

Research Article

The development of media learning using plotagon software on circle material

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ABSTRACT

The challenges in learning mathematics at schools could be worrying because the delivery is usually less interesting which makes students feel bored with the lesson. Mathematics from the student's perspective is considered a scary subject because it is very difficult to understand. This study aims to determine the feasibility level of learning media using Plotagon software in Mathematics Subjects at SMA Negeri 1 Terangun. This type of study is research and development (R&D). The model used in this study is the Analyze, Design, Development, Implementation, Evaluation (ADDIE) model. The subjects of this study were students of class XI IPA I SMA Negeri 1 Terangun. Data collection techniques were carried out by questionnaires and observations. The instrument used is a questionnaire using a Likert scale. The results of the study obtained were Plotagon Learning Media in the Mathematics Subject Circle material received an assessment with average score 3,36 from material experts, 3,45 from media experts, 3,80 from small group students and 3,83 from large group students. So it can be concluded that the Plotagon software learning media in the Mathematics subject matter Circle is suitable for learning at SMA Negeri 1 Terangun.

Keywords: Learning Media; Plotagon Software; Mathematics Education; Circle Material

1. INTRODUCTION

The education process is always undergoing improvements that will produce quality graduates or educational products (Rubiyanto in Indriyani, 2010). In addition, education is also not free from the influence of technology (Rahmayanti, 2015). The results of technology have long been used in the field of education. For example printing machines, films, television, computers, and others. These tools can change the way of thinking, working, and living. Educational technology software can change the role of teachers, in delivering learning, many tools have been created to make it easier for students to understand it. One of the uses of technology in education is to use technology-based media in learning activities such as computers or mobile phones. Matematika berperan sangat penting dalam pendidikan. According to the National Council of Teachers of Mathematics (NTCM), (2000), there are several objectives of learning mathematics, including: 1). To train how to think and reason in concluding, 2). to develop creative activities that involve imagination and discovery in developing thinking patterns, 3). To develop problem development skills, 4). To develop the ability to convey information or communicate ideas. However, according to Muijs and Reynold (2005) mathematics from a student's perspective is considered a difficult subject to understand and is considered a scary subject as well as boring. The biggest cause occurs because the delivery is less interesting so students feel bored when they have to learn mathematics. To improve student achievement in mathematics, it is necessary to find a solution to solve this problem which is expected to improve competency in mathematics. According to Susanto (2016), mathematics is one of the fields of study that exist at all levels of education, from elementary school to university level.

Based on the opinions above, it can be concluded that mathematics is very necessary to be studied and understood in the world of education. Therefore, it is very important for teachers to create a pleasant learning atmosphere, so that students are interested and motivated to learn mathematics. One way to solve this problem, researchers took the initiative to present interesting learning media, namely by utilizing software as a learning medium. Karo-karo and Rohani (2018), explained that the use of relevant media in the classroom can optimize the learning process. For teachers, learning media help concrete concepts or ideas and help motivate active learning participants. For students, the media can be a bridge for critical thinking and action. Along with the rapid development of technology, teachers have choices of learning media that will be applied in learning activities. One option that teachers can use is software-assisted learning media. If you pay attention today, software

is very often used as a learning medium (Saputra, 2012, Zubair. 2015, Saputra & Fahrizal 2019, Sari. 2020, Irmayanti, et.al 2020). The results of the evaluation of the development of learning media in Salama research (2018) obtained: (1) Learning media and guidebooks are in the very high valid category with validity coefficients of 0.86 and 0.97, respectively. (2) The learning media in the effective category with the percentage of completeness of the learning outcomes test is 80%. (3) The learning media is in the efficient or practical category with an average percentage of student responses of 80.84%.

In this study, researchers will use Plotagon software as a learning medium. The use of Plotagon can increase students' motivation to write through interactive and interesting interphases to create digital stories. Students can create their own stories in pairs and as a result can improve their vocabulary, improve their English writing skills, and others. Data collection tools (survey, test, journal, observation, and dialogue as production) show that Plotagon is a pedagogical tool that promotes students' English writing in a fun way (Gamez and Cuellar, 2019). Based on the results of observations made by researchers at SMA Negeri 1Terangun, it was found that teachers only used books and blackboards as learning media. Students in the learning process are passive. During the learning process, students only listen to the explanation of the material from the teacher so that students feel bored quickly. One of the most boring subjects for students in mathematics. Apart from being considered difficult, mathematics is also always considered a scary subject for students. Therefore, it is necessary to encourage students' interest and enthusiasm to learn mathematics. One of the mathematics materials that is considered difficult for students is the circle material. In addition to the many types of formulas that must be mastered by students, in the circle material students are also required to memorize and understand the elements contained in the circle.

2. RESEARCH METHOD

This type of study is Research and Development (R&D) because the researcher will develop a learning media using Plotagon software. Research and development or in English Research and Development is a research method used to produce certain products, and test the effectiveness of these products (Sugiyono, 2015). Sukmadinata (2014) explains that Research and Development is a process or steps to develop a new product or improve an existing product, which can be accounted for. According to Saputro (2017), the Research and Development (R&D) method is a research method that produces a product in a particular area of expertise, which is followed by certain by-products and has the effectiveness of a product. This type of study is different from other educational research because the goal is to develop products based on trials, then revise to produce products that are fit for use.

The type of study used in this study refers to the An-alyze, Design, Development, Implement, Evaluate (ADDIE) model. The ADDIE model was developed by Dick and Carey (1996). The steps that must be carried out in research in the ADDIE model as described by Mulyatiningsih (2011) are as follows:

1. Analysis

At this stage, the main activity is to analyze the need for the development of new learning media and analyze the feasibility and requirements of developing new learning media, the media used in this research is Plotagon software based on computers or mobile phones. The development of Plotagon software learning media begins with problems in the learning media that have been applied, problems that occur such as media that are not relevant to the needs of the target, learning environment, technology, student characteristics, and so on. After analyzing the problem of the need to develop Plotagon software learning media, researchers also need to analyze the feasibility and requirements for developing Plotagon software learning media.

2. Design

In designing learning media, this design stage is a systematic process starting from setting learning objectives, designing scenarios or teaching and learning activities, designing learning tools, designing learning materials, and evaluating learning outcomes. The design of this learning media is still conceptual and will underlie the next development process.

3. Development

The development contains activities about testing the feasibility of learning media as follows:

Test stage by developer

At this stage, the learning media is tested to obtain equality between learning media using Plotagon software and the circle material is appropriate or not.

The testing phase by the validator

At this stage, the media that has been developed and revised is then submitted to the validators, namely material experts, media experts, and mathematics teachers to be given an assessment or validation related to aspects of validity.

4. Implementation

In the implementation phase, it is carried out in 3 stages, namely:

a. Small Group Trial

The subjects of the small group trial were 10 students of class X IPA 1. This trial was conducted to determine the feasibility of the developed media and to find out students' opinions about interactive learning media. In this small group trial, the researcher gave a media feasibility assessment questionnaire to students. This questionnaire consists of several indicators

and uses a Likert scale with 4 alternative answers, namely very good, good, not good, and very bad. Students fill out a questionnaire after using the Plotagon software learning media developed by the researcher.

b. Revision (if needed)

This study did not revise the results of the small group trial. Students did not provide revisions related to the developed learning media.

c. Field Trial

Field trials will be conducted on students of class XI IPA 1 SMA Negeri 1 Terangun. Researchers prepare instructional media products that are already in the form of animated videos. At the end of the lesson, students were asked to respond to the learning media by filling out a questionnaire distributed by the researcher.

1. Evaluation

- At the evaluation stage, a final revision is made to the product developed based on the suggestions and input of students given during the implementation stage.
- Feasibility Analysis of Plotagon Software Learning Media

Data collection techniques used in this study there are several kinds of methods in collecting data, namely questionnaires, observations, and interviews. The assessment of the feasibility of learning media was obtained from validation by material experts, media experts, and students.

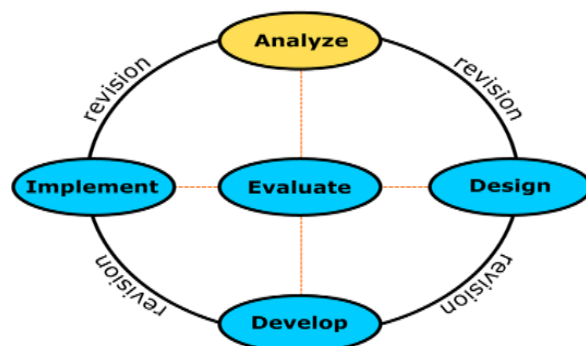


Figure 1. ADDIE Method
Source: Cahyadi (2019)

Assessment Design

a. Validation of media experts and materials experts

A media expert is someone who is an expert in the field of mathematics learning media. The assessment of media experts is emphasized in the animated video presentation that has been designed. Whether the media has entered the category of good quality or not. In addition to providing an assessment of media experts, they also provide input on learning media using the Plotagon software. The material experts in this study are experts in the field of material, especially circle material and mathematics subject teachers at SMA Negeri 1 Terangun. The material expert's assessment is emphasized on the content of the animated video presentation regarding the circle material, whether the material has been presented correctly and completely. In addition to providing material expert assessments, they will also provide input on the learning media circle material using Plotagon software.

b. Field trial

Field trials were taken from students of class XI IPA 1 SMA Negeri 1 Terangun. This trial was carried out in two stages, namely a small group trial by 10 students and a large group trial by 22 students.

3. RESULTS AND DISCUSSION

1. Analysis Stage

Based on the results of observations made by researchers at SMA Negeri 1 Terangun, teachers in the process of teaching and learning activities in mathematics subjects do not use technology-based learning media. Teachers only use textbooks that are used as sources to explain back to students. Less interesting submissions make students bored quickly. Students need media that can stimulate and arouse enthusiasm and interest in learning as an alternative learning resource that can be used during face-to-face or online learning such as during this pandemic. Based on the results of the needs analysis, it can be concluded that the development of learning media using Plotagon software is very necessary to improve the learning process which is more fun so that it can attract students' attention and foster learning motivation student attitudes.

2. Design Stage

The planning stage is a follow-up to the needs analysis, the planning of learning media using Plotagon software is adjusted to the needs analysis. At this stage, there are various kinds of activities that must be carried out.

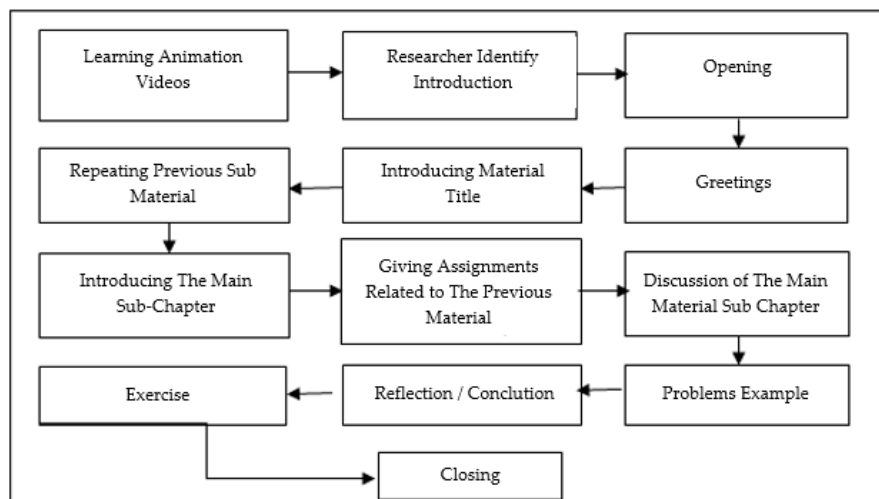


Figure 2. Learning Animation Flow

The making of Plotagon software learning media is done using a computer device. Here are some pictures of learning media using Plotagon software.

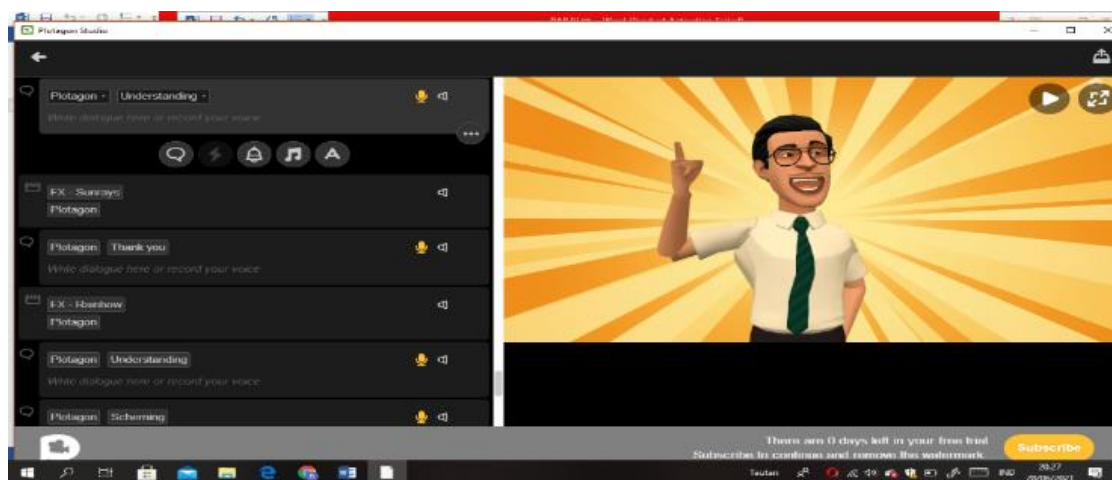


Figure 3. Learning Reflection

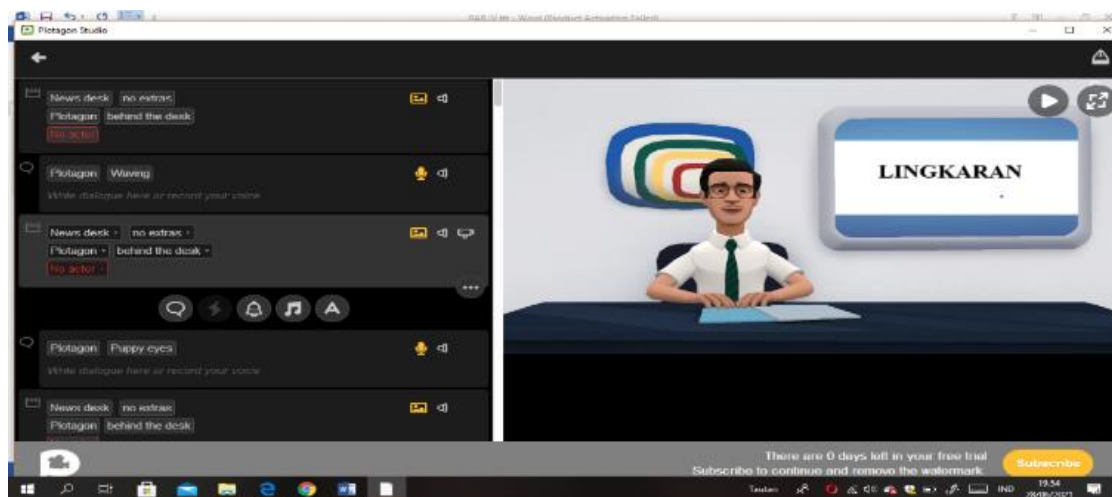


Figure 4. Explanation of circle material

3. Development Stage

1. Material expert assessment

Table 1. Material Expert

Stage	Aspect	Average	Percentage	Category
Stage 1	Material	3,20	80	Good
	Linguistic	3,25	81	Good
	Implementation	3,00	75	Good
Average score		3,18	80	Good
Stage 2	Material	3,40	85	Good
	Linguistic	3,50	88	Very good
	Implementation	3,00	75	Good
Average score		3,36	84	Good

The results of the first stage of validation by material experts on the 3 aspects, namely the material aspect, obtained an average score of 3.20 with a percentage of 80% and categorized as good, the assessment consists of 5 indicators. on the linguistic aspect, the average score obtained is 3.25 with a percentage of 81% and is categorized as good, the assessment consists of 4 indicators. while the implementation aspect gets an average score of 3,00 with a percentage of 75% and is categorized as good, the assessment consists of 2 indicators. Overall, the average score obtained in the first stage of the assessment from material experts is 3.18 with a percentage of 80% and is categorized as good.

The results of the second stage of validation by material experts on the 3 aspects, namely the material aspect, obtained an average score of 3.40 with a percentage of 85% and categorized as good, the assessment consists of 5 indicators. on the linguistic aspect, the average score obtained is 3.50 with a percentage of 88% and is categorized as very good, the assessment consists of 4 indicators. while the implementation aspect gets an average score of 3 with a percentage of 75% and is categorized as good, the assessment consists of 2 indicators. Overall, the average score obtained in the assessment of stage 2 from material experts is 3.36 with a percentage of 84% and is categorized as good.

2. Media expert assessment

The media expert assessment was carried out in 5 stages, the first stage got an average score of 2.55 with a percentage of 64%, the second stage got an average score of 2.91 with a percentage of 73%, the third stage got an average score of 3.00 with the percentage of 75%, the fourth stage got an average score of 3.18 with a percentage of 80%, while the fifth stage got an average score of 3.45 with a percentage of 86%.

4. Implementation Stage

The small group trial phase involving 10 students got an average score of 3.80 in the Very Good category. At the small group trial stage, there were no criticisms or suggestions from students on the Plotagon software learning media that was developed. In the large group trial phase involving 22 students, the average score was 3.83 in the Very Good category. At the large group trial stage, suggestions were obtained from students so that animated learning videos could be shared with the class WhatsApp group so that students could study at home.

5. Evaluation Stage

At the evaluation stage, the final revision of the product developed was carried out based on the value of the student responses given during the implementation stage. Based on small-group trials conducted by 10 students, an average score of 3.80 was obtained. Referring to the conversion table, the average small group trial is in the range of $3.5 < x < 4$ with a very good category. Then, a large group trial was conducted by 22 students and the average score was 3.83. Referring to the conversion table, the average of large group trials is in the range of $3.4 < x < 4$ with a very good category. So that the feasibility level of learning media using Plotagon software based on student responses is in the very good category, the media is feasible to be used as learning media in schools.

CONCLUSION

Based on the results of research and discussions that have been carried out, it is concluded that:

1. The development of learning media is carried out through 5 (five) stages, namely the analysis stage, the planning stage, the development stage, and the implementation stage.
 - a. The analysis phase is carried out by analyzing field observation data, the results are as follows: 1) Teachers have never used animation-based learning media in the learning process, especially in mathematics; 2) Students in the learning process tend to be bored when learning takes place; 3) Teachers only use textbooks as learning media.
 - b. The planning stage is carried out after the analysis stage, the analysis will be useful as a reference in planning the form of the development of learning media according to the needs of students. The planning stage includes the formulation of learning objectives, learning indicators, determining the learning flow, and making material sheets that will be displayed in animation.
 - c. The development stage is carried out after the planning stage. The development stage of learning media products includes the creation of learning media, validation of material experts, and media experts.

- d. The implementation phase was carried out in two stages, namely small group trials and large group trials.
- e. At the evaluation stage, the final revision of the product developed was carried out based on the value of the student responses given during the implementation stage.
2. Assessment of learning media using Plotagon software
 - a. based on the assessment of the material expert stage 1 obtained an average score of 3.18 with a good category. Furthermore, the assessment of the material expert stage 2 obtained an average of 3.36 with a good category.
 - b. based on the assessment of media experts, stage 1 obtained an average of 2.55 in the good category. Stage 2 media expert assessment obtained an average of 2.91 in the good category. Stage 3 media expert assessment obtained an average of 3.00 in the good category. While the assessment of media experts in stage 4 obtained an average of 3.18 in the good category. Furthermore, the assessment of media experts at stage 5 obtained an average result of 3,45 in the good category.
3. Assessment of learning media using Plotagon software for circle material based on student assessments obtained an average score of 3.80 in the small group and 3,83 in the large group with a very good category.

Based on these conclusions, the product of learning media using Plotagon software on circle material is appropriate to be used as a learning medium for students of class XI IPA I SMA Negeri 1 Terangun.

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AUTHOR'S CONTRIBUTIONS

The authors discussed the results and contributed to from the start to final manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest declared by the authors.

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