Effectiveness of 3D animation using Google Sketchup and Lumion as tourist attraction information media

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ABSTRACT. 3D animation is easy to describe for presenting visual information attractively and realistically, making it an ideal choice for attraction promotion but more difficult to work with. This study aimed to develop 3D animated videos and test their effectiveness as an information medium for promoting tourist attractions. The research method used was the Multimedia Development Life Cycle (MDLC), which consists of six stages: concept, design, material collection, assembly, testing, and distribution. Designing and creating 3D objects using Google SketchUp, rendering them in animation using Lumion, and editing animated videos using Adobe Premiere Pro CC. The results of the feasibility test by media experts show that 95% of the categories are feasible regarding animation quality and appearance. The feasibility test of 35 people as respondents from the community showed that, in terms of aspects of the display, quality, speed, brightness, time duration, and selection of viewing angles, 90% were found to be in very appropriate categories. These results indicate that 3D animated videos developed using Sketchup and Lumion are worthy of use as information media to promote tourist attractions.

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INTRODUCTION

Tourism is an alternative sector that drives the Indonesian economy as well as the industrial and trade sectors. Therefore, the opportunity to develop the tourism sector is reliable, and this is supported by the lifestyles of people who now prefer to travel. Indonesia is an exciting tourist destination because of its beautiful nature, hospitality, and uniqueness of its cultural customs and local wisdom. However, efforts to develop tourism in Indonesia have not been practical until now because several crucial problems still exist in developing tourism in the country (Nugroho, 2020). In addition to cross-sectoral connectivity and coordination, promotional funds are not transparent and the quality of human resources is less supportive of tourism management, which does not support the increase in tourist visits to Indonesia.

Gorontalo has a land area of 12,215.44 km2 and sea management area of 50,500 km2. It has abundant natural resource potential, most of which has not been optimally utilized. The Gorontalo region is also inseparable from various scattered tourist attractions, such as the Bone Bolango region, Gorontalo Regency, North Gorontalo, Boalemo, Pohuwato, and other areas with their tourist attractions. Therefore, Gorontalo has many diverse tourist objects, such as the Gorontalo Regency. Gorontalo Regency has various tourist attractions, such as Otanaha Fort, Bongo Religious Tourism Village, Pulo Cinta, and others. Dulanga Beach, located in the Batudaa Pantai subdistrict, is one of the tourist attractions in the Gorontalo Regency.

This tourist attraction has a high economic value and greatly helps the surrounding community's economy; however, since the emergence of the COVID-19 pandemic, the Dulanga Beach tourist attraction temporarily closed, and when it reopened, the number of visitors decreased. This is certainly a problem for the managers of these tourist attractions because the pandemic has caused many negative impacts on the sustainability of the surrounding community's business. Lack of promotions also causes a decline in tourist visits. Based on the results of interviews with the manager, promotional activities are less efficient; therefore, the number of tourist visits has decreased.

Tourists often seek information before deciding to visit a tourist spot based on the attributes of the destination or promotion. Information about these destination attributes can be sought through various media that can be claimed to be promotional events for tourist spots (Auliya and Prianti, 2022; Pai et al., 2017). Promoting tourist attractions supports transactions by informing, persuading, reminding, and distinguishing promoted tourist attractions from other tourist attractions (Raya et al., 2020). In addition, promotions affect the process of providing information to tourists and play an important role in increasing tourist visits (Florido-Benítez, 2022; Pambudhi and Usman, 2020; Manangiuli, 2019). The success of tourism promotion can be measured by the amount of information requested and volume of tourist visits. Promoting tourist attractions creates destination positioning and branding, thereby leading to the choice of the most appropriate market (Morrison, 2023; Wulandari et al., 2021).

The era of globalization and the development of information technology have made information dissemination easier and faster, especially through social media. Travelers can obtain new information within a few seconds. Social media can promote tourism destinations innovatively (Santi and Fadjar, 2019; Endri and Prasetyo, 2021). Setiyorini and Kristiyana (2019) found that social media promotions positively and significantly affect visitor decisions. However, the use of 3D animation as an information medium to promote tourist objects remains rare. However, using 3D animation in promotional content generates enthusiasm and mystery for viewers. In addition, 3D animation can be used to enhance product introductions, and offer pages that will be more attractive and professional in the eyes of consumers. 3D animation depends on technological advances and is a product of high-tech productivity (Du, 2021).

Sun (2022) stated that using 3D animation for promotions can provide advertising and deliver information more effectively. The use of Sketchup for 3D animation modeling is equipped with simple tools and an enhanced drawing system with an uncomplicated appearance, where the Sketchup software is flexible because it can receive or read *dwg and *dxf format data (Hariyani and Sunardi, 2021). Rendering is used with Lumion, a 3D animation software, to visualize architectural designs that can present a real impression. Suarna et al. (2022) found that in creating 3D animation using Lumion software, in addition to the objects depicted as genuine, many features can facilitate the creation and management of a 3D object by an animator. This study aims to develop 3D animation videos and test their effectiveness as information media for promoting tourist attractions.

METHODS

The research location was Dulanga Beach Tourism in Batudaa Pantai District, Gorontalo Regency. The Multimedia Development Life Cycle (MDLC) method was used in this research, with six stages arranged systematically: concept, design, material collection, assembly, testing, and distribution. Figure 1 shows the stages of the MDLC.

Concept

This stage identifies the problem as the background and determines the purpose and concept of creating a 3D animation and the displayed material. In this study, a problem can be identified as a decrease in the number of tourists, which has many negative impacts on the sustainability of the

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surrounding community's business purpose of creating 3D animation as an information medium to promote beach attraction.

Design

A concept that has matured from the previous process makes it easier to determine what should be done. The design process aimed to provide detailed details of the beach tourist attraction environment. At this stage, storyboards and scripts were used as design media.

Material Collecting

At this stage, the materials obtained from the design stage are collected. These materials include design drawings that have been made, reference images from the Internet, audio narration, background music, and sound effects as needed, as a reference for creating 3D objects in animated videos.

Assembly

At the stage of creating the 3D animation based on the design stage, information results were obtained at the material-collecting stage. This activity uses Google SketchUp Pro software to create 3D objects, Lumion software to develop tourist attractions and rendering, and Adobe Premiere Pro CC to edit video results.

Testing

The testing stage was performed when the 3D animation was completed at the assembly stage. At this stage, testing was conducted during the animation run and checked to ensure that there were errors in creating the 3D animation. Testing was performed using a black box and the questionnaires.

Distribution

This stage is carried out distribution, the results of 3D animation videos that have been declared appropriate through the testing process, will then be distributed through system usability scale (SUS) testing.
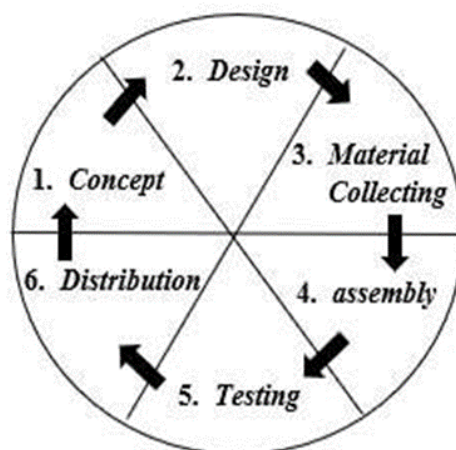

Figure 1. The stages of the MDLC

RESULTS AND DISCUSSION

This study produced 3D animation video technology products as information media, introducing beach tourism objects more interestingly to potential tourists. The 3D animation video display, designed as an information media for promotion, uses realistic images and objects from the original.

Colors are made more contrasting to attract the attention of potential tourists and to use supporting sounds, such as back sound music, to enhance video results.

Concept

The result of creating 3D animation is an information medium to promote beach tourism objects using the SketchUp and Lumion applications. The material in this video shows the layout and shape of beach tourism objects.

Design

A storyboard is a rectangular sketch containing video, text, and sound in a scene and a script to describe the scene by listing all multimedia objects and links to other scenes with the concept of 3D animation design, as shown in Figure 2.
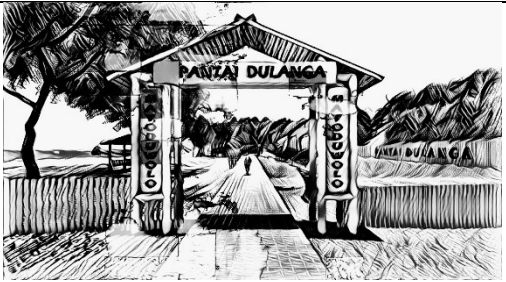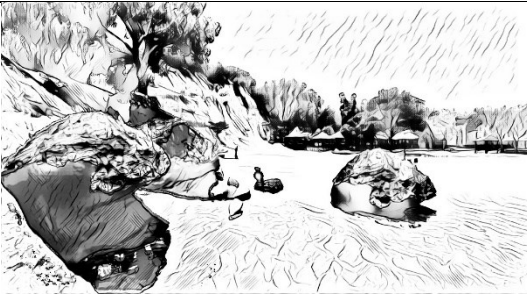
Scene 1: shows a timelapse of the sunrise of the attraction, which lasts for 8 seconds.	Scene 2: displays the shape of the Beach Attraction, which lasts for 21 seconds.
Scene 3: displays the gate of the Beach Attraction, which lasts 26 seconds	Scene 4: showing along the coast of the Beach Attraction, which lasts 18 seconds
Scene 5: showing photo spots on the beach with 15 seconds	Scene 6: nighttime conditions of the attraction with a duration of 34 seconds

Figure 2. Storyboard of Dulanga beach attractions

Material Collection

At this stage, the needs analysis and collection of materials are displayed in the animation video, such as materials and applications used to design the 3D animation of beach tourism objects.

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Material

The material here is information about beach attractions that will be incorporated into the 3D animation models. This material was obtained from a study of images and videos captured directly from a beach.

Application

In the development process, 3D objects are formed using the SketchUp Pro 2020 application because of the ease of creating 3D models, such as the required buildings. Next, the Lumion application creates beach tourism objects in 3D and performs texturing and rendering. Support applications such as Adobe Premiere Pro CC 2020 are then used to edit 3D animation videos.

Assembly

At this stage, the animation creation process begins, which consists of several steps starting from modeling. The animation creation process consists of several stages: 3D modeling, placing, completion, texturing, animation, rendering, and composites. 3D modeling, placement, completion, texturing, animation, rendering, and composites The first step in the assembly stage is 3D modeling by creating several objects, such as gates, buildings, toilets, gazebos, stairs, and fences, using the SketchUp Pro 2020 application. The second step is the placing stage, which involves placing all objects created into a new folder because each object was created in a different file in the previous stage. This was done to make changing the shape of the object easier if needed. Creating each object in the form of separate files also makes it easier to organize all files.

The third step is completion by exporting the results of the 3D objects created in SketchUp Pro 2020 to Lumion. When exported, it will be in the DAE format, which is compatible with Lumion with a new project as a tourist attraction, as shown in Figure 3.
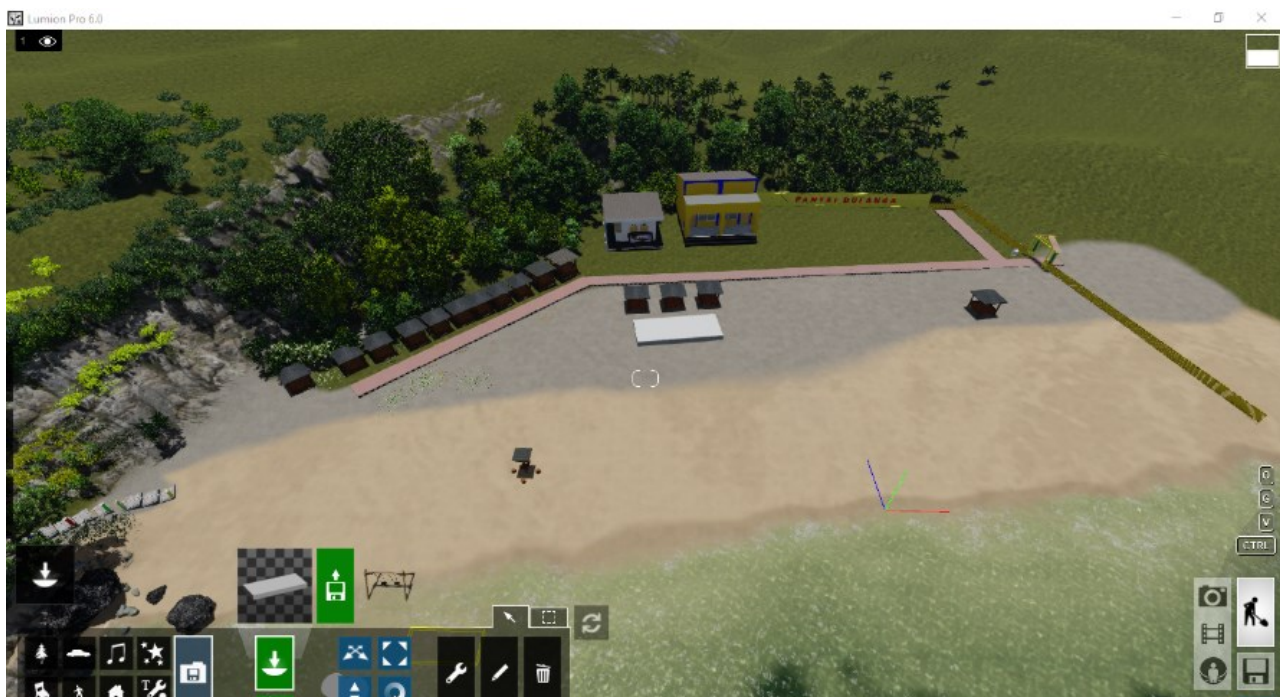

Figure 3. Process of placing 3D objects

The next step is texturing by determining and applying colors (materials) to all the previously designed objects. In this step, the texture collected in the material collection process is used to texture the designed objects, as shown in Figure 4.
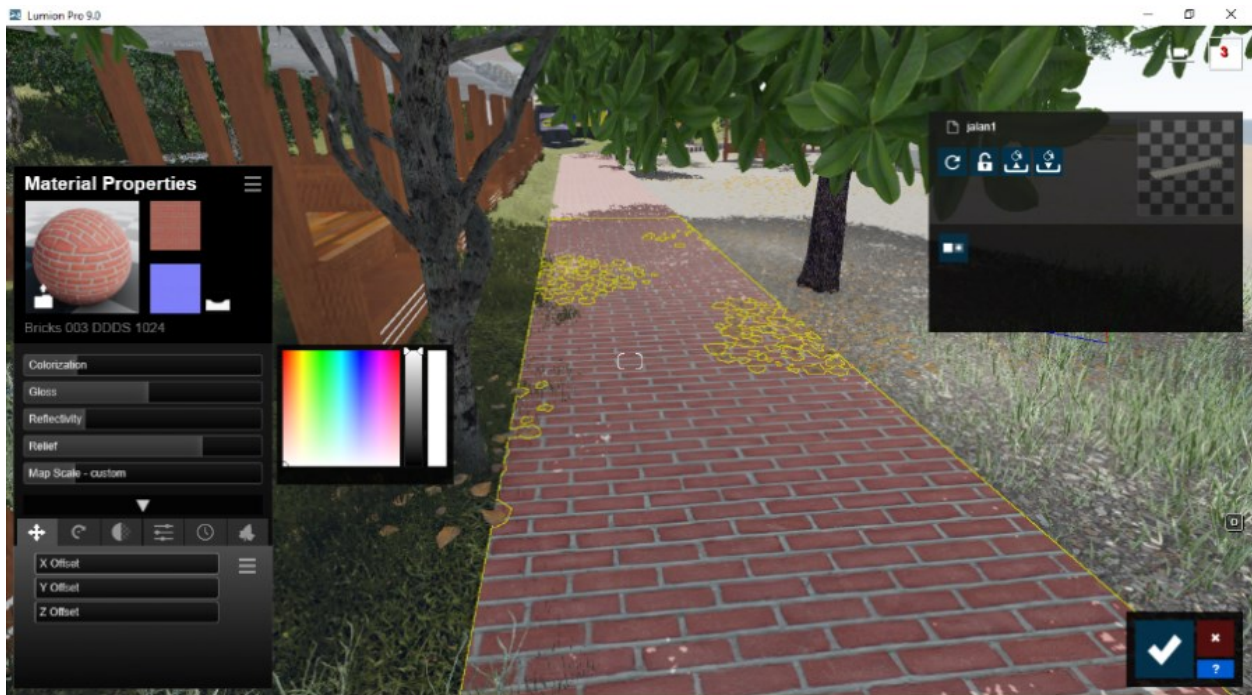
Figure 4. Texturing the road

In the animating step, a video clip was prepared before animating the object. The process of animating the objects is shown in Figure 5.

Figure 5. Process of animating objects

The final step is the rendering. In this step, the animation format is changed to a video format using Lumion. Subsequently, the output quality is determined, and the final output quality determines the level of reality of the design. The higher the resolution, the more natural is the design and animation. For the rendering process in the Lumion application, settings with a 3-star output quality, frames per second at 30, and Full HD 1920 × 1080 resolution were used. The process of animating an object is illustrated in Figure 6.

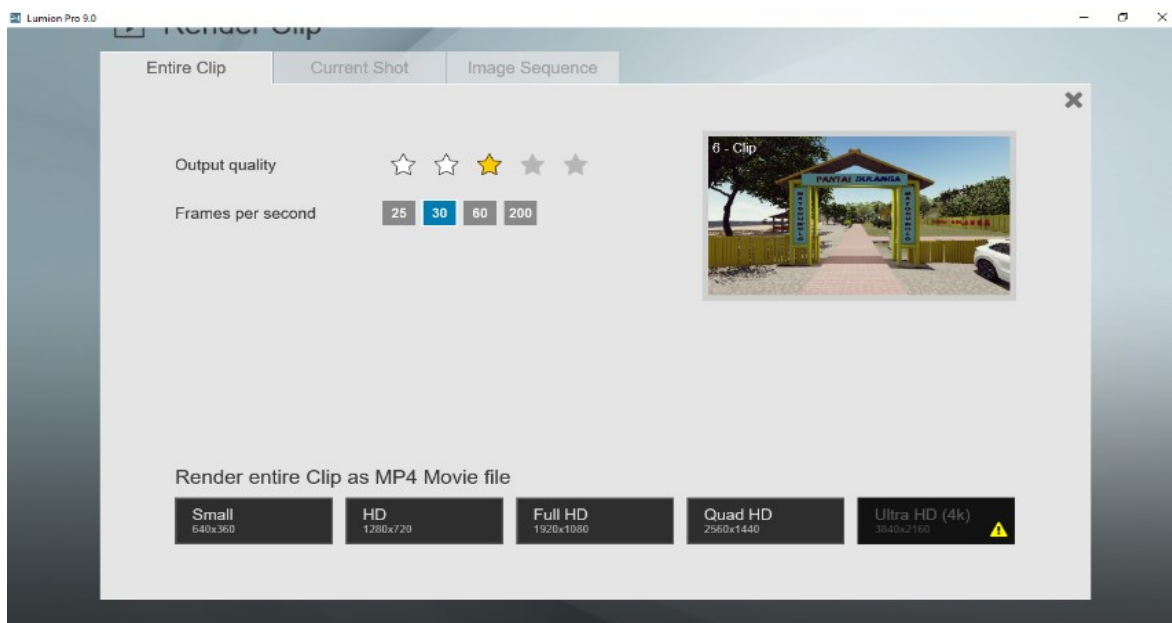*Amali et al. (Effectiveness of 3D animation using ....)*

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Figure 6. The animation rendering process

After the entire scene has undergone the rendering process in Lumion, the next step is compositing. This process combines all rendered videos in the animating process that has been previously performed. The object animation process is illustrated in Figure 7.
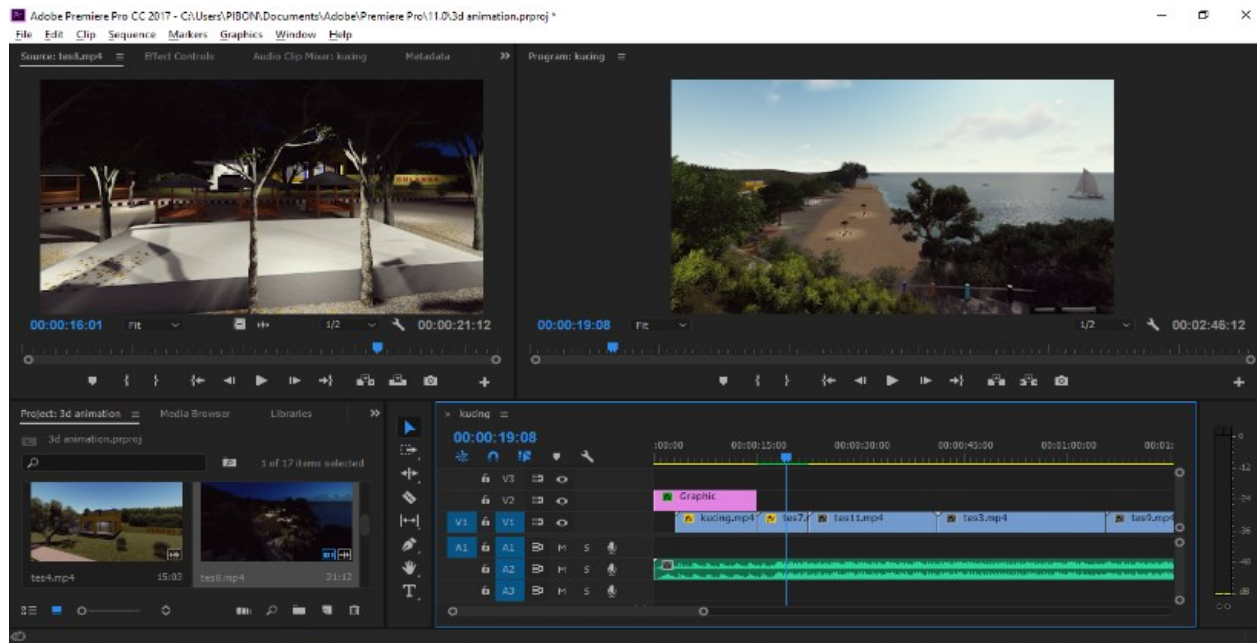

Figure 7. Editing process of animated video

Testing

Black box testing was performed by testing the quality and completeness of the 3D animation videos. The test results prove that the developed project meets the development objectives and user requirements. The test results are presented in Table 1.

Table 1. Testing results

No	Test Data	Input	Expectations	Output	Conclusion
1	Video Display	Live Observation	The video displayed is as expected both from design and the quality of the video produced	The 3D animation video produced is already by expectations	Suitable
2	Video Quality	Live Observation	Video quality is HD with a frame rate of 30 fps Mp4 video format	Video with 1080 30fps MP4 quality	Suitable

Furthermore, a feasibility test was conducted by media experts that included animation displays and animation quality. The results of this validation were analyzed by calculating the percentage categorized as feasible or not feasible in terms of the media. After the data were analyzed, the average percentage of the assessments of responses by media experts to the developed 3D animation video was included in the very feasible category, with a percentage value of 95%. A feasibility test of the 3D animation video of beach tourism objects was also carried out on users as information media using a Google Form questionnaire with a sample of 35 people from the community in the city and outside the city of Gorontalo. The results of the average percentage assessment of responses by the public to the developed 3D animation video were included in the Very Good category, with a percentage value of 90%.

Distribution

Tests were carried out for technology testing on hardware, software, websites, and mobile devices. Based on the final results of the respondent's assessment, which was divided into two tests, namely, acceptability testing, Grade Scale, and Adjective Rating, the results obtained for the acceptability range level included Acceptable, the grade scale level was B, and the adjective rating was in the Good category. For testing based on the Percentile Range (SUS Score), the value is 70.5. This shows that the assessment of the virtual tour reality website developed by the community is included in the good category.

These results show that the use of 3D animated videos of beach attractions has a fairly high positive response rate and can be useful for promoting beach attractions. The application is made easy to understand and the design is made as close as possible to the original so that it can convey information. The practical implication of developing this information media is that it can foster new value through innovations that prioritize societal needs. The tourism industry is likely to create tour package packages tailored to the needs of the community by utilizing information technology. This allows for the achievement of a climate that can promote the development of the tourism sector while finding solutions to sustainable tourism problems, especially the benefits of tourism for local communities in tourism destinations.

CONCLUSION

3D animation information media using Google SketchUp and Lumion on beach attractions can provide interesting and realistic information regarding the description of beach tourist attractions. The design and creation of 3D animations of beach attractions are made as similar as possible to the original to convey the information. The results of testing its effectiveness as an information medium in promoting tourist attractions by media experts were 95% and categorized as very feasible. The user calculation trial obtained data of 90% or was classified as very good. The test results prove that the

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developed 3D animation video meets the development objectives and user needs. The limitation of this study is that it still needs to add 3D objects that are lacking to make it look more attractive. In addition, adequate devices are required to support the process of 3D modeling animation and maximize the rendering results.

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