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Research Article

Development of Video Animation Media for Learning a System Two-Variable Linear Equation

Erina Tetriyani*, Asep Jihad, Tika Karlina Rachmawati, and Hamdan Sugilar

Jl. A.H Nasution No. 105 Cibiru, Bandung, Indonesia

ORCID
Asep Jihad: https://orcid.org/0000-0002-6130-0037
Tika Karlina Rachmawati: https://orcid.org/0009-0007-4413-2098
Hamdan Sugilar: https://orcid.org/0000-0001-8588-3372

Abstract.
Optimization that has not been implemented for learning media is the background of this Research, the medium that is needed will be used to support the learning process in the school. For this reason, media is needed which can later be used to support the learning process in schools. This research aims to: (1) describe the process of developing Powtoon-based animated videos on the material of the two-variable linear equation system (SPLDV). After teaching intern at SMP Negeri 31 Bandung, Bandung, West Java, (2) analyze the feasibility of Powtoon-based animated video media on the material of the two-variable linear equation system (SPLDV) at SMP Negeri 31 Bandung, and (3) see student responses in the use of Powtoon-based animated videos on two-variable linear equation system (SPLDV) materials at SMP Negeri 31 Bandung. The research method used is RND with ADDIE development model (analysis; design, development, implementation, evaluation). The research instruments used are interview sheets, material expert validation questionnaires, media experts and subject experts, and student responses.

Keywords: Video Animation, Learning a System, Linear Equation

Corresponding Author: Erina Tetriyani; email: erinatetriyani2@gmail.com

1. INTRODUCTION

I⌧ the average result was obtained with a value of 93.18% because students responded well to learning media in the form of videos. Almost all students gave positive comments on the given learning media.

Currently, there are various applications that can be used to create learning media in the form of videos, one of which is the Powtoon application. Judging from the research conducted by Kholilurrohmi and Syahrul Fajar, using animated Powtoon videos as learning media, the results showed that there was an increase in student learning outcomes and interest. Videos made by teachers can help students to remember, understand, and also apply them [5]. Videos created in the Powtoon application can

be used offline in the form of presentations and pdfs. The advantages of the Powtoon application include having animation features such as handwritten animation, cartoons, and transition effects, and can also provide convenience in using the timeline [6]. Accordingly, the use of animation-based learning media based on Powtoon can have a positive effect. Then the researcher will develop a Powtoon-based animated video learning media on the material of a two-variable linear equation system (SPLDV).

2. RESEARCH METHOD

The writer uses Research and Development (R&D) research in this research process. With the ADDIE development model (Analysis, Design, Development or Implementation, and Evaluation). The ADDIE model was developed by Dick and Carry (1996) to design a learning system [7]. The following is the development flow used in the ADDIE model.

Analysis (Analysis). According to [8] At the analysis stage, there are 3 things that must be considered. The first is performance analysis, to collect data about problems that occur in the learning process that has been carried out. Then the second, from these problems the researcher must analyze students' needs in accordance with learning characteristics. The three researchers determined what types of supporting media would allow it to be developed in order to improve the learning process.

Design (Design). Design activity is a systematic process that starts from designing the concept and content in the product.

Development (Development). At this stage, the researcher realizes the concepts and products that have been made at the design stage. At this stage, the conceptual framework is realized into a product that is ready to be used. At this stage, an instrument is needed to measure the feasibility of the product made. Then the instrument was first validated by the expert.

Implementation. At this stage, the concepts and products that have been developed will be implemented in real situations, namely during learning.

Evaluation. At this stage, an evaluation is carried out to collect data at each stage that has been carried out. then revisions are made according to the results of the evaluation or needs that have not been met by the new product that the researcher has made. So that in the future products to support learning can be created even better.

The research is conducted at SMP Negeri 31 Bandung. Respondents who were involved in this study to collect data include (1) material experts, (2) media experts, (3) mathematics teachers (4) and class VIII K students at SMP Negeri 31 Bandung with 34 students. with instruments in the form of interview sheets, validation sheets,

student response questionnaires, and student needs analysis questionnaires. To find out student responses regarding animation learning videos based on Powtoon on the material of a two-variable linear equation system (SPLDV) at SMP Negeri 31 Bandung, namely using a Likert scale with validation sheet categorization as follows: strongly agree get a score of 5, agree get score 4, disagree get a score of 3, disagree get a score of 2 and strongly disagree get a score of 1 [9]. To make it easier to get a percentage then use the formula below [7]

$$P = \frac{\sum x}{\sum y} \times 100\% \tag{1}$$

Information:

P = Eligibility percentage rate

$\sum x$ = Total score obtained

$\sum y$ = Total maximum score

Next, we determine the ideal percentage score is the maximum score, the lowest percentage score is the minimum score, and determine the range by subtracting the maximum score from the minimum score. Next, determine the width of the interval by (maximum score-minimum score) / number of intervals. The results obtained are then processed and converted into a table to see the feasibility of products that have been made. To determine it is carried out in the following ways in Table 1.

TABLE 1: Criteria presentage score.

No	Interval	Kriteria
1	$80\% < Skor \leq 100\%$	Very Good
2	$60\% < Skor \leq 80\%$	Good
3	$40\% < Skor \leq 60\%$	Average
4	$20\% < Skor \leq 40\%$Deficient	5
$0\% < skor \leq 20\%$	Very Deficient	

3. RESULTS AND DISCUSSION

The following is a discussion of research data that has been obtained by researchers during the research:

The method of learning carried out at SMP Negeri 31 Bandung

Based on the results of an interview with one of the mathematics teachers at SMP Negeri 31 Bandung, it was found that learning during this pandemic period was carried

out online or PJJ (distance learning) and offline learning was carried out alternately. The distance learning system (PJJ) uses WhatsApp groups, namely by giving assignments in students' math textbooks or by providing material through screenshots of slides in PowerPoint. In addition, to support learning, sometimes teachers like to provide YouTube links to be used as other references in understanding the material and increasing student effectiveness. Meanwhile, face-to-face learning is carried out by dividing each class into two sessions. In each session, there are only approximately 16 so students can sit by implementing social distancing. As for each subject, the length of the lesson is limited to only 30 minutes per lesson. In one week face-to-face learning is carried out 2 times, and in one month face-to-face learning is carried out 4 times. Therefore, making videos is very important to support the learning process.

3.1. Development of Learning Media Using Powtoon-Based Animation Video on Two-Variable Linear Equation System (SPLDV) Material

3.1.1. Analysis Stage

The initial step taken before making a learning video is by analyzing student needs. In the questionnaire, there are 3 aspects that are seen. The first is the problem aspect, the need aspect, and the supporting aspect. For the first, namely the problem aspect, in the interview several questions were asked, namely about student learning difficulties, student enthusiasm in learning, and also about student learning time at school. From the results of the questionnaire analysis of student needs, it can be seen that the overall index of the questionnaire is 66.72%, which means that students agree to develop animated learning videos. Powtoon based on the material of the two-variable linear equation system (SPLDV).

3.2. Design Stage

3.2.1. Initial product planning

At the initial design of the product to be developed. Before the production stage, the first thing to do is create a material flow. The flow of the material is made by describing in its entirety the material to be discussed, namely the material for the two-variable linear equation system (SPLDV). In addition, before developing the product, a scenario must be made so that the storyline in the video can be clearly seen.

3.3. Initial product design

At this stage, the production of an animated video based on Powtoon begins. This Powtoon-based animation video design is a realization of the flow of material, scenarios, and scripts that have previously been made. The initial design of this product used two-variable linear equation system (SPLDV) material. The design stages are divided into 3 parts. Namely the opening, content, and closing.

The opening section contains an opening greeting, the title of the material to be discussed, and an explanation of the methods that can be used to solve SPLDV problems. However, only the points mentioned have not been given an explanation. Then further in the content, the content is divided into 4 topics, namely the first topic discusses the substitution method. It explains the meaning of the substitution method, how to solve problems using the substitution method and examples of questions accompanied by how to solve them. The content of the second topic discusses the method of elimination. how to solve a problem using the elimination method, and the last one is given an example of a problem and how to solve it. The content of the third topic discusses mixed methods. In the fourth topic, a story related to problems in everyday life is displayed. Then the problem is solved using one of the methods in SPLDV, the mixed method.

3.4. Development stage

At this stage, the product that has been made is tested for validation by the validators, namely material experts, media experts, and subject teachers. After going through the validation stage, we then enter the product revision stage so that the learning videos that have been made are feasible to be given to students. From the validation results, the percentage is obtained as follows in Table 2.

TABLE 2: Category percentage for validator.

Validatior	Percentage	Category
Material expert	76%	Good
Media expert	59.5%	Average
Subject teachers	75%	good

3.5. Implementation Stage

After the video has been validated by material experts, media experts, and maths subject teachers, then the videos that have gone through the revision and improvement stages are given to students to see how students respond to the animation video based on Powtoon that has been made. To see student responses to the animated learning videos that have been given, the researcher used a student response questionnaire containing 15 questions. The data is then processed and the following results are obtained in Table 3.

TABLE 3: Category percentage for rated aspect.

Rated aspect	Percentage (%)	Mean	Category
Effectiveness of using learning media	76.1%		
The attractiveness of the powtoon-based animated learning video	76.2%	76.1%	Good

3.6. Evaluation

In the final stage, the evaluation stage is carried out after giving the video to students. In this study, animation learning videos based on Powtoon are included in the good category with several suggestions that can be used as a reference for renewal that will be developed by researchers.

4. CONCLUSION

4.1. Conclusion

Based on the results of research on the development of animation learning videos based on powtoon on the material of a two-variable linear equation system (SPLDV) conducted at SMA Negeri 31 Bandung, it can be concluded as follows:

The validation results obtained from the development of animation learning videos based on powtoon on the material of the two-variable linear equation system (SPLDV) conducted at SMA Negeri 31 Bandung got a percentage of material experts of 76% in good category, media experts 59.5% in good enough category, and the last is subject matter experts with a percentage of 75% which is in the good category. Hence the video product. Powtoon-based learning on the material of the two-variable linear equation system (SPLDV) is categorized as good and can be used for students.

Student responses obtained from giving a questionnaire regarding the effectiveness of using animation video learning media based on Powtoon on SPLDV material get a percentage of 76.1% of the maximum value of 100%, which means that it falls into good criteria. And the percentage on the attractiveness aspect of animation-based animation learning videos on SPLDV material is 76.2%, which means it is in the good category. While the percentage of the average results of the student response questionnaires is 76.1%, which means that students get a good response.

4.2. Suggestion

Based on the data from the research that has been done, the discussion and conclusions have been explained. There are several suggestions that researchers convey to be considered by other parties in the development of animation videos based on Powtoon on SPLDV material, namely:

In accordance with the results of the study, the product that has been developed is in the form of animated learning videos based on POWTOON on SPLDV material which is categorized as good, and student responses to animation videos based on POWTOON on SPLDV material are classified as good. So that teachers and schools can make it an alternative for learning during this pandemic.

The development of animated learning videos based on Powtoon on SPLDV material has several improvements that can be used as references for teachers and future researchers in making animated learning videos based on Powtoon on different materials.

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