

VIRTUAL REALITY: AS A TRANSFORMATION TO REBUILD THE TOURISM SECTOR IN BADUNG DISTRICT

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Abstract

Badung Regency has the highest local revenue (PAD) in the province of Bali. In addition, Badung Regency has a lot of exciting tourism potential, but unfortunately, this tourism potential is still not well known by the public. As a result of the COVID-19 pandemic, the tourism sector in Badung Regency has experienced a decline due to restrictions on community activities not being allowed to visit a tourist spot directly. Therefore, a solution is needed to overcome this problem, one of which is utilizing information technology currently developing in society, such as Virtual Reality. Virtual Reality can be the key to promoting tourism potential in Badung Regency so that the tourism sector can revive. Through Virtual Reality, users can directly interact and get information about the tours to be visited digitally. This virtual reality application is built on a website so everyone can easily access it. The design of this application uses the MDLC (Multimedia Development Life Cycle) method, which consists of 6 stages: Concept, Design, Material Collecting, Assembly, Testing, and Distribution, after designing a Virtual Reality application using 3sixty software. Furthermore, this Virtual Reality was evaluated through a questionnaire that was tested by 15 SMA Negeri (Public Senior High School) 2 Abiansemal students so that the test results can conclude that Virtual Reality can potentially improve the tourism sector in Badung Regency. Therefore, Virtual Reality can help revive Regional Original Revenue (PAD) in Badung Regency through the tourism sector.

Keywords: virtual reality, website, MDLC, tourism

I. INTRODUCTION

Badung Regency has the highest Regional Original Income (PAD) in the Province of Bali, which comes from tourism as a driving force for the regional economy. It is supported by the many exciting tourist potentials to visit, such as natural, cultural, historical, religious, culinary potential, and others. One exciting place to visit, but not all tourists visit, is Taman Ayun. Taman Ayun is a place that has a rich history of Balinese cultural heritage.

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The Central Bureau of Statistics for the Province of Bali reported that Badung Regency PAD in 2020 amounted to Rp. 2,116,974,302, which experienced an 82% decrease due to the impact of the COVID-19 pandemic, compared to the previous year, which was Rp. 4,835,188,460. The COVID-19 pandemic has also caused a reduction in business actors in the tourism sector, thereby reducing regional income levels [1]. The COVID-19 pandemic has destroyed the tourism sector because to prevent the spread of the virus, physical and social barriers must be implemented so that tourists can visit tourist attractions directly (GNFI, 2020). However, in the industrial era 5.0, technological developments are increas-

ing fast so that humans cannot be separated from technology [2] One of the efforts that can be made to promote the tourism sector after the COVID-19 pandemic is to take advantage of technological advances, one of which is using Virtual Reality technology [3]. Virtual Reality (VR) can build a 3D dimensional virtual world through simulation.

The formulation of the problem in this study is as follows: 1) How is Virtual Reality (VR) technology designed in the tourism sector as a medium to promote tourism in Badung, and 2) How can Virtual Reality (VR) be a solution to revive the tourism sector in Badung Regency?

The objectives of this research are as follows: 1) To find out the design of Virtual Reality (VR) technology in tourism as a medium to promote tourism in Badung and 2) To find solutions to revive the tourism sector in Badung Regency with Virtual Reality (VR).

A. Virtual Reality

Virtual Reality is a technology that displays an image realized by a computer and special electronic equipment so that users can experience it directly and obtain information through a photograph and sound (American Libraries Association). Virtual Reality (VR) can give users the impression that they will feel like they are in that environment [4]. In previous research, Virtual Reality can indirectly increase a person's interest in visiting a tourist destination [5]. The application of Virtual Reality and its use in tourism provides a long-term increase in the potential for tourist visits to a tourist destination.

B. Tourism Sector

In general, tourism involves travel activities for entertainment and recreation. According to [6], tourism is individual or group travel from one place to another with a predetermined plan, intending to relax and enjoy entertainment so that they can fulfill their wishes. Factors significantly affecting the tourism sector are tourists and objects themselves [7]. Developments in the virtual reality-based tourism sector can be an alternative in increasing tourist interest.

C. Websites

According to Elgamar [8], a website is a medium consisting of a group of pages that are relat-

ed to each other and can function as a means of providing information through photos, videos, text, or sound. In addition, the website is multi-platform, which means it can be accessed by any device connected to the internet.

II. RESEARCH METHOD

The development of this research uses the Multimedia Development Life Cycle (MDLC) method [9]. This method has six stages: concept, design, material collecting, assembly, testing, and distribution. The stages in this method can be observed as shown in Figure 1:

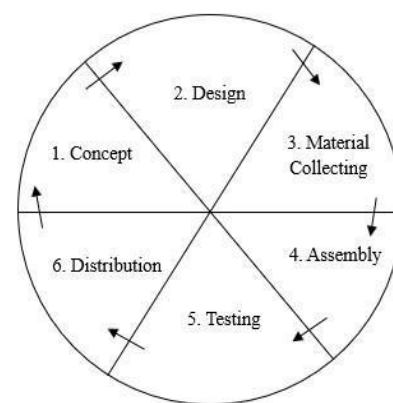


Figure 1 MDLC Model [9]

1. Concepts

Stage concept (concept) is the stage of gathering information. This stage aims to identify the program's target audience, determine the type of application to be produced, and clarify the purpose of the application, such as entertainment, learning, and so on. This application will be installed through the website so that it is easily accessible by everyone via desktop or cellphone.

2. Design

The design stage is the stage in developing a display program that will be executed. The main focus of this stage is to design a display that will make it easier for users to run Virtual Reality applications. In this design, the use case diagram method will be used to model in detail the interaction between the user and the application.

3. Material Collecting

The material collecting stage is a stage in collecting materials according to needs. In this col-

lection, 360o panoramic photos will be taken using the INSTA360 One X3 camera, according to a predetermined location.

4. Assembly

The assembly stage is where all materials, such as audio, images, and other multimedia materials, will be combined and designed using the 3sixty application. The panoramic photo obtained is made a navigation point (hotspot), where this point will connect one location to another. Besides that, the hotspot sign will also provide information or display audio.

5. Testing

The testing phase is the stage that will be carried out after completing the assembly stage. At this stage, it will run and practice the Virtual Reality application directly to ensure that the development of the Virtual Reality application can be according to what is planned, and that all features can run properly so that they can be repaired before later being released and distributed in the community.

6. Distribution

The distribution stage is the final stage of the MDLC method. At this stage, it will be carried out after ensuring that all functions in the Virtual Reality application are appropriate and running well so that later, it is feasible to be distributed to the community.

III. RESULTS AND DISCUSSION

A. Concept

In making this Virtual Reality application, we introduced the Taman Ayun tourist attraction in Badung Regency. Still, in developing this Virtual Reality application, other tourist objects can also be used. Virtual Reality allows users to see the entire tourist attraction through 360-degree photos. In this Virtual Reality, we presented in-depth information about the meaning of historical places in the Taman Ayun tourist attraction. Virtual Reality applications can make users interact and feel as if they were directly in that place. In addition, the development of this application was website-based, as an information medium that was easily accessible to everyone.

Table 1 Concept of Virtual Reality Application Development

Title	Virtual Reality: As a Transformation to Revive the Tourism Sector in Badung Regency.
Objective	It was developing a website-based Virtual Reality application by introducing the Taman Ayun tourist attraction in Badung Regency. This Virtual Reality can be used as an information medium to promote
User	Public.
Virtual Object	Multimedia content to be displayed: 360-degree photos, audio, text

B. Design

At this stage, all media content displayed in the program was compiled, and the features provided to users were determined. In addition, the design of the Virtual Reality flow was carried out using the use case diagram method. Figure 2 shows the details regarding the design of this flow.

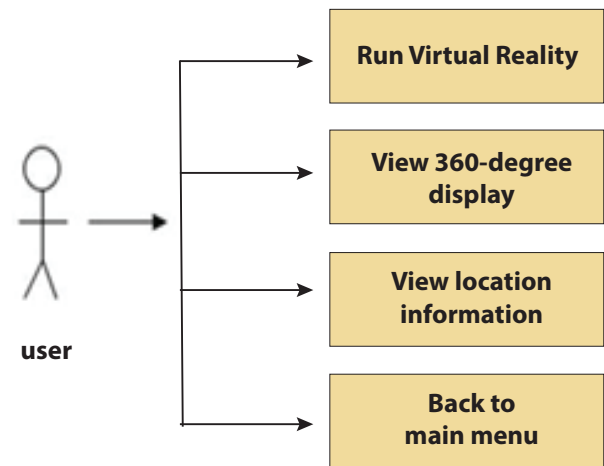


Figure 2 Use Case Diagram Virtual Reality

C. Material Collecting

At this stage, a collection of materials were carried out to be used. The material consists of 360-degree panoramic images from each predetermined location or spot. The tools to capture these images involve a tripod equipped with a 360-degree camera. Some of the results of taking these pictures can be seen in Figure 3:



Figure 3 Results of taking 360-degree panoramic photos

D. Assembly

At this stage, it was continued by combining all the media content that had been prepared. At this stage, it added navigation (hotspots) that function so that users could go from one place to the next and display information about tourist attractions. Hotspot and information displays are shown in Figures 4 and 5.



Figure 4 Hotspot Display in Virtual Reality

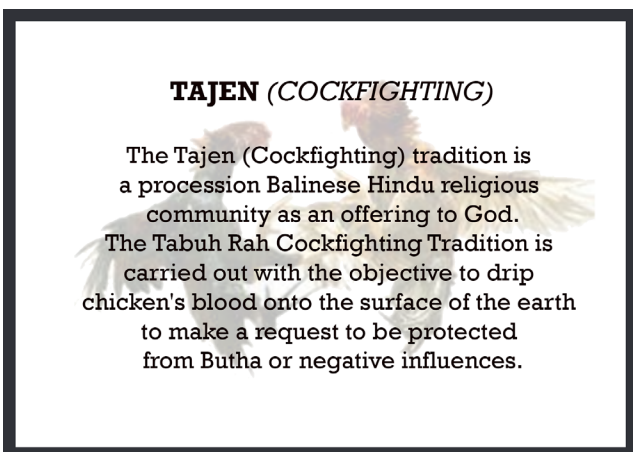


Figure 5 Information Display in Virtual Reality

D. Testing

After the assembly stage was complete, a test was carried out. This Virtual Reality test used a questionnaire distributed online with 15 students

from SMA Negeri 2 Abiansemai as respondents. This stage determined whether all the hotspots and information were clear and could run properly before it would be distributed later. The test results can be seen in Table 2.

Table 2. Virtual Reality Testing Results

Virtual Reality Testing	Results
The Virtual Reality Link is now accessible	Valid
Hotspots in Virtual Reality can be seen clearly	Valid
Hotspots in Virtual Reality can work well so user can move from one point to another.	Valid
Hotspots in Virtual Reality can already display a appropriate information.	Valid
Virtual Reality can be zoomed in and out.	Valid
Virtual Reality can potentially improve the sector tourism in Badung Regency.	Valid

E. Distribution

After going through the testing phase and ensuring that all functions in the Virtual Reality application could run properly, the next stage was the installation stage of the Virtual Reality application.

IV. CONCLUSION

Based on the research results, it can be concluded:

1. The design of this Virtual Reality application uses the MDLC (Multimedia Development Life Cycle) method, which has been successfully designed using the 3sixty application. The design of the Virtual Reality application uses 360-degree panoramic photos captured using a 360o camera.
2. The use of Virtual Reality technology can be a solution to improve the tourism sector in Badung Regency because Virtual Reality can increase the interest of tourists to visit a tourist destination. It can be a breakthrough and transformation in tourism by digitally introducing tourism potential.

Future research is developing the website for application so that later, this application will be easily run by the entire community.

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