Implementation of the Luther Method in Virtual Reality Designing of the Flow of Making a Driver's License (SIM) at the Traffic Unit (Satlantas) of the Kampar Regency Regional Police

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Abstract. SIM issuance is carried out by the Polres traffic unit, including Satlantas Polres Kampar, which currently still uses banners to convey information about the flow of SIM issuance. This problem can be overcome by making a website-based Virtual Tour of the Flow of Making a Driver's License. This Virtual Tour was developed using the PHP programming language, CodeIgniter v3 framework, MySQL database, Apache, jQuery, and hardware in the form of Insta Nano 360 cameras and iPhone cellphones, as well as software such as Adobe Photoshop. This research aims to facilitate the public in finding information about the flow of making a driver's license since it can be accessed anytime and anywhere without having to come or ask directly to the location. The method used in this research is the Luther method, which consists of six stages: concept, design, material collection, manufacture, testing, and distribution. The results of this study successfully created a Virtual Tour of the flow of making a driver's license that can be accessed through the website, and serves as information that makes it easier for the public to find out the flow of making a driver's license at Satlantas Polres Kampar, with the results of user response reaching an average value of 90.15%.

Keywords: Virtual Tour, Satlantas Polres Kampar, Luther.

INTRODUCTION

A Driver's License (SIM) is official proof that indicates that a person has competence, and is legally recognized by the public through an authorized institution that provides legitimacy for this ability. In addition to being a means of control, a driver's license also functions as forensic data managed by the police for someone who has passed a series of tests of knowledge, skills, and driving abilities following the standards set out in the Road Traffic and Transportation Law [1]. Accordingly, a driver's license is an absolute requirement for anyone who wants to operate a motor vehicle on public roads, where the possession of a driver's license indicates that a person is allowed to drive [2].

In 1967, Indonesia first implemented a driver's license as a mandatory requirement for motor vehicle drivers. At first, the issuance of a driver's license was done manually using handwriting, then developed by using a typewriter, until finally using a printing device. The whole process was undertaken without involving computerization [1]. As

technology advances, Korlantas Polri launched Smart SIM, an electronic SIM based on information technology that replaces the conventional SIM. This SIM not only stores forensic data for traffic violators but also provides convenience for all motorcycle drivers in Indonesia [2].

The process of issuing a driver's license is carried out at the Traffic Unit (Satlantas) of the Polres with the aim of overseeing public safety and order in traffic [3]. The flow of driver's license application should be clearly designed, organized, and easily understood by the public. However, in reality, information related to the procedure of making and renewing a driver's license is still frequently presented through banners, which are sometimes unclear and cause confusion among the public. As a result, people still often ask officers at the Traffic Unit about the procedure [4].

As an example, at Satlantas Polres Kampar, information about the flow of issuing and renewing a driver's license still uses banners. The procedure begins with completing requirements such as having the original electronic identity card (E-KTP), a photocopy of the E-KTP, a health letter from a police doctor, and a certificate of passing the psychological test. Next, registration and filling out the SIM form is done manually or electronically, followed by traffic education, and identification through fingerprints, signatures, and facial photographs. Then, participants take the theory and practical exams. If successful, the last step is to make the PNBP payment, print the SIM, and hand over the SIM to the applicant. Many people still do not understand the details of each step of this process, especially when renewing a SIM, which does not require a theoretical or practical exam, but still requires administrative requirements such as a valid old SIM [4].

To simplify the process of issuing and renewing a driver's license, information technology can be utilized, one of which is through a Virtual Tour. Virtual Tour is an interactive media that uses waypoints as directions, allowing users to see images or panoramic objects in 360 degrees. This technology provides an interactive simulation of the stages involved in the process of making and renewing a driver's license so that users can simply follow each step required in a virtual environment [5]. By utilizing Virtual Tour, SIM-related services can be made more modern and optimized, improving the public experience in getting more efficient services. As one of the most important basic administrative services, a driver's license gives its holder the rights and obligations to drive on the road [6].

The research conducted by [7] addresses the problem of inadequate solar system learning tools in science subjects for elementary school students. Nevertheless, an update is needed, especially on visualization that must be adapted to the current curriculum. This research aims to develop planetary virtual reality (VR) applications as solar system learning media. The method used is the Luther method. As a result, the planetary VR application was successfully created and runs optimally on Android devices of at least version 4.4 (KitKat) with 2 GB RAM and a Gyroscope sensor.

The research carried out by [8] discusses the development of an application that uses 3D objects and virtual reality (VR) technology, with the gyroscope feature on smartphones as a control and interaction system.The objective is to utilize 3D object visualization and gyroscope for interaction in the application. The object used is the building of PT.ADD.Co, which is intended to introduce the company environment to potential investors or new employees. The method utilized is Luther's version of the multimedia development method. The results showed that the VR application was successfully designed with 3D building objects and gyroscope features used as navigation.

The research conducted by [9] explores the creation of an interesting application to provide a new experience for museum visitors. The method used is Luther-Sutopo. As a result, a virtual tour application was successfully created as a medium of information and promotion for Banten State Museum.

The research conducted by [10] addressed the problem of the job market at the State Polytechnic which is still done manually. The goal is to develop a virtual reality-based virtual job market information system, with application design using the CodeIgniter framework. The result of this research is the establishment of an online job market application that connects companies with job seekers.

Research carried out by [11] addressed the problem of access to distance and time for those who want to see the current condition of the Sacred Heart of Jesus Palasari Church, Bali, which is often renovated. As a result, the web-based virtual tour application was successfully created as expected.

The Research conducted by [12] discusses the problem of booking tour packages for Seribu Island which is still manual, causing the recording of visitor data, reservations, payments, and reviews to be less than optimal. The goal is to develop a website-based online booking application using the CodeIgniter framework. As a result, the Thousand Island tour package booking application was successfully created.

The research conducted by [13] discusses the ineffectiveness of delivering Hajj manasik information at the Medan City Hajj Dormitory which is still done manually. The purpose is to design an Android-based virtual tour application with virtual joystick features, using UML design. As a result, the Hajj Manasik simulation application with a virtual joystick was successfully made.

The research conducted by [14] discussed the lack of effectiveness of the socialization of new student admissions (PPMB) at STMIK Amik Riau which still uses brochures, banners, and billboards.The goal is to develop promotional media with virtual tours based on 360-degree photography technology and image stitching techniques, using UML design. As a result, a virtual tour was successfully created as a promotional media for STMIK Amik Riau.

Research carried out by [15] addresses the problem of conventional visits to Universitas Pendidikan Indonesia (UPI), where visitors still rely on in-person guides. The objective is to develop a virtual tour system using information and communication technology to facilitate visits to UPI. As a result, a virtual tour system was successfully created that makes it easier for the general public to visit UPI.

METHODS

The method used in the process of obtaining a Virtual Tour of the Flow of Making a SIM (Driver's License) at Satlantas Polres Kampar is the Luther method.

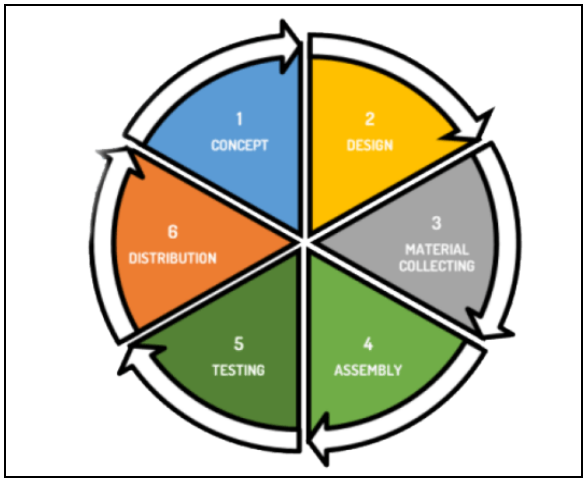

FIGURE 1. Luther's method

The following are the stages in Luther's method to complete the research to be carried out:

1. Concept

The stage of the concept applied in making this 3-dimensional digital information media is a Virtual Tour of the flow of making a Driver's License (SIM) at Satlantas Polres Kampar. This virtual tour displays the entire flow of making a SIM from start to finish using 360-degree panoramic technology, so that people can understand the process of making a SIM more precisely and correctly.

2. Design

In the design stage, the virtual tour of the SIM making flow will be developed using flowcharts and UML (Unified Modeling Language) as a guide in system design. This design will be the main reference in making a website-based virtual tour that displays the flow of making a driver's license interactively. In designing the Virtual Tour Website for the SIM Making Flow at Satlantas Polres Kampar, the author uses a user flowchart to see how the user's workflow process is depicted. The following user flowchart can be found in Figure 2.

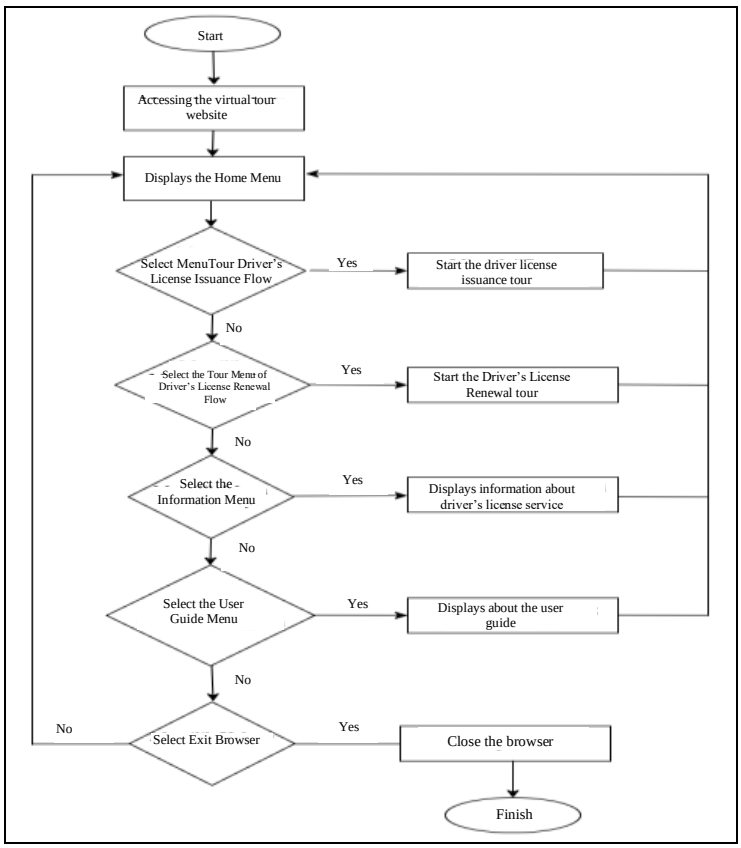

FIGURE 2. User flowchart

In Figure 2 which is a user flowchart that describes the workflow process of the Virtual Tour website for the SIM Making Flow at Satlantas Polres Kampar. First the user accesses the Virtual Tour website, it will display the Home Menu page, then the user can select 5 menus contained on the Home Menu page, namely if you select the home menu, it will display the main page and menus on the main page, then if you select the SIM making flow tour menu, it will start the SIM making tour, then if the user chooses the SIM extension Tour menu, it will start the SIM extension Tour, then if the user chooses the information menu, it will display information about SIM services, and if the user guide is selected, it will display information about the user guide, if the user wants to return, he can select the Home menu, it will return to the main page and if he does not select the menu, the user can exit the browser.

3. Material Collecting

The materials needed will be collected based on planned needs. Material collection is carried out directly at Satlantas Polres Kampar through interviews and observations. The materials collected include 360-degree panoramic images taken using a 360 Insta Nano camera, which will be used in making virtual tours.

Below is the design of the panoramic image object that will be used in making the Virtual Tour of the SIM making flow at Satlantas Polres Kampar.

Table 1 The design of object

Code	Panoramic Name	Decription	Pictures
P1	Panoramic 1	Traffic Unit of Kampar Police	
P2	Panoramic 2	The road to driver's health certificate	
P3	Panoramic 3	In front of Health Certificate for Drivers	
P4	Panoramic 4	Driver's Health Check by Police Doctor	
P5	Panoramic 5	In front of the issuance of driver's psychology test certificate	
P6	Panoramic 6	Driver Psychology Test testing door	
P7	Panoramic 7	Road to Integrated Services	

Code	Panoramic Name	Decription	Pictures
P8	Panoramic 8	In front of the Integrated Services building	
P9	Panoramic 9	Driver's License Service Information Counter	
P10	Panoramic 10	Counter 1	
P11	Panoramic 11	Counter 2	
P12	Panoramic 12	Waiting Seats	
P13	Panoramic 13	Driver's License Education /Enlightenment Door	
P14	Panoramic 14	Driver's License Education /Enlightenment Room	

Code	Panoramic Name	Decription	Pictures
P15	Panoramic 15	Counter Door 3	
P16	Panoramic 16	Counter Door 3	
P17	Panoramic 17	Driver's License Theory Exam Room Door	
P18	Panoramic 18	Driver's License Theory Exam Room	
P19	Panoramic 19	Reporting post Driver's License Practice Exam	
P20	Panoramic 20	Field Implementation of Car Driver's License Practical Examination	
P21	Panoramic 21	Motorcycle License Practical Examination Field	

Code	Panoramic Name	Decription	Pictures
P22	Panoramic 22	Balance and braking forward track test	
P23	Panoramic 23	U-turn track test	
P24	Panoramic 24	Test trajectory forming the letter “S”	
P25	Panoramic 25	Avoidance selection reaction test	
P26	Panoramic 26	PNBP payment counter	

4. Assembly

In the production stage, the objects and materials that have been collected will be processed and arranged in accordance with the flowchart and UML that have been designed previously. This process involves data processing and integration into a website-based virtual tour system.

The stage of production (assembly) is a stage where all assets or objects are done. This assembly stage, is divided into several manufacturing processes, namely taking photo assets using the Insta 360 Nano camera, editing panorama360 image assets using Photoshop CS6 software, creating a virtual tour website using the Codeigniter v3.1.13 Framework, using XAMPP Control Panel v3.2.3, creating a database using phpMyAdmin and using pannellum.

The first stage is taking image assets with Insta 360 Nano camera then editing 360 panoramic images with photoshop CS6 and saving files in jpg or png. Codeigneter framework serves to build a dynamic website using PHP with PHP framework with MVC model (Model, View, Controller). The PHP programming language is used to connect 360 panoramic images to the database so that they can be inputted into the website.

The next stage in using Xampp Control Panel v3.2.3 is able to replace the role of web hosting by saving website files to local hosting so that they can be called via a browser. Xampp Control Panel can be used to manage database pages on PhpMyAdmin, by only accessing the local computer server without an internet connection. PhpMyAdmin

allows you to freely edit, delete, update or add users, as well as databases with ease. Not only to access the database, Xampp Control Panel can also activate apache, mySQL, filezilla, config, netstat and other Xampp Control Panel configurations and is also obtained for free with the GNU (General Public License) label. The use of PhpMyAdmin version 7.3.2 to create a panoramic database in order to create tables, free to enter data and edit data, delete data, update or add users, and also databases easily. Which phpMyAdmin is part of managing the MySQL database on the computer so that it is easy to call.

The use of Pannellum to display WebGl-based panoramas is a web technology that offers accelerated 3D graphics into the browser without installing additional software, is lightweight and flexible. The use of Pannellum is based on a 3D framework with special interest areas in panorama creation and Virtual Tour.

5. Testing

After the website has been created, testing is carried out to evaluate its performance and functionality. Testing is done using the Black Box Testing method to ensure that all features, buttons, and components of the website function properly and as expected.

Testing is a testing process carried out by running the application/program and validating the entire application whether it has worked properly and whether there are errors or not [16]. The testing stage (Testing) is carried out after completing the assembly stage, the first stage carried out in testing is alpha testing (alpha test) which is tested by the maker or the maker's environment, this test is carried out to see the errors and deficiencies that exist on the SIM Making Flow Virtual Tour Website that has been made, aiming to ensure that the website being tested can run smoothly without any errors or bugs. After passing alpha testing, then conduct beta testing which involves end users or the general public to evaluate the website [17]. Beta testing involves users / users directly in the environment or the general public by distributing questionnaires to users / users who will be calculated to get conclusions on the assessment of the website created. For testing, you can use the virtual tour link for the flow of making a SIM at Satlantas Polres Kampar which has been hosted.

6. Distribution

At the distribution stage, the virtual tour application will be uploaded and stored on the website. This stage also includes product evaluation for further development, to ensure the quality and sustainability of the application so that it can be continuously improved according to the needs of the users.

RESULTS AND DISCUSSION

The result of this research is a virtual tour website of the SIM Making Flow at Satlantas Polres Kampar which is made by applying the stages in the Luther method. virtual tour website of the SIM Making Flow at Satlantas Polres Kampar:

1. Home page

The following is a display of the home menu page of the virtual tour website which has five menus, namely the SIM making flow tour menu, the SIM extension flow tour menu, the home menu, the information menu, and the user guide menu, which are found in Figure 3 as follows:

FIGURE 3 Home menu page image

2. Driver's License Flow Tour Page

The following is a display of the tour menu page of the SIM making flow on the virtual tour website which displays panoramic images that can be rotated 360 degrees to the right side, left side, bottom, and top, and has three buttons, namely the continue, back, and information buttons, which are found in Figure 4 as follows:

FIGURE 4 Driver's license flow tour menu page

3. User Guide Page

The following is a display of the user guide menu page on the virtual tour website that displays information about user guidance in using the virtual tour website for the SIM making flow, which is found in Figure 5 as follows:

FIGURE 5 User guide menu page

To find out the feasibility of a virtual tour of the flow of making a SIM at the Kampar Police satlantas which has been made accessible to users via the website, a questionnaire is made via google forms to determine the level of user satisfaction with the quality of the virtual tour of the SIM making flow at the Kampar Police satlantas. The following discussion for the results of user responses can be seen in table 2 as follows:

Table 2 Questionnaire results

No	Question	Range of Score				Total Number of Respondents	Score
		1	2	3	4		
1	Does viewing the virtual tour website make it easier for the public to see the initial flow that must be done in making a driver's license?	1	4	16	44	65	89,62%
2	Is the use of virtual tours easy to	1	3	15	46	65	90,77%

	understand?						
3	Is the virtual tour of the flow of making a driver's license on the website in accordance with the actual display at Satlantas Polres Kampar?	1	5	16	43	65	88,85%
4	Is the virtual tour interface attractive?	1	2	19	43	65	90,00%
5	Can the virtual tour website for the flow of making a driver's license be used as information media by the public?	1	3	13	48	65	91,54%
	Average results						90,15%

Table 2 shows the results of the user response questionnaire with a total of 65 participants who have filled out the questionnaire. Then there is a presentation of data in the form of a diagram as follows:

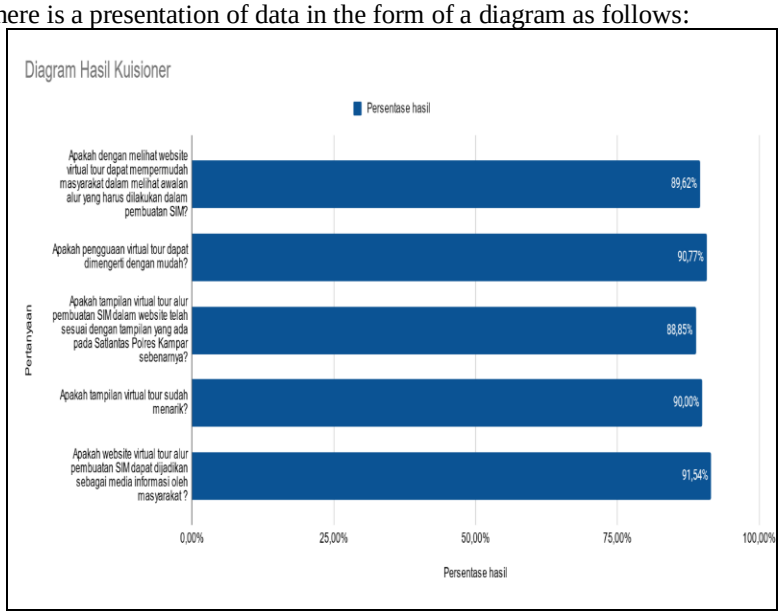

FIGURE 6 Driver's license flow tour menu page

The explanation of Figure 6 on the first question obtained a value of 89.62%, on the second question obtained a value of 90.77%, on the third question obtained a value of 88.85%, on the fourth question obtained a value of 90.00%, and finally on the fifth question obtained a value of 91.54% so it can be concluded that the results of the questionnaire have an average value of 90.15%.

CONCLUSIONS

This research successfully designed a virtual tour website for the flow of making a driver's license at Satlantas Polres Kampar Regency using the Luther method. Successfully created a virtual tour of the flow of making a driver's license at the Satlantas Polres based on the website. Successfully facilitating the public in finding information about the flow of making a driver's license at Satlantas Polres Kampar by applying virtual tour technology 360 can be seen from the results of user responses with an average value of 90.15%.

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