
Development Of Android-Based Digital Maps for Learning the Mapping Process

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ABSTRACT

Educational media is an important component in education for making the Jambi Province Map which must be presented in an innovative way. Media that is currently known is a digital map that is not easy to read and the position and location or color errors, this situation will lead to errors in meaning and purpose. This study aims to make a product in the form of a digital map and test its validity based on media experts. This study uses the ADDIE model development procedure which is modified into 4 stages, namely analysis, design, development and implementation. The Likert scale method was used as an analysis to retrieve information from 20 class VII students of SMPN I Jambi City as respondents, while the validation method was used as an analysis to test product validity. The results of the development in this study are in the form of digital map images designed through the Android-based UMapper and WhatsApp Plus Aero applications. Test results from two material experts show that this product gets a score of 47 and 46 out of a maximum score of 50 which means very good. This shows that the development of this media is very good in meeting the needs of students in the field of education for making Jambi Province maps, being creative and innovating in using media in the form of android-based applications.

Keywords: WhatsApp Plus Aero Android application, Umapper , Addie

1. INTRODUCTION

Aero is based on Android for easy text editing developed by App Holdings. Supporting features include creating text, 3D text, text effects, hundreds of fonts and creating images in the desired shapes. This application can also save projects and export them in various formats, such as pdf, jpeg and png. The advantage of this application is that it is integrated with other Android-based design applications. So that in use, this application is easy to use, simple, fast and efficient (Bac, C. W., Hemming, J., & Van Henten, E. J. (2014), (A. Aisa et al. 2022), (Zamsuri and Handayani 2021). The author uses this application to remove the background of the map writing screen that the author has designed using the previous Umapper and WhatsApp Plus Aero applications, the aim is to make the designs that have been made easier to edit and can be applied to subsequent designs.

Several studies on the development of application-based maps have been carried out by many academics. Research on digital maps using multimedia shows that the developed application can create letters with several font variants. The use of this application can be done independently by the user (Helmy Thendean 2007). Similar developments were also carried out by Silvia Rostianingsih, Ivan Handoyo, and Kartika Gunadi. The results showed that there was a design made with a variant of the font in the ICT-based "Kelk" software. The design results that have been made can be saved in jpeg or image format. (Silvia Rostianingsih, Ivan Handoyo, and Kartika Gunadi 2004). On the other hand, there is a video product developed by Fitrianto using Adobe Flash which produces video tutorials for making map designs and ornaments (Rahmaibu, Ahmadi, and Prasetyaningsih 2016), (Nasution and Siregar 2019). Munawir has also carried out other developments related to maps based on android applications which focus on developing media in the form of applications of the concept of cardinal directions for learning maps (Munawir 2020). The use of the whatsapp application has also been widely used by various educators or the academic community as a learning medium and also as a means of communication media (Doherty 2014), (Velioglu, Yildiz, and Yildirim 2018).

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From the above literacy, the study of development in making digital map images based on Android applications is still a bit of attention. For this reason, the author tries to take advantage of the software available on Google Play to create digital map images. The author chose the UMapper and WhatsApp Plus Aero applications. The reason the author chose these three applications is because of the ease of use. From this research it is hoped that students can be creative and innovate to develop subject matter Introduction to the Jambi Province Map in making digital works in the form of digital map images. This development will provide a new variant on the diverse collection of Map images on the WhatsApp application with a more attractive and varied design offer. The creations created by students will later help in following the Introduction to the Map of Jambi Province lesson. Learning is no longer monotonous and also the results of his work can be utilized by smartphone application users.

This paper will describe the process of making digital map images using these three applications and test their validity through standard eligibility tests by media experts. The test form uses product validation techniques. The author did this test to prove product standards and to prove that the product being developed can meet needs and has innovation value in learning how to make the Jambi Province Map for SMPN 1 students in Jambi City. From the testing of media experts, the product developed by the author in the form of an Android application-based Map image will meet the eligibility standards with a very good value.

2. LITERATURE REVIEW

2.1 Application

Android is an operating system for Linux-based mobile devices designed for touch screen mobile devices such as smartphones and tablet computers (Santoso, Ghofur, and Kuswanto 2021). Mobile-learning students can access learning materials and information from anywhere and anytime. Learners do not need to wait for a certain time to study or go to a certain place to study. They can use mobile wireless technology for their learning needs, both formal and informal. The number of mobile devices is more than Personal Computer (PC). Mobile devices are easier to operate than PCs. Mobile devices can be used as learning media. More and more people own and use mobile devices. This opens up opportunities for the use of mobile technology devices in the world of education. The use of mobile devices (mobile-devices) in the learning process is then known as mobile-learning. One of the main advantages of Android applications is the accessibility of a variety of software with an installed web browser, such as a computer, smartphone, or tablet. This allows users to access applications from anywhere and at any time if they are connected to the internet. Internet users as well as mobile gadgets are dominated by young people, making it possible to use mobile devices for learning (Syahputra, Arwansyah, and Hasyim 2021).

2.2 Addie's Development Model

This development model follows the learning development model from the ADDIE model design which includes analysis, design, development, implementation, evaluation (Hidayat and Nizar 2021): 1. Analysis, at this stage the researcher conducts a needs analysis in the form of learning media and identifies problems and products according to goals, thoughts about the product to be developed. 2. Design, the design stage is the product concept design stage that will be developed which contains material, learning videos, quizzes or questions. 3. Development, in this process the researcher will make the design a reality. At this stage, what is done is to analyze system users. In this research the use of this application is the teacher and students. The teacher here is in charge of managing learning needs such as materials, assignments and grades, as well as monitoring students in the development of learning. While students can only see material, assignments and grades. 4. Implementation, in this trial I will do the product as a concrete step to implement the product we are making. Then apply the learning system test that is being made to the target of several validation experts, teachers and students to find out their respective responses about the feasibility and effectiveness of the learning media being developed. 5. Evaluation, namely the process to see whether the product made is successful, in accordance with initial expectations or not.

2.3. UMapper and WhatsApp Plus Aero applications

The UMapper app is UMapper makes it easier to create, manage, distribute and monetize maps. online UMapper is able to create interactive maps and geogames, distribute various points of interest and track a need for map making (S. Aisa 2021). **WhatsApp Plus Aero** WhatsApp Aero is WhatsApp that has received a special "touch" from professional modders. The modders managed to add premium features that you won't find on the original

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WhatsApp. Existing premium features are guaranteed to make you turn away from the original WA. WhatsApp Plus aero a perfect replica of the original WhatsApp. The only difference between WhatsApp Plus and original WhatsApp is the blue color of the icon. This application was developed by a developer from Spain named Rafalete in 2012 (Akhmadi and Nugroho 2022).

3. RESEARCH METHOD

The author uses a research and development approach with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) (Handrianto et al. 2021). This model is a development model for research that focuses on products so that learning becomes effective. (Mansur and Rafiudin 2020). In this study, the authors used four steps, namely the process of analysis, design and development as well as implementation. This analysis step is used by the author to find out some image errors on WhatApps, this analysis includes writing lines, positions, images, colors and aesthetics of the work. While the development steps the author uses to design Map sketches on the UMapper and WhatsApp Plus Aero applications (Rusli et al. 2022). The implementation step, the authors use to test how effective the product to be developed is.

In the UMapper application, the author will select fonts, such as images, lines, map positions, determine colors and create layouts. In addition, the author will also consider the suitability and arrangement of map shapes, readability, font creation and design creativity. The UMapper application is supported by saving in png form. The author uses the WhatsApp Plus Aero Software application to convert the master design into an image that can be used in the WhatsApp application. As for the subjects in this study were SMPN 1 Jambi City students who were taking social studies subjects with the subject of Introduction to the Jambi Province Map at SMPN 1 Jambi City. Based on initial observations, this location was chosen because SMPN 1 Kota Jambi class VII Odd semester students were known to be taking the IPS subject Introduction to the Map of Jambi Province but were not optimal in using learning media in the form of using Android-based applications for learning Introduction to the Map of Jambi Province. In fact, most students have smartphones as a support in following subjects. Of all students of SMPN 1 Kota Jambi grade VII, the authors chose 20 users as respondents using a random sampling technique.

The author collects data using document, interview and questionnaire techniques to WhatsApp users which are then analyzed using the Likert scale technique (Budiaji 2013), with the formula:

$$p = \sum X_i \times 100\% \tag{1}$$

The following is table 1 regarding the product need score and table 2 regarding the material validation score;

Table 1.

Product need score

No.	Standard	Value Remarks
1	80-100 %	Strongly Agree
2	50-79 %	Agree
3	20-49 %	Disagree
4	00-48 %	Strongly Disagree

Tabel 2.

Categories of material validation scores

No.	Standard	Value Remarks
1	35-50	Very Good
2	20-34	Fine
3	10-33	Enaough
4	00-32	Less

The formula that the author uses is the Likert scale (Nasution and Siregar 2019) as follows:

$$p = \sum X_i \times 100\% \tag{2}$$

Information:

P = average score, $\sum x_i$ = number of answers obtained, $\sum x$ = highest score

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Meanwhile, to calculate the score of the validation questionnaire, the author uses the following formula (Rahmi, Budiman, and Widyaningrum 2019):

$$K = n \times A, \text{ Total Score} = \sum K \tag{3}$$

Information:

K = Score per item, N = Number of questions answered = Score answers

4. RESULT AND DISCUSSION

4.1. Digital Map Product Development Description

The product produced in this research and development is a digital map image using the Umapper application and the Android-based WhatsApp Plus Aero software which can be used in the whatsapp application for learning the Introduction to the Map of Jambi Province for class VII students of SMPN 1 Jambi City. The steps used in this research adopt the ADDIE development model (Hidayat and Nizar 2021), (Cahyadi 2019). This model has five processes, namely (1) Analysis or analysis, (2) Design or design, (3) Development or development, (4) Implementation or implementation and (5) Evaluation or evaluation. Of the five components, the author will conduct a discussion covering only 4 elements, due to the limitations of the author. The four stages include analysis, design, development and implementation. The steps will be described by the author as follows:

- a) First, the analysis stage is carried out by the author by analyzing WhatsApp application users from among students who use pictures in their chat activities. This analysis is important to do to find out that the media developed is in accordance with learning needs (Hidayat and Nizar 2021), (Sudarman and Ardian 2021) especially in the subject of Introduction to students who are taking social studies subjects on that topic. Making a Map of Jambi Province. The interview results show a good response in welcoming this product design. The results of interviews with 20 student respondents produced the following data Table 3.

Table 3.

Table of Interview Results with students as respondents

No.	Student initials	Student Answers
1	S1, S2, S3, S4, S5 and S6	Strongly agree digital map images are needed to understand map material
2	S7, S8, S9, S10, and S11	Agree with an error that occurs when writing digital Map images in the whatsapp application
3	S12, S13 and S14	Sometimes the user sends the wrong image, even the color of the map image is not clear
4	S15, S16, S17, S18, S19 and S20	Totally agree if there is an interesting, good and innovative map design development. With pleasure, he will send this picture via chat to his friends

The results of the questionnaire needs that the author distributed to 20 users as a sample, produced the following data 4.

Table 4.

Questionnaire table for digital map image user needs on the WhatsApp application

No.	Question	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Users use digital Map images in chats on the WhatsApp application	70%	30%	0%	0%
2	I get error in digital Map image on Whatsapp app	9%	22%	55%	14%
3	Users sometimes send wrong pictures on the WhatsApp application	4%	30%	52%	14%
4	I am bored with the pictures in the current WhatsApp application	15%	22%	48%	15%
5	I have difficulty reading digital map images on WhatsApp at the	6%	9%	75%	10%

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	moment				
6	I need legible digital Map images	65%	23%	5%	7%
7	I need digital Map images to understand the meaning of the drawings, positions, lines and colors	82%	8%	5%	5%
8	I need a good, attractive and innovative map image design	85%	15%	0%	0%
9	I am interested if there is development in making digital map images	87%	13%	0%	0%
10	I am happy if I send a picture with an attractive map design	90%	10%	0%	0%
	Total Average	51%	18%	24%	0.07%

Information : SS = Strongly Agree , S = Agree, TS = Disagree, STS = Strongly Disagree

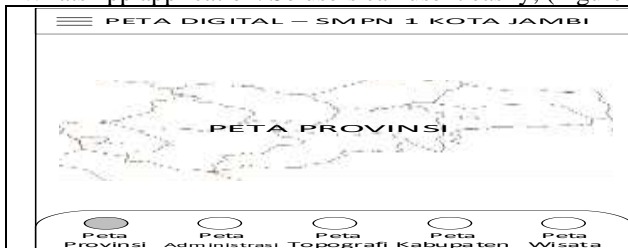
The results of the table above show that the average respondent strongly agrees with the needs related to digital map images. The number of percentages from the questionnaire that the authors distributed to 20 samples showed that 51% strongly agreed with the development of the Jambi Province Map Introduction learning product in the form of a digital map image, while 18% of respondents agreed. Those who disagree are 24% and those who strongly disagree are 0.07%. The results of the table indicate that most of the sample agrees with the product being developed.

b) Second, the product design stage which aims to create product designs that are relevant to user needs. This design will then be developed by researchers to become a product that has benefits for the needs of developing social studies subjects with the material Introduction to the Jambi Province Map. The product to be developed by the author is in the form of a map image that can be used in the WhatsApp application. The author chose whatsapp as the object for developing this map image because learning the Introduction to the Jambi Province Map uses an application for learning needs. This whatsapp application was chosen because it has features that are easy to use (Sukrillah, Ratnamulyani, and Kusumadinata 2018). So, by using this application, the utilization of the media developed in the form of this Map image will be maximized.

At this stage, the author collects material related to map images that can be used as digital map images. The author has summarized it from various sources which are usually found in Map images in the WhatsApp application. This summary is based on the results of interviews that the author asked the students. Several map themes that were successfully summarized by the author will be used as material in making digital map images.

c) Third, the product media development stage aims to produce Android-based digital map images. This development stage begins with the creation of a digital map image that has been designed beforehand. The author develops digital map images using three applications available on Google Play, namely the Umapper and WhatsApp Plus Aero applications.

Each application has its own function. Applications for making fonts, starting from composing letters, lines and giving color, to giving color to fonts, removing the background, and designing the writing to make it more interesting for writers to use the UMapper application. The results of this creation will then be processed in the WhatsApp Plus Aero application to change the image format to an image that can be directly used in the WhatsApp application. So users can use it easily; (Figure 1).



Map Font Design Process using the Umapper application



Coloring and Layout Process for Map Fonts using the WhatsApp Plus Aero application

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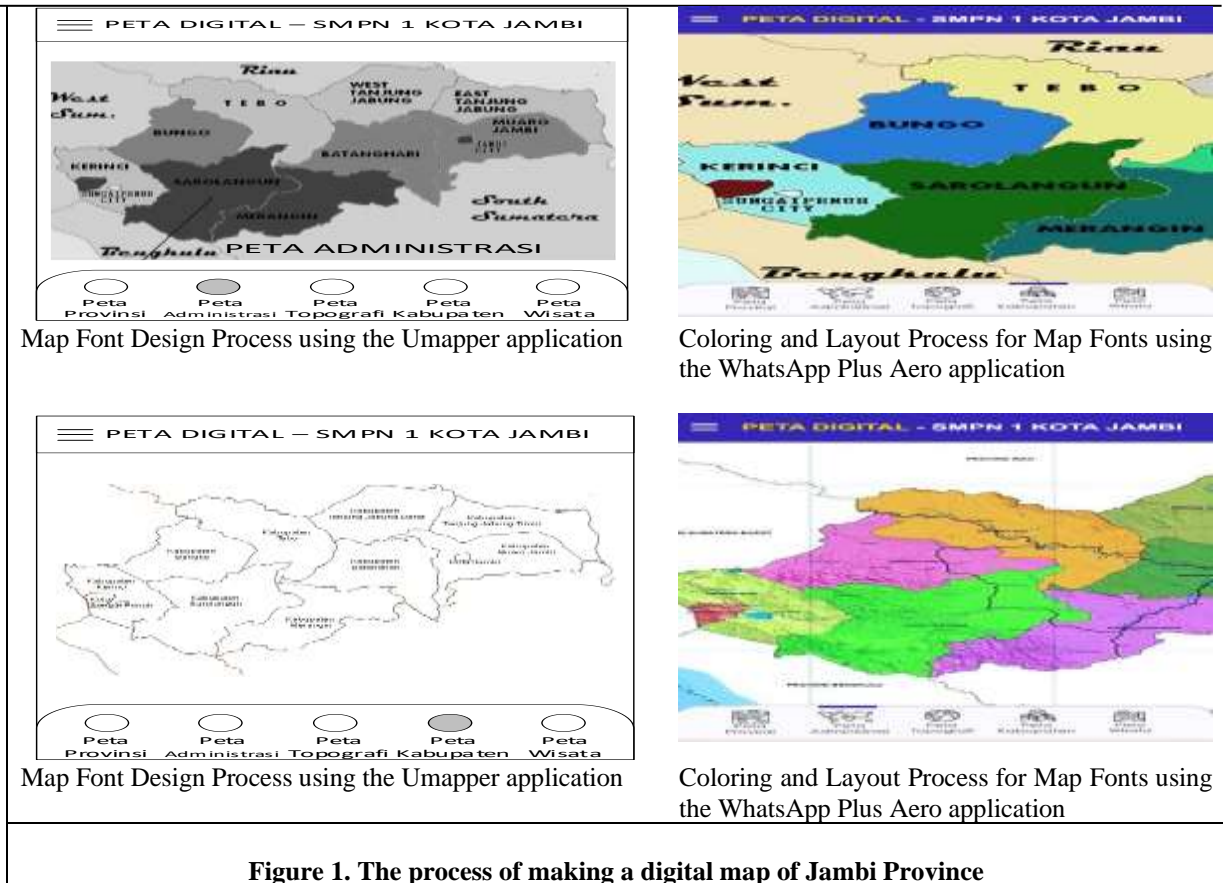


Figure 1. The process of making a digital map of Jambi Province

d). Fourth, the implementation stage is in the form of testing digital map image products that have been developed in the previous stages. The purpose of this trial is to measure the feasibility of the media developed with the needs of students for learning the Introduction to the Jambi Province Map. This product will be tested on material experts. As the validator, the authors appoint map material experts and media material experts. Both of them are Indonesian Map experts who have achievements up to the international level as well as who know about computer technology information. They have participated in various events both domestically and abroad. Starting from competition events, exhibitions, workshops and seminars and talk shows.

Tests carried out by material experts consider several aspects, including the ease of use of images, the arrangement of text, ease of reading and design creativity as well as the selection of appropriate colors. The purpose of this test is to create an innovation in learning the Introduction to the Jambi Province Map, where the material previously presented was only limited to writing and fulfilling the coursework load and there was no learning innovation in the form of making Android-based digital maps. So, the existence of this digital map image product is an innovation in learning to make maps of Jambi Province by utilizing the Umapper application and the WhatsApp Plus Aero software as supporting materials for making digital-based map works. This test will also assist in achieving learning objectives (Posumah, Waworuntu, and Komansilan 2021), especially in the subject of making the Jambi province map for SMPN 1 students in Jambi City. Summary of product results is summarized in table 5 and table 6 below.

Table 5.

Product results of the map media expert validator

No.	Questionnaire Question	Score Student Acquisition	Value					Value
			1	2	3	4	5	
1	Ease of use of digital Map images						√	5

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2	Arrangement of map lines well	√		4
3	Good text preparation		√	5
4	Arrangement of map positions well		√	5
5	Clarity of media images Digital map √ 5		√	5
6	Set the size of the image on the digital map image	√		3
7	Clarity of writing material on digital map images		√	5
8	Suitability of digital map image font size and type		√	5
9	Color matching of each image display Digital map		√	5
10	Color matching of each image display Digital map		√	5
Total				47

Table 6.

Product results of the map material expert validator

No.	Questionnaire Question	Score Student Acquisition					Value
		1	2	3	4	5	
1	Ease of use of digital Map images				√		4
2	Arrangement of map lines well					√	5
3	Good text preparation					√	5
4	Arrangement of map positions well					√	5
5	Clarity of media images Digital map					√	5
6	Set the size of the image on the digital map image			√			3
7	Clarity of writing material on digital map images				√		4
8	Suitability of digital map image font size and type					√	5
9	Color matching of each image display Digital map					√	5
10	Image clarity Digital media maps					√	5
Total							46

The results of the questionnaire above are analyzed using the Validation formula, namely $K = \frac{n \times A}{K}$, $K = 10 \times 5$ with a K value of 50. From the table, the value obtained from the media expert validator is 47 from the standard maximum value of 50. Meanwhile the value from The map material expert validator is 46. Both of these values are in the range of 35-50, indicating that the product developed by the author is in a very good category. These results were also found in research using android as a basis for developing media products (Nasution and Siregar 2019), it was found that trials on experts were an indication as a benchmark for the feasibility of learning media products (Nasution and Siregar 2019).

5. CONCLUSION

Based on the discussion above, it can be concluded that the final product of the development of digital maps based on this Android application is in the form of digital map images. This product was developed using the Umapper application and the Android-based WhatsApp Plus Aero software for learning to make a Map of Jambi Province for SMPN 1 students in Jambi City. The images developed by the researchers are in the form of lines, location positions and colors. Test results from two material experts showed that this product scored 47 and 46 out of a maximum score of 50, which means very good. Thus, product development in the form of an Android-based digital map image is able to meet the needs of SMPN 1 Jambi City students in learning to make Jambi Province Maps, namely being creative and innovating in utilizing media in the form of android-based applications in making works.

The limitations of this product are the unavailability of transition and development features for animated images or GIFs, so that when sending images, the impression is still stiff and not soft enough. For this reason, the development of this image product can be continued by further researchers in order to make the product perfect and more varied, so that this Android-based Map image can be utilized even more optimally.

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