Implementation of Virtual Reality In Residential Interior Development  
Case Study: Bukit Baruga

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Abstract
The implementation of Virtual Reality (VR) in housing interior development is the focus of this research, with a case study conducted in the residential area of "Bukit Baruga." VR technology is employed to enhance user experience and improve understanding of interior design before actual implementation. This case study elaborates on the step-by-step implementation of VR in the context of housing interior development in Bukit Baruga. The research covers the design process, material selection, and virtual space arrangement, enabling prospective residents to explore and interact with the interior design before final decisions are made. The results indicate that the use of VR significantly enhances user engagement, facilitates understanding of design aspects, and provides deeper insights. However, challenges such as technological infrastructure and the need for market adaptation remain crucial considerations in VR implementation. By detailing the implementation steps and evaluating their impact, this research provides a comprehensive view of how VR technology can improve the quality of housing interior development. It is hoped that the findings of this research will serve as a foundation for further advancements in adopting VR as an effective tool in the housing development industry.

Keywords: Virtual Reality, Property Interior, VR Technology Design.

Abstrak

Kata kunci: Virtual Reality, Interior Properti, Desain Teknologi VR

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1. Introduction

In the current era of advanced technology, Virtual Reality (VR) has created a new paradigm in various sectors, introducing deep and immersive experiences through the integration of three-dimensional (3D) objects, hearing and vision. This feature opens up great opportunities, especially in the context of residential interior development. In understanding these dynamics, this research focuses on the implementation of VR in the development of residential interiors, with case research conducted in an interesting residential environment, namely Bukit Baruga.

In the literature, we realize that VR technology has gained significant attention in the interior design industry. A number of studies have illustrated the potential of VR in increasing consumers’ understanding of design and stimulating their active participation in the decision-making process [1]. Study on research highlighting the importance of VR in creating a more holistic and dynamic design experience. However, there is a dearth of specific in-depth research on the application of VR in the development of residential interiors, especially in residential environments that have unique characteristics such as "Baruga Hill". [2] provides a foundation regarding the potential application of VR in the context of interior design and shows that improving user experience can be achieved through this technology.

The effort of this research is to explore further and provide a deeper understanding of the impact of applying VR in the development of residential interiors, especially in less explored areas [3]. Presenting information about consumer decision making in a real estate context using VR, but this specific application on the residential neighborhood "Bukit Baruga" is still an open question.

By detailing and deepening this research, it is hoped that we can fill this knowledge gap and provide a strong foundation for a practical understanding of how VR can be a critical element in the development of residential interiors [4], adds dimension to the importance of innovation in interior design and how VR technology can spur creativity.

In facing housing challenges in the future, especially in developing designs that are responsive to residents’ needs, this research becomes relevant in exploring the potential of VR as an innovative tool in developing residential interiors. By detailing how this technology can be effectively adopted in a specific environment such as "Baruga Hills," it is hoped that this research can contribute valuable insights to the housing development industry as a whole.

2. Method

This research was carried out using a case study approach to understand in depth the implementation of Virtual Reality (VR) in residential interior development, with Bukit Baruga as the study environment. The following are the steps and stages of the research method used:

2.1. Literature Review

Conduct a literature review of research related to the use of VR in the development of residential interiors. Then study VR implementation in similar cases and effective interior design concepts in a virtual environment.

2.2. Research Design

Develop a research framework based on the findings of literature studies and determine variables to be measured, such as the level of user engagement, design understanding, and consumer decisions.

2.3. Sample Selection

Selecting a sample of potential residents in Bukit Baruga who are willing to participate in the use of VR applications for residential interior exploration.

2.4. VR App Development

Using the Unity 3D game engine as a VR application development platform, incorporating Bukit Baruga residential interior design models into VR applications and implementing gyroscope sensor-based controls to improve interactivity.

2.5. Trial and Evaluation

Testing VR applications with selected participants. Collect data related to engagement levels, design understanding, and occupant preferences through the use of VR applications.

2.6. Data Analysis

Analyze the data obtained using appropriate statistical methods, such as descriptive analysis and hypothesis testing if needed and interpret the results of the analysis to gain insight into the influence of VR implementation in residential interior development.

2.7. Evaluation of Challenges and Successes

Evaluate technical challenges and market acceptance related to VR implementation and detail the success and positive impact generated by VR
applications in the process of developing residential interiors in Bukit Baruga.

This research method is expected to provide an in-depth understanding of the effectiveness and potential of VR implementation in residential interior development, while addressing challenges that may arise during the process.

Results and Discussion
The results of the study are in the form of virtual reality images of the interior of the house in the new evidence as follows:

Ruang Utama Virtual Reality Interior
In the main room there are several functions and can interact with users such as changing colors and can move objects in residential interior VR applications.

3.1. Master Bedroom Virtual Reality Interior
In the master bedroom there is a bed and some furniture such as tv, table, chair and can interact with the user by changing the color of the bed and opening the cabinet.

3.2. Children's Room Virtual Reality Interior
In the child's room there is a bed, study table and the user can change the color of the blanket from the bed.

Figure 1: Main Room View of Home Interior
Figure 2: Echoing VR Object Colors
Figure 3: VR view of Main room
Figure 4: VR display changing the color of the blanket
Figure 5: VR view of Children's Room
3.3. Toilet Virtual Reality Interior

In the toilet there are several furniture provided and also the user can open the glass door lid of the toilet.

3.4. Discussion of Application Usage questionnaire

The questionnaire was given to 30 respondents from prospective housing buyers to use VR to better know the shape of the interior of the house before buying the residential property of interest. The questionnaire used 4 Likert scales, namely strongly agree, agree, disagree and strongly disagree. With the following questions:

a) This VR app is very easy to use
b) This VR app is practical to use
c) This VR application is very effective for prospective buyers to know the interior and shape of the house before buying
d) This VR application is very helpful for potential buyers
e) This VR application is in accordance with the needs of prospective buyers to know the interior of the house
f) This VR app is easy to use.

Respondents collected answers with the following details:

a) Respondents Answer Very Agreed : 15
b) Respondents Answer Agree : 10
c) Respondents Respond to Disagree : 3
d) Respondents answered strongly disagree: 2

Equals : (1) T x Pn
T = Total Number of Respondents who voted
Pn= Pilihan Scale Likert
SS = 15 x 4 = 60
S = 10 x 3 = 30
TS = 3 x 2 = 6
STS = 2 x 1 = 2
Total = 98

Next Calculate the Interpretaso Results
Y = highest score of likert x number of respondents, then 4 x 30 = 120
X = lowest likert score x number of respondents, then 1 x 30 = 30

Then interpretation on percent where I = 100 / total score (linkert) which is 100/4 = 25%
Hence the result
0 – 24.99% = Strongly Disagree
25% – 49.99% = disagree
50% – 74.99% = Agree
75% – 100% = Strongly Agree

The final completion becomes a Total score/Y x 100, then:

98 / 120 x 100% = 81.66 %

From the results of the calculation above, it is obtained that 81.66% is the value of the 81.66% category which is very agreeable.

3. Conclusion

The conclusion of this study explains that the application of VR home interiors on the new evidence has a significant impact on prospective buyers before buying a house can first see the shape of the house, the room until the interior of the house is evidenced in the
results of the questionnaire of respondents 30 prospective buyers who want to buy a house with the results strongly agree. VR applications really help them to see the interior of the house.

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References