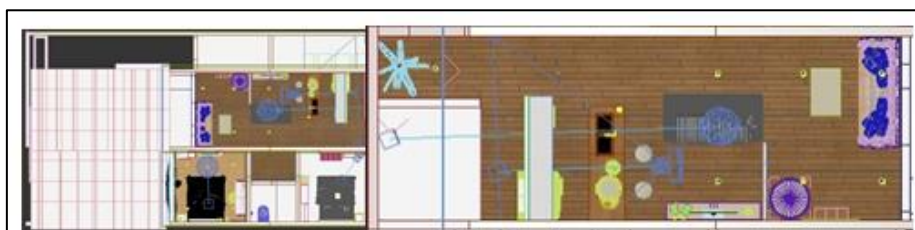
potential of information and communication technologies (ICT) in the interior design industry [8]. The process of transferring imagination is usually used with VR equipment, such as Samsung Gear VR, Google Card Board, or even using Oculus Computer-connected Rift. Redesign any modifications that need re-constructing the prototype [9]. Participating in artificial intelligence, image processing, and multisensor knowledge [10]. VR technology is no longer a new technology nowadays, but the development of VR does not stop, in 2016 the development of VR experienced its peak in which year VR began to be used in various gadget products. Interior design's use of color has an impact on emotions [11]. The emergence of VR is used as a medium for playing games, and also as a video player and 360 VR panoramic photos human sensory experience [12]. Apart from being used as games, videos and photos, VR is used. VR is also often used as a simulation, the use of VR as a simulation can be found in almost all fields of entertainment, education, tourism, planning, heritage preservation, accessibility, and management. The use of VR has made it possible to fully immerse oneself in the creation of a home or environment [13], To creates a link between high-resolution picture production, which delivers more information but requires lengthy simulation periods, and illuminance sensor calculations, which are quick to calculate but only supply limited information [14]. Visualizations in the intermittent condition demonstrated considerable reductions in visual comfort during the bright light phases [15] The goal of design is to provide target consumers with an immersive experience so they may obtain the most accurate perception at any time or location [16]. In the interior sector, there has been no research examining the use of virtual reality media as an interior presentation comfort visualization medium.

## 2 Method

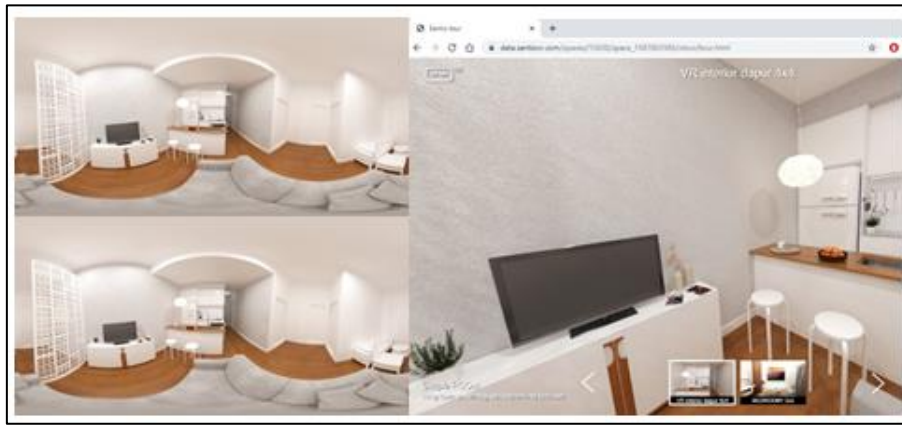
In the study of the use of interior virtual reality technology as an experimentation on interior presentations using the experimental deep interview method. Experimental according to Kerlinger (1986: 315) is as in scientific investigation, researchers manipulate and oversee independent variables while observing dependent variables to identify correlations that coincide with the alterations made to these independent factors. Arboleda (1981: 27) defines experimental as research in which the investigator deliberately controls and influences one or more variables in a certain way so that they affect one or more of the other variables being measured. To elaborate, the modified variable is referred to as the independent variable, while the variable whose impact will be observed is termed the dependent variable. Meanwhile, Isaac and Michael (1977: 24) explain that experimental research aims to examine possible causation by subjecting one or more experimental groups to various treatment conditions and comparing the outcomes with one or more control groups that haven't received the treatment. An understanding like that is given by Rakhmat (1985: 44) that by changing one or more variables in one or more experimental groups and comparing the outcomes with the control group, which did not receive any manipulation, the experimental method seeks to analyze causal linkages. Meanwhile, Robert Plutchik (1988: 213) put forward a more concise definition of experimental, which is a way of setting experimental conditions to identify variables and determine the causes and effects of an event.

## 3 Results and Discussion

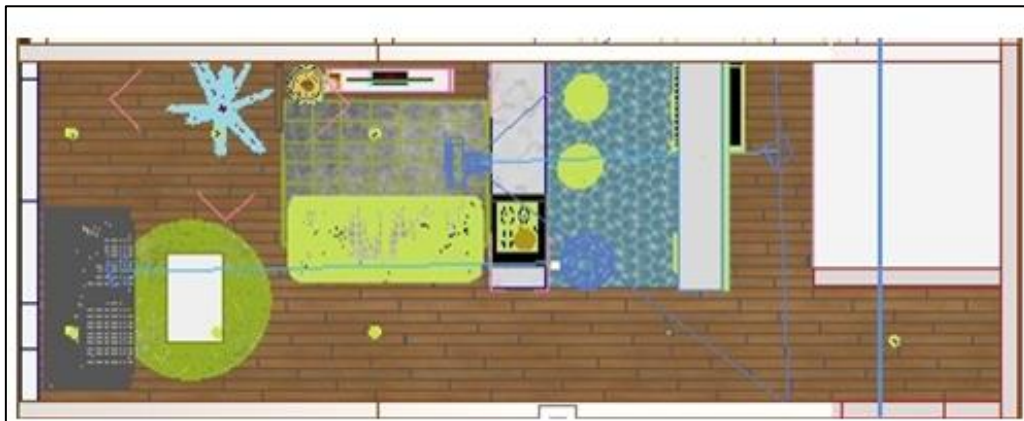
Study of interior virtual reality technology means of experimentation in interior presentations through several stages, figure 1 show the interior concept planning stage, the interior modelling stage, and the implementation stage. At the interior design concept stage, figure 3 show comparisons were chosen between classic modern interior design and modern interior design. After doing the modelling, figure 2 show the panorama 360 image will be uploaded to the panorama 360 website.



**Figure 1** modern interior layout experimentation in interior presentations



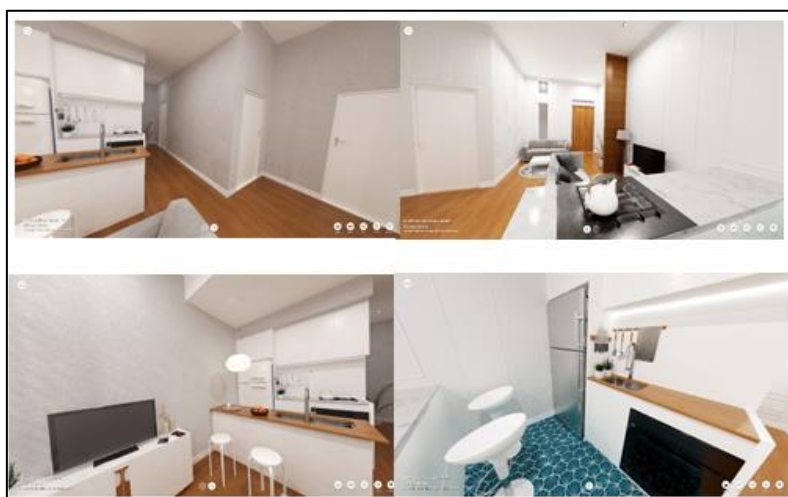
**Figure 2** Render a modern style interior layout panorama 360 image



**Figure 3** classic interior layout experimentation in interior presentations

After doing the modelling and rendering, the next step is to make experiments by making images into different styles to be used as a benchmark for evaluating the results of the research.

Here are 360 panoramic images of different styles figure 4, 5, 6, 7, 8 :



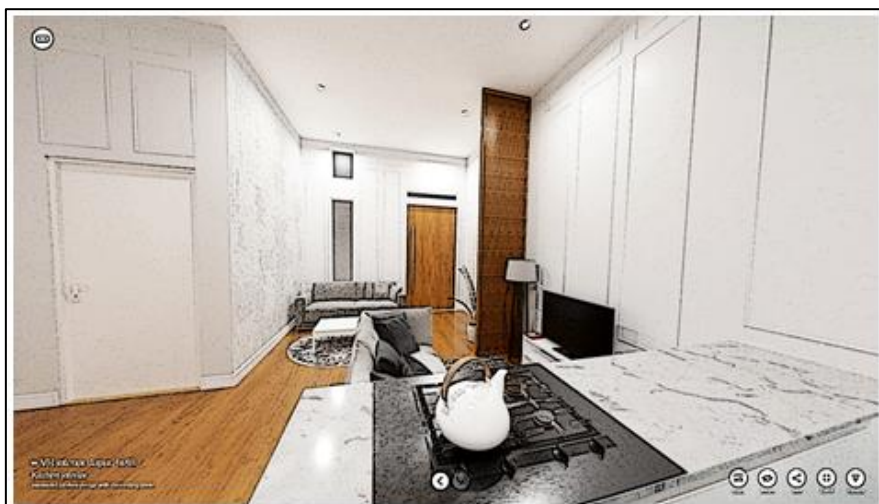
**Figure 4** modern interior layout 360 panoramic with different style



**Figure 5** high resolution render Virtual Reality 360 with natural material

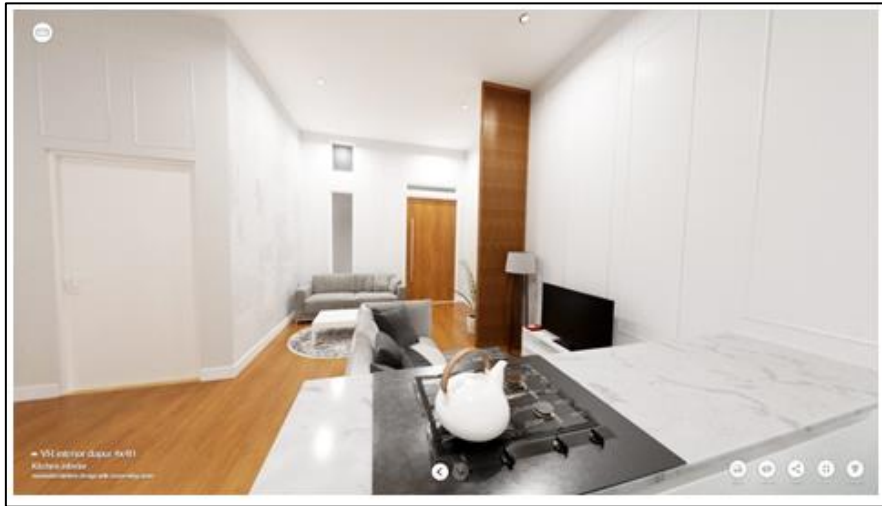


**Figure 6** Panoramic Low Resolution Render Virtual Reality style



**Figure 7** Cartoon Resolution Render Virtual Reality with no clear image





**Figure 8** Photo Realistic Resolution Render Virtual Reality close to realistic image

From some of the pictures above, an analysis of the pictures is carried out by conducting interviews with ordinary people and people who have been working in the interior sector for a long time to answer some of the questions that have been made to find answers from researchers.

### 3.1 Interview Conclusion Points

The following are points related to questions regarding the use of virtual reality as an interior presentation medium:

(1) The addition of aesthetics in virtual reality interiors can add an interesting impression to be seen by the client. (2) In terms of lighting, it can be seen clearly how light is refracted in a room. (3) With the form of virtual reality, the interior can create an atmosphere to influence the interests of the client. (4) The advantage of virtual reality itself is that it can create interest from clients to be more willing to work with the design company if the quality of the rendering is good.

## 4 Conclusion

Based on results of an analysis interior virtual reality media, it is still rarely used as a visualization medium, but interior virtual reality displays can attract consumers to use it. Virtual reality can enhance visualization in learning media because in terms of motor and emotion virtual reality can express the experiences of interior virtual reality users. In terms of time and cost, virtual reality can be more easily used as a presentation medium and interior virtual reality media will be effectively used as a visualization medium in the future.

An analysis of user preferences for interior virtual reality media as an interior visualization tool concludes that the main aspects that influence by means of interior the use of virtual reality media visualization tool are good images that look realistic and using simple devices can make consumers interested the first time, they use the media. virtual reality interiors. This preference analysis stated that this user stated that a good visual appearance greatly influenced the respondent's preference for choosing interior virtual reality as a visualization medium.

Based on an analysis of virtual reality media used as a means of visualization, it is possible to infer that respondent said the interior virtual reality display had attracted the interest of respondents, but there were also many virtual reality media. Interior virtual reality media used as a means of visualization is still considered an expensive medium because interior virtual reality is rarely used as a visualization medium. Overall, it is possible to infer that interior virtual reality media has attracted the attention of consumers to use it, but interior virtual reality media providers still seem expensive and there are still many consumers who do not understand the use of virtual reality.

As for user behavior, there should be further socialization because there are very few interior virtual reality media users because users still do not know in depth about interior virtual reality and think that other visualization media are still more affordable than interior virtual reality visualization media itself.

## 5 Acknowledgment

We would like to express our heartfelt gratitude to all those who have contributed to the successful completion of the study titled "Study of Image Resolution in Virtual Reality Panorama Technology 360 for Comfortable Interior Visualization."

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## 6 Conflict of Interest

In the interest of transparency and to uphold the integrity of the research conducted for the study titled "Study of Image Resolution in Virtual Reality Panorama Technology 360 for Comfortable Interior Visualization," we hereby declare any potential conflicts of interest that might have influenced the research process or findings. The authors have a personal interest in the advancement of virtual reality technology and its applications, including interior visualization. However, steps were taken to critically evaluate the research process and maintain objectivity throughout the study. To mitigate the potential influence of these conflicts of interest, measures such as peer review, rigorous data analysis, and adherence to ethical research practices were employed. The research findings and conclusions presented in this study are based solely on the data and evidence collected during the research process. We believe that by openly acknowledging these potential conflicts of interest, we uphold the credibility and transparency of our research.

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