

**LEARNING MEDIA OF MACROMEDIA FLASH
ANDROID-BASED AND CONTAINS CHARACTER EDUCATION**

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Abstract

This study aimed to produce Macromedia flash learning media based on android and filled with effective, practical, and effective character education. This study adopts 4D development design model, which includes four main stages, Define, Design, Develop, and Disseminate. The subjects of this research were students of class X SMA Graduation Pontianak. The data collection tools were validation sheets, questionnaires, and tests. The data analysis technique used is descriptive statistics. The results showed that the media validation results by the three experts were 78.5%, which is a very valid criterion. The cumulative score of the teacher and student questionnaire reached 93.71%, which is very practical. The results of the t-test show that $t_{Stat} > t_{Critical}$ two-tail then H_0 is rejected, which means H_1 is accepted, so it can be concluded that the learning media Macromedia Flash 8 is classified as effective because there is an increase in student learning outcomes between before and after being given learning with Macromedia Flash 8 learning media based on android and loaded with character education.

Keywords: Macromedia Flash, Character Education, Android, Development

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INTRODUCTION

The use of video conferencing applications that have been used in the online learning process includes the Zoom and Google Meet applications. However, in the online teaching and learning process, there are still constraints on the limitations of supporting facilities in the form of learning media (Abdul Latip, 2020). Learning media helps students in the learning process so that it is easy to understand concepts, provides motivation to be active in learning, and makes the class atmosphere more enjoyable (Setyadi & Qohar, 2017). But in reality, the learning media used in the field still needs to be as expected. This is in accordance with previous research related to the importance of media in the learning process (Hodiyanto et al., 2020; Yani et al., 2021, 2022).

Based on the results of a preliminary study conducted by researchers with mathematics teachers at the Pontianak Graduation High School in class X through direct interviews, it can be concluded that mathematics learning in class X at the Pontianak Graduation High School uses several media, including worksheets, textbooks, PowerPoint slides, WhatsApp groups, zoom meeting and google meet. However, from some of these media, the teacher stated that they should have utilized supporting facilities such as using learning media in the online learning process. However, there is one obstacle experienced by the teacher in the teaching and learning process, namely limited time in using the application, especially in using Zoom meeting and Google Meet, which results in students having difficulty repeating learning material (Daling et al., 2021). In addition, researchers found that there needed to be more character education for students because learning was done online.

With the problems that occur now, the role of learning media is significant in supporting educational facilities. Therefore, we need a supporting media that is expected to produce independent learning media to help students as well as educators so that the online teaching and learning process is carried out optimally. One of them is assisted by Macromedia Flash 8 because Macromedia Flash 8 is a learning medium that can contain teaching materials to achieve learning objectives (Hodiyanto et al., 2020; Yani et al., 2021). Macromedia Flash 8 is a media with advantages. It makes it easier to prepare teaching materials to make abstract teaching materials more real and improve students' understanding of concepts (Masykur et al., 2017). In this research, the development of Macromedia Flash 8 will be combined with android. Android is a Linux-based mobile operating system that includes an operating system, middleware and applications (Murtiwiwati & Lauren, 2013). That way, android is one of the media that can be used as an alternative to stationary. Utilizing the Android-based Macromedia Flash 8 learning media is an application that can help the online learning process. This is reinforced by Khuzaini & Yogo Sulisty (2018). The growing development of smartphones (android) is not only used as a communication tool indirectly but also used as an alternative learning media. This research is a follow-up study conducted by Hodiyanto et al. (2020) and Yani et al. (2021). The difference between this study and previous research lies in the material and content contained in Macromedia Flash.

The growing development of technology and information has an impact on the character of the younger generation. One of the impacts of technological advances is the decline in morale among adolescents. As explained by Pantu & Luneto, (2014), as technological advances cause a decline in morality among adolescents, character education needs to be implemented early. The sake of realizing the goals of national education contained in Law Number 20 (2003) aims to develop the potential of students to become human beings who believe and fear God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. Besides that, the importance of character education in schools considering the lack of value of character education in the learning process, especially in learning mathematics (Anugraheni, 2018; Fauziyah & Jailani, 2014; Kamaruddin, Rahman, & Djadir, 2014). The results of previous research show valid, practical, and effective learning media combined with character education (Yani et al., 2022; Yulius et al., 2021).

The problem that is no less important is the ability of students to solve mathematical problems. One of the benchmarks for student learning success is the final result of learning, so when students have difficulty learning mathematics, especially on a specific material, it is the most important problem in implementing math learning. One of the mathematics materials that make it difficult for students to learn is geometry; from the search results on student achievement in geometry material, it can be seen that students' abilities are still relatively low. Based on the results of research by (Nessa et al., 2017) on geometry material, students' difficulty in solving questions is still relatively great, with an average of 75.69%. Student's difficulties in understanding geometric material are because geometric objects such as points, lines, and planes are abstract objects of thought, while students' ability to think abstractly is still lacking (Nessa et al., 2017). This study aims to determine the validity,

practicality, and effectiveness Macromedia Flash 8 learning media based on android and contains character education.

METHODS

The research method used in this research is Research and Development method. The research design that will be carried out uses the 4-D development model, Define, Design, Develop, and Disseminate (Sugiyono, 2016).

definition

The defining stage is carried out to determine and define the learning requirements by analyzing the objectives of the material boundaries to be developed.

Design Stage

The design stage is carried out to design products that are developed and adapted to the problems obtained in the field during the definition stage. The design stage consists of the preparation of research instruments and the design of Macromedia Flash 8 Learning Media.

Development Stage

This development stage aims to improve the Macromedia Flash 8 learning media, which will be developed by evaluating and revising before it becomes a valid, practical and effective product.

Trials

After the Macromedia Flash 8 learning media was validated by four validators, namely three lecturers in the mathematics education study program and one teacher in the field of mathematics education in class X SMA Graduation Pontianak, then another limited trial was carried out at the same school as the school that will be the site of media research. Macromedia Flash learning 8. The tryout aims to get suggestions and input from teachers and students which will be considered as a revision to the Macromedia Flash 8 learning media with experts.

The final product

After the field trial stage, the input results and suggestions from the teacher and student response questionnaire on Macromedia flash 8 learning media were packaged as the final product.

Data analysis technique

In this study, the learning media Macromedia Flash 8 is valid and practical if the percentage of validation and questionnaire results is above 60%. The effectiveness of macromedia flash 8 learning media was analyzed using statistical tests with the assistance of Microsoft Excel 2010 (Paired Samples t-test) to determine the effectiveness of the product being developed. This is in accordance with research Oktaviana, et al. (2020) where the data analysis technique is assisted by SPSS 16.0, namely the t-test of paired samples.

RESULTS AND DISCUSSION

RESULTS

Learning media is a learning tool to facilitate the learning process that takes place. The Macromedia Flash 8 application can make it easier for students to understand the material presented in learning activities. In the Macromedia Flash 8 application, there is material and videos with character education that can attract students' attention in learning activities. This Macromedia flash 8 application learning media is made to carry out learning activities online and offline, according to the circumstances required. This Macromedia flash application has received expert validation from media and material experts, namely lecturers and subject teachers at SMA Graduation Pontianak. In this study, the 4D model was modified to 3D. The development steps are described as follows:

Define

Activities at this stage are carried out to establish and define development requirements. The define stage is divided into two, namely, the initial analysis and the identification of needs.

Final initial analysis

The researchers first step in this study was an interview with a teacher. Based on the results of interviews with subject teachers, mathematics learning has never used learning media such as applications or application development but only used existing applications such as PowerPoint, WhatsApp groups, and classrooms. Therefore, we need a learning media or to develop a new learning media that can assist in students' teaching and learning process. One of the media that can be used to add to the treasury or alternatives other than books, whiteboards, and visual aids is learning media. Based on this, researchers want to develop a Macromedia Flash 8 learning media. The interviews found that the average student has a smartphone, namely as many as ten students and students prefer to use smartphones because they feel that smartphones are more practical and more interesting than the books they have. Based on this problem, the teacher hopes that students can still focus on learning even by using a smartphone, so the researcher then conducts research by developing an Android-based Macromedia Flash 8 application so that students can take advantage of the smartphones they have.

Identification of Needs

In the next stage, the researcher defined the students' needs in learning three-dimensional material (geometry), where the material is adapted to core competencies, essential competencies, and learning indicators to achieve learning objectives. Based on the final initial and needs analysis results, learning media will be developed *Macromedia flash 8* android based. This is in line with research conducted by Rachma et al. (2020) that the use of mobile learning media can increase students' understanding of learning.

Design

This stage is carried out to design product development adapted to the problems obtained in the field during the definition stage. This product design is called the initial design.

Initial Design

This initial design will be validated to revise and improve Android-based Macromedia Flash 8 before being tested. The initial design of Android-based Macromedia Flash 8 with the following design:

Main course

The main menu will appear after the loading page. This menu has six main menu buttons: the profile button, video, indicator kd, material, questions, and conclusions. In addition, this menu also has an alternative button, namely the close application button, where each button on the main menu has its function, as shown in Figure 1.



Figure 1 Application Main Menu Page

Video Menu Display

This video menu will display two frames, namely the initial frame, which contains a blank display without a video with a play button. In contrast, the second frame contains a video that has a character education meaning that this video can be watched live. The display can be seen in Figure 2.



Figure 2 Page Video Frame 1 Application

Display Menu KD indicator

Indicators on the Basic Competency menu will display Basic Competency, Indicators, Home button, following and Back buttons, as shown in Figure 3.

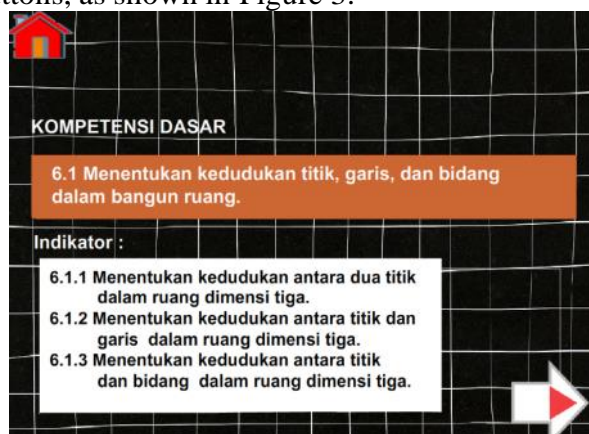


Figure 3 Page Indicator Frame 1 Application

Material Menu Display

The material menu will display geometry material (three dimensions) which will be shown in Figure 4.

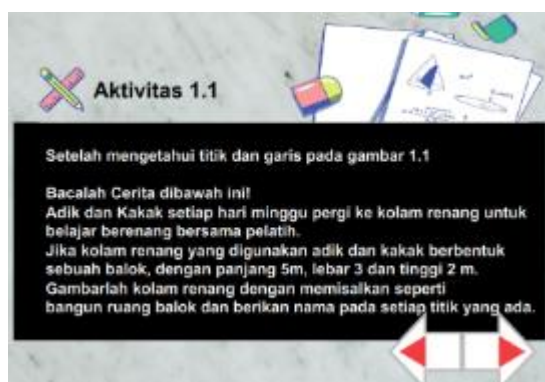


Figure 4 Application Material Page

Question Menu Display

The question menu will display, which contains practice questions.

Display Menu Conclusion

The conclusion menu displays conclusions from each important point in the geometry material (three dimensions), as shown in Figure 5.

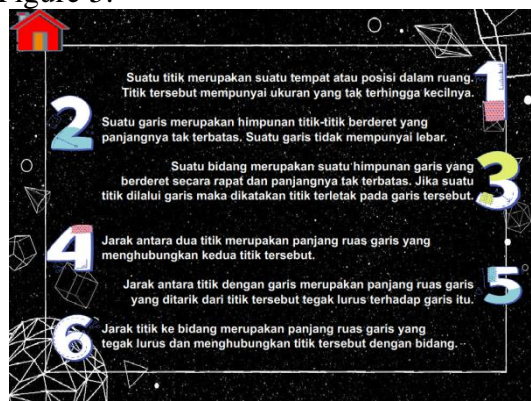


Figure 5 Application Conclusion Page

Develop

In this research, at the development stage, there are several steps that must be carried out, as follows:

Making Learning Media

At the stage of making this media, the researcher designed learning media for Macromedia Flash 8 and then created and developed it with the help of PowerPoint, painters, GeoGebra and Macromedia Flash 8. This learning media contains material obtained from several math books for class X in the 2013 curriculum.

Media Eligibility Validation

At this stage, the researcher validates the developed media to the validator to determine the feasibility of the developed media. The researcher validated this media with three validators. The suggestions from the validator were used as input to revise the Macromedia Flash 8 application so that the Macromedia Flash 8 application is valid and ready to be implemented for class X SMA Graduation Pontianak students.

Validation By Material Experts

Material experts assess the aspects of material relevance, aspects of organizing material, aspects of practice questions, aspects of language, and aspects of effect for learning strategies. The average result of validator 1 is 80%, validator 2 is 80%, and validator 3 is 80%. Therefore, the validation results of the three validators obtained an average percentage of 80.0% with very valid criteria so that they are suitable for use as learning media.

Validation By Media Experts

Media experts provide an assessment from the aspect of graphic feasibility. The average result of validator 1 is 80%, validator 2 is 80%, and validator 3 is 73%. Therefore, the validation results from three media experts obtained an average percentage of 77% with valid criteria, so the Macromedia Flash 8 application is suitable for use as a learning medium. There are several comments and suggestions given by experts for revision. After revision, the Macromedia Flash 8 application can be used in research. The comments and suggestions given by media experts which are used as improvements are as follows:

1. There is a revision in the background section where the advice from the background validator determines the suitability of the learning media application so that students prefer to see an aesthetic background. This revision can be seen in Figure 6.



Figure 6 changes the Application Background

2. In the Video section, according to the validator, the volume and speed-up buttons on the video do not work. As seen in Figure 7.

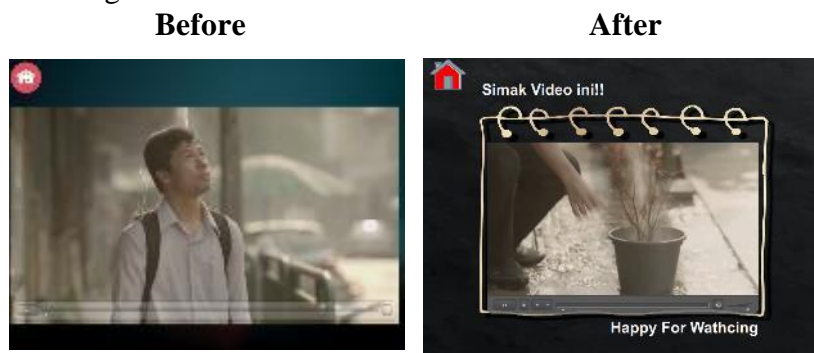


Figure 7 Changing The Application Video

3. The question page is changed because according to the validator, the questions must be in accordance with the contents of the material contained in the media. As seen in Figure 8.



Figure 8 Changes The Application Questions

Media Expert Results

Based on calculations from the validation of material experts and media experts. The result of material expert validation is 80.00%, and the result of media expert validation is 77.00%, so the average of experts is 78,5%. Therefore, the validity level of the Android-based Macromedia Flash 8 learning media, which contains character education in geometry material for class X SMA Graduation Pontianak, has valid criteria with an average percentage of 78.5%.

Product Trials

After the Macromedia Flash 8 learning media has been validated, the next step is to carry out a limited trial phase only because circumstances do not allow carrying out trials on a large scale. The school in question is the Pontianak Graduation High School. What is tested at this stage is product trials. The purpose of this trial is the same as the research scheme for large-scale field trials, among

others, to see the feasibility of the application of Macromedia Flash 8 learning media when applied to class XI students.

Practicality

The practicality of the Macromedia Flash 8 application can be seen from the results of the teacher and student response questionnaires. The practicality assessment was completed by 10 students of class X SMA Wisdua Pontianak teachers regarding their responses to the Macromedia Flash 8 application used during the learning process. The results of the teacher response are 93.33%, very Practical, and the student response is 94.1%. Therefore, the percentage index average of teachers and students is 93.71%, with very practical criteria.

Effectiveness

In this study, effectiveness was measured using different statistical tests. The results are as follows:

Normality Test Results

The normality test was carried out to determine whether the distribution of the data was normally distributed or not using the Lilifors formula to see whether the data obtained from the pretest and posttest results were normally distributed.

(1). Pretest Data Normality Test

Based on the calculations, the $L_{count} = 0.1794$ and $L_{table} = 0.258$. It turns out that the $L_{count} < L_{table}$ or $0.1794 < 0.258$. So it can be concluded that the population is normally distributed.

(2). Posttest Data Normality Test

Based on calculations, $L_{count} = 0.2217$ and $L_{table} = 0.258$. The $L_{count} < L_{table}$ or $0.2217 < 0.258$, it can be concluded that the population is normally distributed.

Effectiveness Test

To see whether the developed media is effective, the researcher analyzes it using a parametric test. However, before the parametric test is carried out, the normality test is first carried out. Based on the results of the normality test, it was found that the data were normally distributed. Therefore, a parametric test, the t-test, is carried out. The results of the calculation of the t-test can be seen in Table 1.

Table 1 t-test results

	After	Before
Means	84,886	44,885
Variances	77.71589333	305.9626944
Observations	10	10
Pearson Correlation	0.97724467	
Hypothesized Mean Difference	0	
Df	9	
t Stats	13.94406423	
P(T<=t) one-tailed	1.0615E-07	
t Critical one-tail	1.833112933	
P(T<=t) two-tailed	2.123E-07	
t Critical two-tail	2.262157163	

Based on Table 1 it is known that: $t \text{ Stats} > t \text{ Critical two-tail}$, then it is rejected, which means it is accepted. It can be concluded that the learning media Macromedia Flash 8 is effective because there is an increase in student learning outcomes before and after being given learning with Android-based Macromedia Flash 8 learning media and contains character education in geometry material in class

X SMA Graduation Pontianak so that the Macromedia Flash 8 application can already be used as a learning medium.

The final product

After limited trials, Macromedia Flash 8 Learning Media is ready to be packaged into the final product. The math teacher at the tryout did not give any advice. However, based on suggestions and comments from experts, researchers hope that this application can be used by teachers as an alternative learning medium and facilitate the online learning process.

Discussion

The Android-based Macromedia Flash 8 learning media containing character education developed in this study refers to the Thiagarajan development model, which consists of the Define, Design, Develop, and Disseminate stages (Sugiyono, 2016). However, in this study, researchers are only at the development stage. The 4-D design carried out aims to see the validity, practicality, and effectiveness of Android-based Macromedia Flash 8. This is in accordance with the opinion of (Haviz, 2016), who says that the quality of the results of the development of learning media in development research is determined by several criteria, namely validity, practicality, and effectiveness.

Analysis of the validation of Android-based Macromedia Flash 8 by material experts obtained an average percentage of 80.0% with very valid criteria, while in the analysis of Android-based Macromedia Flash 8 validation by media experts obtained an average percentage of 77% with valid criteria, so Android-based Macromedia Flash 8 learning media is feasible to use. The results of calculations by material experts and media experts obtained an average percentage of 78.5% with valid criteria so that the developed Android-based Macromedia Flash 8 learning media can be used properly as a learning medium. This is confirmed by research Anjarsari, et al. (2020) that the quality of learning media development results must have a valid category. This also aligns with previous research that Macromedia flash learning media is classified as valid (Hodiyanto et al., 2020; Yani et al., 2021).

To find out the practicality of this research, it was carried out by giving student and teacher response questionnaires. Student response questionnaires were given to 10 class X SMA Graduation Pontianak students with an average student response score of to Android-based Macromedia Flash 8 learning media of 94.1% with very practical criteria. In contrast, the teacher's response questionnaire obtained a percentage of 93.33% with very practical criteria. From the student and teacher response questionnaires, an average practicality score of 93.71% was obtained with very practical criteria. This is in line with research Firdausi & Santosa (2016), who developed mobile learning media assisted by Android smartphones. It was found that the questionnaire in the study showed that students' assessments were stated to be good with a percentage of 80.50%. Previous research also obtained that the development of Macromedia flash learning media is quite practical (Ramadani et al., 2018)

To find out the effectiveness of learning media based on Android-based Macromedia Flash 8 by way of a pretest and posttest, which contains five questions. The questions were given to the same subject, namely ten students in class X SMA Graduation Pontianak. The effectiveness of Android-based Macromedia Flash 8 learning media. From the results of the statistical test, it was concluded that it was rejected, which means that there was an increase in the value of student learning outcomes before and after being given the Android-based Macromedia Flash 8 learning media so that the Android-based Macromedia Flash 8 learning media is effective. The results of this study are also in line with research conducted by Hodiyanto et al. (2020) that the results of the study obtained results for the level of validity with an average rating score from the validator of 85.75% with very valid criteria, a practicality level with an average of 87.91% which is included in the very practical category, and an average level of effectiveness 80% belonging to the effective category. The results of this study are also in line with previous research that the development of Macromedia flash learning media is classified as effective (Dwiranata et al., 2019; Yani et al., 2021).

CONCLUSIONS

Based on the results of the research and discussion previously described, in general, it can be concluded that the development of Android-based Macromedia Flash 8 learning media contains character education in geometry material for class X SMA Graduation Pontianak using a 4-D model which is limited to three stages, namely: definition (define), stage of design (design), stage (develop) are classified as good to use. The results of the formulation of the sub-problems that have been found are as follows: (1) Validity level Android-based Macromedia Flash 8 learning media and contains character education in geometry material for class X SMA Graduation Pontianak 78.5% with valid criteria. (2) Practicality level Android-based Macromedia Flash 8 learning media and contains character education in geometry material for class X SMA Graduation Pontianak 93.71% with very practical criteria. (3) Effectiveness level android-based Macromedia Flash 8 learning media and contains character education in geometry material for class X SMA Graduation Pontianak from the results of the statistical test, it was concluded that it was rejected, which means that there was an increase in the value of student learning outcomes so that Android-based Macromedia Flash 8 learning media was effective.

The suggestions from this research so that it can become a point of view for readers and further researchers include: (1) The Android-based Macromedia Flash 8 learning media developed in this study can be continued by other researchers to the dissemination stage in other classes, by other teachers, other schools, and on a wider scale. (2) The developed Android-based Macromedia Flash 8 learning media still needs to be refined in further trials in the dissemination stage, so that the quality of Android-based Macromedia Flash 8 learning media is truly tested in terms of its utilization. (3) Android-based Macromedia Flash 8 learning media also needs to be developed on other materials and can also use other methods, models, strategies and approaches according to the needs in the field. (4) Before developing a product, look for as many references as possible related to the product to be developed. (6) In the Android-based Macromedia Flash 8 learning media, it is necessary to add a material explanation video to help.

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