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Promotional Media Application with Android-Based Virtual Tour Technology

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ABSTRACT

Due to the impact of COVID-19, it has resulted in a decrease in the number of students entering SMK Bina Am Ma'mur or SMK BAM. Currently, the dissemination of information about SMK BAM can be said to be not so good. So this research innovates to create new and unique promotional media by utilizing virtual tour media. The purpose of this study is to introduce the environment by utilizing virtual tour media and increase students' interest in entering SMK BAM. The study was conducted using qualitative methods. Data were collected by observation and interview techniques. Furthermore, using the MDLC Method to design the system consists of the stages of concept, design, material collecting, assembly, testing, and distribution. The results of this study created a school promotional media application with a Virtual tour in the form of a 360° panoramic photo for the Android-based SMK Bina Am Ma'mur so that prospective new students can find out school information without coming to school.

1. Introduction

School as one of the formal places for students to get education and knowledge and form behavior both moral, spiritual and social in line with advances in science and technology (IPTEK). [1] The schoolis expected to have quality and facilities that support students to get the best education. Information Technology (IT) itself has changed changes in human life [2] with the development of the internet helping students to gain the knowledge and references needed to support learning. [3] If students can get information from various sources, then as one of the school institutions SMK Bina Am Ma'mur is expected to be the main source for students to get education and knowledge

SMK Bina Am Ma'mur (SMK BAM), on its official website smkbam.sch.id is one of the Vocational High Schools (SMK) that was established on January 27, 2007, becoming the first Vocational High School (SMK) in Tangerang Regency that organizes vocational education in the field of Information Communication Technology, and Tourism which already has 3 expertise programs, namely Multimedia, Network Computer Engineering and Tata Boga. It is hoped that SMK Bina Am Ma'mur will be able to provide a positive impact and color of life for the general public and most importantly in carrying out religious, social, and state life. Therefore, the students of SMK Bina Am Ma'mur are always equipped with great knowledge and advance according to the times and deep religion.

At the end of 2019, the Indonesian state was shocked by the virus that disturbed the Indonesian people. [4] The occurrence of coronavirus *disease* or COVID-19 originated from bats and pangolins traded in China's Wuhan Market. The symptoms when infected with the COVID-19 virus vary from individual to individual depending on how the body responds and the individual's own immune system itself. However, according to WHO or the World Health Organization, the symptoms of the COVID-19 virus are dry cough, fever, and fatigue. The most serious symptoms of the COVID-19 virus are shortness of breath, chest pain, and loss of ability to speak and control the body, this virus is notified that it can be transmitted through fluids or droplets, therefore to prevent the virus, each individual is recommended not to touch the eye area, nose, and face before washing hands with soap or can also use *a hand sanitizer*, due to the impact of this pandemic, various industrial sectors and the economy began to falter. [5] One of them has had a considerable negative impact on the education sector. then many schools need to formulate the right marketing or promotion strategy, so that the number of students in the future can return to stability, as it was. [6]

With the outbreak of the COVID-19 pandemic which was followed by the enactment of large-scale social restrictions (PSBB). This affects changes and policy updates to be implemented. [7]. So that the decline in the number of students who apply to SMK Bina Am Ma'mur until now. This can be from the development data of new student recipients as follows

Figure 1. Data on the development of new student recipients of SMK Bina Am Ma'mur (2022)

The need for information in the recognition medium still uses a lot of conventional methods and does not combine elements of modern technology. [8] Currently, the dissemination of information about the profile of SMK Bina Am Ma'mur can be said to be not so good coupled with the current conditions of the COVID-19 pandemic even though the way to publish to the public is already digitally using social media which is a strategy to increase the interest of new students to enter SMK Bina Am Ma'mur by utilizing school websites and social media such as Facebook, instagram, whatsapp and youtube. However, the information contained is limited and too ordinary. Information about school facilities or facilities and infrastructure is also felt to need to be conveyed to school information media by innovating aspects of visual technology devices, interactive activities and distribution channels. [9]

Based on the results of the author's interview with one of the teachers of SMK Bina Am Ma'mur, Tangerang, the main factor that caused the decline in students who applied to SMK Bina Am Ma'mur was not only due to the covid-19 pandemic conditions but also because of the lack of innovation in formulating promotional or marketing strategies that still use print media while the school's social media did not convey the information needed and looked monotonous. so that the dissemination of information about his school is not on target plus the government's policy of reducing activities outside the home. So a promotional media that is unique and different from what is usually and can be accessed anywhere and anytime without the need to leave the house using *virtual reality (VR) technology.* The development of ICT (information and communication technology) makes it easier for humans to access information anytime and anywhere. [10] This has given rise to new innovations. One of the innovations of the well-known technology is virtual reality or VR. [11] thus helping prospective students and the wider community easily find out the information of the smk Bina Am Ma'mur area.

Virtual Tour is part of *Virtual Reality (VR)* refers to the concept where all the forms seen seem to be explored like the original world. [12] Virtual tours themselves are usually used to give you the experience of having been somewhere just by looking at the monitor screen. The presentation of a virtual tour can be done by utilizing images or videos. In addition, it can use three-dimensional models. For presentation using images, panoramic photos can be used. The selection of the type of panoramic photo also affects the resulting virtual tour results[13].

Based on this background, a school promotional media application was created with *a Virtual tour* in the form of a 360° panoramic photo for the Android-based SMK Bina Am Ma'mur. It can be formulated how to implement the design of an interesting and interactive virtual tour application so that it is easy to use and informative. The design of this virtual tour promotional media application was made using *Unity 3D* to create content from the game and *Adobe Illustrator software* consisting of button creation, *user interface* (UI) and other assets.

In the school promotional media application with virtual tour, it has a scope including, having navigation buttons to move spots between one place to another, conceptually introducing the school through profile videos and virtual tours in order to explore the school as it was originally, displaying the facilities and infrastructure of the SMK Bina Am Ma'mur school, using 360º panoramic photos, and this application can be used to smartphones.

With this application, it is hoped that it can help prospective students and the wider community easily find out the information on the area of SMK Bina Am Ma'mur so that access to the school area is easier, unique and more memorable with the Virtual Tour application.

2. Method

The research objectives achieved well requires good planning through the stages carried out. The stages used in this study are shown in Figure 2

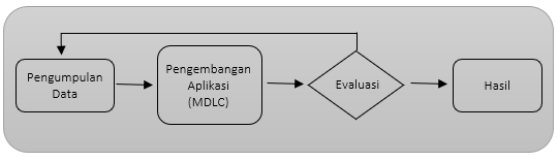

Figure 2. Research Flow

2.1 Data Collection

In this study, the first flow is that the data is collected in the following way:

1. Observation, data collection begins with observation or observation used for data collection in a study and to directly review the conditions that occur at the research site. In this observation process, it is carried out by observing directly and analyzing what media has been used by the school in publishing information about SMK Bina Am Ma'mur to the community.
2. The interview was then conducted directly with a resource person from one of the teachers at SMK Bina Am Ma'mur. This interview aims to dig up information and find out the problems that exist and to determine what features will be provided in the application.
3. Literature Study, Literature study of the creation of this virtual tour application is carried out with searches related to research on making virtual tours and data collection is carried out by analyzing literature from supporting journal references. [14]

2.2 System Architecture Design

The system architecture is an outline of how the system works that is depicted through interconnected models. The system architecture describes the components contained in the system. [15] The application is built on android and has 1 group of users, namely *users*.

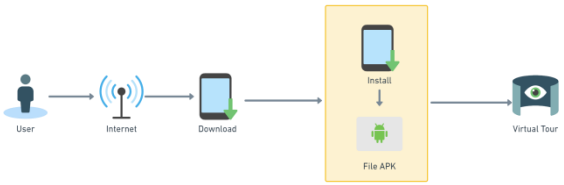

Figure 3. System Architecture

2.3 Application Development

In the application development section, the system is carried out using the *Multimedia Development Life Cycle* (MDLC) method, where this method has 6 stages, namely *concept*, *design*, *material collecting*, *assembly*, *testing* and distribution The MDLC steps in this study are as follows: [16]

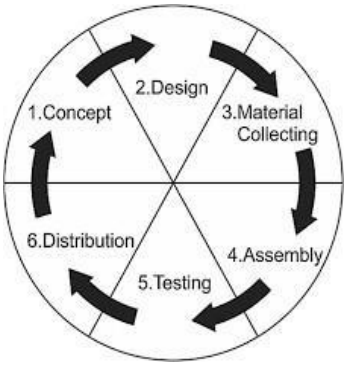

Figure 4. Stages of System Development Multimedia Development Life Cycle

3. Result and Discussion

1. Concept is the stage of determining the basics of the application to be created such as who the user of the program is (audience identification), the type of application, the purpose of the application, and the general specifications of the application.

Table 1. *Concept*

Heading	Android-Based Virtual Tour Promotion Al Media Application (Case Study: SMK Bina Am Ma'mur)
Purpose	Create an interactive virtual tour that can display information visually as a medium for SMK Bina Am Ma'mur promotion so that it is easily known by the public or prospective students and can be accessed virtually as real
End User	General Public and Students
Virtual Objects	Multimedia content, namely photos and videos
Input	Photos, Texts, and Videos
Output	Photo 360, text and music

2. Design is the stage of making detailed specifications regarding the architecture of the program, style, appearance and material / material needs for the program.

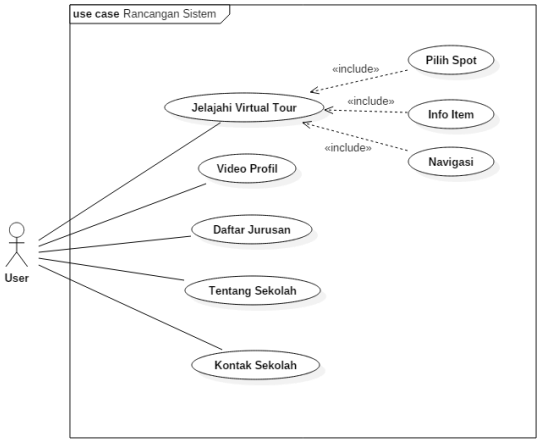

Figure 5. Use Case

3. Material collecting is the stage of collecting materials that are in accordance with the needs of the work.

Table 2. List of 360 Panorama Photo Capture *Spots*

Spot	Category	Information
Main Gate	Outdoor	
Parking Area	Outdoor	
Garden	Outdoor	
Field	Outdoor	
Front Door	Outdoor	
TU Room	Indoor – 1st floor	
CS Table	Indoor – 1st floor	
Teacher's Room	Indoor – 1st floor	
Tata Boga Kitchen	Indoor – 1st floor	
Men's Toilets	Indoor – 1st floor	
Women's Toilets	Indoor – 1st floor	
Principal Room	Indoor – 1st floor	
2nd floor Ladder	Indoor – 1st floor	
South Door & Lobby	Indoor – 1st floor	
Interactive Media Animation & Design LAB	Indoor – 1st floor	
LAB Graphic Design & Audio Video	Indoor – 1st floor	
LAB SIMDIG	Indoor – 1st floor	
Mosque	Indoor – 1st floor	
Aisle 2nd floor	Indoor – 2nd floor	
Women's Toilets	Indoor – 2nd floor	
Network Lab	Indoor – 2nd floor	
Lab Shooting	Indoor – 2nd floor	
2nd floor Class	Indoor – 2nd floor	3 Classes displayed
Aisle 3rd floor	Indoor – 3rd floor	
Men's Toilets	Indoor –3rd floor	
3rd floor Class	Indoor –3rd floor	3 Classes displayed

4. Assembly (creation), is the stage of making a program by compiling all the collected objects or multimedia materials in accordance with the design that has been made.

A. Main Menu Display

On the main menu display, there are several buttons, such as the "Browse", "Profile Video", "Home", "Department List", "About School" and "School Contact" buttons. When the user selects "Explore", it will enter the Virtual Tour of the School area. "Profile Video" button to view the school's company profile video. Then the "Department List", "About School" and "School Contact" buttons are buttons leading to important information pages about the school. The following is what the main menu looks like when run.

Figure 6. School Contact Menu Display

B. Profile Video View

In the school profile video display, it displays a company profile video from SMK BAM school and buttons are provided "Back Home", "Play Video", "Pause Video" and "Restart Video". When the user select "Back Menu", then return to the Main Menu.

Figure 2. Profile Video Display

C. Browse View (Virtual Tour)

In the Explore view, this virtual tour displays 360-degree photos/videos of the SMK BAM school area, users can shift various directions to see around and are provided with the "Back Home", "Menu Panel (Select Spot)", "Back sounds on/off", "Navigation", "Info Item/Spot", and "Video 360" buttons are provided.

Figure 8. Browse View (Virtual Tour)

Figure 9. Virtual Tour Display (Item/Spot Info)

Figure 10. Virtual Tour Display (Select Spot Panel)

5. Testing (testing), is the stage of testing the ability and performance of the program that has been made, whether it is in accordance with what was expected before distribution, can be seen in Table 4

Table 3. Alpha Testing

No.	Test Items	Result		Information
		Good	Not	
1	Button Back Site	✓		Succeed
2	Button List of Majors	✓		Succeed
3	Button Hamburger Menu	✓		Succeed
4	Button Hide Info Item/Spot	✓		Succeed
5	Button Hide Panel Select Spot	✓		Succeed
6	Button Home	✓		Succeed
7	Explore button	✓		Succeed
8	School Contact Button	✓		Succeed
9	Music Button On/Off	✓		Succeed
10	Button Next Site/Spot	✓		Succeed
11	Button Open Door	✓		Succeed
12	Button Pause Video	✓		Succeed
13	Button Play Video	✓		Succeed
14	Button Restart Video	✓		Succeed
15	Button Social Media	✓		Succeed
16	Button About School	✓		Succeed
17	Profile Video Button	✓		Succeed
18	Button WA	✓		Succeed
19	Button Website	✓		Succeed
20	Spot Pick Feature	✓		Succeed
21	About School Page	✓		Succeed
22	Department List Page	✓		Succeed
23	School Contact Page	✓		Succeed
24	Main Menu Page	✓		Succeed
25	Virtual Tour Page	✓		Succeed
26	Featuring The Boga Kitchen	✓		Succeed
27	Displaying the Main Gate	✓		Succeed
28	Displaying LT Class 2	✓		Succeed
29	Displaying LT Class 3	✓		Succeed
30	Featuring Lab Animation & Interactive Media Design	✓		Succeed
31	Featuring LAB Graphic Design & Audio Video	✓		Succeed
32	Displaying LAB Network	✓		Succeed
33	Featuring The Shooting LAB	✓		Succeed
34	Featuring SIMDIG LAB	✓		Succeed
35	Displaying the Field	✓		Succeed
36	Featuring the 2nd floor Aisle	✓		Succeed
37	Featuring the 3rd floor Aisle	✓		Succeed
38	Displaying CS Table	✓		Succeed
39	Featuring The Prayer Room	✓		Succeed
40	Featuring Motorbike &car parking	✓		Succeed
41	Featuring South Door & Lobby	✓		Succeed
42	Displaying the Front Door	✓		Succeed
43	Featuring Principal room	✓		Succeed
44	Displaying the Teacher's Room	✓		Succeed
45	Displaying TU Space	✓		Succeed
46	Featuring Parks	✓		Succeed
47	Displaying the 2nd floor Ladder	✓		Succeed
48	Featuring Men's Toilets	✓		Succeed
49	Featuring Men's Toilets	✓		Succeed
50	Featuring Women's Toilets	✓		Succeed
51	Featuring Women's Toilets	✓		Succeed
52	View 360 Control	✓		Succeed

Furthermore, the testing stage of these respondents was carried out online by distributing a questionnaire form link. In the first stage, respondents were directed to download the beta version of the SMK BAM virtual tour application using an Android smartphone using the link that had been shared to directly test the application.

After this test is completed, respondents are required to fill out a form through the link provided to find out how feasible the effect of the application is on the growth of the number of students to enter SMK Bina Am Ma'mur in the future. This questionnaire was given to 31 respondents, namely 1 principal, 15 teachers and 15 students of SMK BAM. The following is the content of the questionnaire that the researcher provided with several question criteria and then recapitulated using the UAT (*User Acceptance Testing)* method.

Table 4. Questionnaire Assessment Rate

Assessment Letters	Weight assessment	Assessment Description
A	5	Excellent
B	4	Good
C	3	Hesitate
D	2	Less
E	1	Very Lacking

Table 5. Questionnaire Assessment Final Results

No	Pertanyaan	A	B	C	D	E	Jumlah	Rata-Rata	Persentase Nilai
		Ax5	Bx4	Cx3	Dx2	Ex1			
1	Apakah semua tombol berfungsi dengan baik?	130	20	0	0	0	150	4,84	97%
2	Apakah tampilan aplikasi "Virtual Tour SMK BAM" ini menarik?	100	44	0	0	0	144	4,65	93%
3	Apakah tampilan menu-menu yang disediakan dalam aplikasi ini mudah dipahami?	150	4	0	0	0	154	4,97	99%
4	Bagaimana tingkat kenyaman dalam menggunakan aplikasi ini secara keseluruhan?	140	12	0	0	0	152	4,90	98%
5	Apakah aplikasi ini cocok dijadikan media promosi untuk mengenalkan SMK BAM?	155	0	0	0	0	155	5,00	100%
6	Apakah anda sebagai pengguna merasa kesulitan dalam mengoperasikan aplikasi ini?	145	8	0	0	0	153	4,94	99%
								Hasil Akhir	98%

Conclusion of application testing results using the UAT (*User Acceptance Testing)* method, respondents were given a Questionnaire with 5 questions to 31 respondents consisting of 1 principal, 15 teachers and 15 students of SMK BAM. The results of the test obtained a final result of 98%. This means that the application has attractiveness, the menus on the application are easy to understand, the application is comfortable to use throughout and can be used as a promotional aid media that is quite good.

6. Distribution is the stage of storing programs that have been tested in a storage medium. At this stage, the completed application that has been created that has gone through the Concept, Design, Material Collecting, Assembly, and Testing stages is then published into an Android file (APK) which will be uploaded to the playstore by using an internet connection and shared to social media SMK Bina Am Ma'mur

4. Conclusions and Suggestions

4.1 Conclusion

Based on the research that has been carried out in making an application with the concept of Virtual tour as a promotional medium for SMK Bina Am Ma'mur, the author can draw the following conclusions:

1. The implementation of the SMK BAM Virtual Tour application as a promotional medium was successfully carried out
2. In the current conditions of the COVID-19 pandemic, the use of Virtual Tour is very helpful in making a better promotional strategy in increasing the number of students to register for SMK Bina Am Ma'mur.
3. With the Virtual Tour application of SMK BAM as a promotional medium, it makes it easier for prospective students and the wider community to know information about the smk Bina Am Ma'mur area so that access to the school area is easier virtually and in real terms in the current covid-19 pandemic era with the Virtual application

4.2 Suggestion

Based on the conclusions that have been previously stated with the application made, the arrangements that the author can provide based on the results of this research for further research are:

1. To get a better virtual tour application, it is hoped that the author will pay more attention to the displays and features made in order to add attractiveness to prospective students, although the appearance of this application is simple but in it can still provide explanations or information that is correct and appropriate. Viewed color display and layout must be noticed and adjusted to make it look attractive.
2. This Virtual Tour application can be developed even better, such as it can be made website-based also not only android, adding animation effects, adding 3D animations, school Area Maps, full screen mode, additional information about the school such as teacher data, list of extracurricular options, uniform info used and much more

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