

## Test the Effectiveness of Mathematics Learning Media Based on Powtoon Animation Video in Junior High School on Two-Variable Linear Equation System Material

Himaya Agustin<sup>1</sup>, Dwi Priyo Utomo<sup>2</sup>, Adi Slamet Kusumawardana<sup>3</sup>

<sup>123</sup>Mathematics Education, University of Muhammadiyah Malang  
Email: [himayaagustin8@gmail.com](mailto:himayaagustin8@gmail.com)

### Abstract

The purpose of this study was to determine the effectiveness of using Powtoon animation video-based mathematics learning media on the material for the Two-Variable Linear Equation System in Junior High School. The type of approach used is a pre-experimental quantitative approach by applying a one-group pretest-posttest design. The research population includes all students of class VII-A with 32 students consisting of 8 male students and 24 female students. Data collection techniques using tests and questionnaire sheets. The difference was seen from the average score of the students' test results before using the media of 36.41 and after using the media of 92.58. In addition, the research results from the N-Gain Test results show that the use of Powtoon animation video media is effective in learning mathematics. It is evidenced-based on the results of the expert test and media validation by obtaining 85% and 83.75%, which means that it belongs to the outstanding category. The results of the student response questionnaire of 81.29% belong to the outstanding category. Students' test results get an average of 0.88% from the n-gain, which shows a high classification. This study indicates that Powtoon animation video media is effective in learning mathematics compared to learning that only uses the lecture method. 29% of it belongs to the outstanding category, then through the test results, students get an average of 0.88%, which is obtained from the n-gain, which means it shows a high classification. This study indicates that Powtoon animation video media is effective in learning mathematics compared to learning that only uses the lecture method. 29% of it belongs to the outstanding category, then through the test results, students get an average of 0.88%, which is obtained from the n-gain, which means it shows a high classification. This study indicates that Powtoon animation video media is effective in learning mathematics compared to learning that only uses the lecture method.

**Keywords:** Effectiveness; Powtoon; Interactive Learning Media; Concept Understanding

### INTRODUCTION

Education is an effort to guide students by achieving intelligence, maturity, noble character and independence (Khomaidah & Harjono, 2019). In education, there are several essential elements contained in it. So that education functions to develop insight and acquire knowledge and skills that will be useful in realizing the development and progress of students (Gusmania & Dari, 2018).

Science and technology have experienced rapid developments against the development of today's era, without exception in education. Advances in

technology and science influence the learning process in schools (Ramli et al., 2018). When the learning process begins, it is focused on the teacher and only focused on books, where the teacher's role is the only source of learning that presents and conveys as much information as possible to students. (Karimah et al., 2017).

The teacher is an educator who has the knowledge, abilities, and skills. When the learning process takes place, it becomes an important role in producing learning conditions that can make students learn optimally and easily accepted so that they get satisfactory learning outcomes. (Septianto & MK, 2017). Therefore, obtaining optimal learning outcomes requires a technology-assisted tool according to the needs of students anytime and anywhere to support the learning process of students to the maximum, so it is necessary to use teaching aids in the form of learning media appropriately. (Yusuf et al., 2020).

In carrying out learning during class, even outside the classroom, learning media has become a necessity. According to (Goddess & Rimpiati, 2016), learning media are everything used in the learning process, which aims to relieve teachers when presenting teaching materials to students and facilitate the achievement of learning objectives as desired.

Based on the results of field observations at SMP NEGERI 1 NGIMBANG, the learning problems that occur indicate that teaching and learning techniques teachers often apply to mathematics lessons tend to apply often lecture techniques which cause students to feel bored have difficulty understanding concepts and completing practice questions. Students have difficulty understanding the concept of solving a problem, so learning media is needed because it will ease students to digest the subject matter and improve student learning outcomes. (Sari, 2013).

The application of animated video-based learning media can ease the learning process to improve the quality of education, especially in the learning process and delivery of more practical, effective, and interactive material. (Maharani, 2015). Besides being able to function to create learning materials delivered perfectly, the benefits of animated video-based learning media can also increase students' motivation towards the learning process and make students more interested in more positive responses. (Qurrotaini et al., 2020). So that it can be said that learning media can have a significant effect when creating a learning process to be more effective and efficient. Thus the objectives of the learning can be implemented.

With advances in learning media technology, it continues to be innovated so that it is not only limited to books, to meet the diverse needs of students, one of which is using an animated video-based learning media called Powtoon. Villar stated in (Awalia et al., 2019) that learning media based on Powtoon animation videos is an online service that can provide exciting animation features including many choices of types of images and can include videos and various animations in the Powtoon features such as manipulating objects, adding images, providing music and being able to add text. As well as audio (Andrianti & Susanti, 2010), thus the media will produce more varied types and make it easier to make exciting presentations in the delivery of the material so that mathematics learning is more exciting and modern to facilitate students' understanding and get the desired goals.

Through the explanation of the problems from some of these opinions, therefore the author intends to test the effectiveness of the mathematics learning media based on animated Powtoon videos in the material for a Two-variable Linear Equation System which includes components including a summary of the material, examples of story questions and their solutions, and supported by features. Animated cartoons, handwritten animations, transition effects with precise timeline settings, and added audio so that they can help understand the explanation of the material for the Two-Variable Linear Equation System because the problems that often occur are that students do not understand the concept of the material, so they do not understand the meaning contained in the problem. This results in difficulties imagining mathematical symbols that will be used as variables, resulting in difficulties converting story problems into algebraic operations using the elimination and substitution methods.

The media is expected to provide a reference to teachers in creating new learning media that are practical and efficient. In addition, this Powtoon animated video-based media is expected to facilitate teachers in the learning process of the material. This research is entitled "Test the effectiveness of mathematics learning media based on animation video Powtoon in junior high school on SPLDV material". Thus, the researcher conducted a study to know and describe the effectiveness of using Powtoon animation video-based mathematics learning media which will be used to teach understanding concepts in the Two-Variable Linear Equation System material in junior high school.

## **RESEARCH METHOD**

This research is aimed to determine the effectiveness of using a mathematics learning media based on animation video powtoon on the material of Two-Variable Linear Equation System. In this media research using the powtoon application. In this study, a one-group pretest-posttest design was applied. The subjects used in this study were students of class VII-A at SMP NEGERI 1 NGIMBANG in the even semester of the 2020/2021 academic year. The number of subjects taken was all students of class VIII-A with 32 students, consisting of 8 male students and 24 female students. The procedure in research in testing the effectiveness of mathematics learning media based on animated video powtoon on the material System of Linear Equations Two Variables can be described as follows: Planning Stage, Implementation Stage, and Evaluation Stage.

At the stage of data collection techniques, namely: apply the test method and questionnaire sheet. The test in this study was used to measure the students' understanding ability; the test used was an essay. The test in this study was divided into two sessions, namely pretest and posttest. The test aims to determine the effectiveness of interactive learning media. The effectiveness of a learning media can be observed from the difference in students' level of understanding before and after applying Powtoon-based animated video learning media. The questionnaire sheet was used to strengthen the test results obtained in the study. After the test results are obtained, students are given a questionnaire regarding the provision of the Powtoon-based animated video by providing several questions or written statements to respondents to be answered or responded.

The research instrument is a stage or steps applied to accumulate or obtain data on a study. In this study, the instruments used were test sheets, media expert validation sheets and student response questionnaires. The test sheet contains 3 essay questions used to determine students' understanding of the material for the Two-Variable Linear Equation System. In contrast, the media expert validation sheet and questionnaire sheet contain several questions and written statements to respondents to be answered or in response after watching a powtoon-based animated video in the Two-Variable Linear Equation System material to strengthen the results the concept understanding test.

At the stage of data analysis, techniques are applied to processing data related to the formulation of the problem, so it can be used for concluding the data analysis technique carried out in the form of quantitative with the following explanation: The test given to students is in the form of an essay. To measure the understanding of the concept through a test to be compared between the Pretest and Posttest. In knowing increasing students' conceptual understanding of applying Powtoon animation-based learning media can be formulated using the normalized n-gain formula:

$$\langle g \rangle = \frac{\text{skor posttest} - \text{skor pretest}}{\text{skor maksimum} - \text{skor pretest}}$$

The results of the gain calculation can be interpreted using an interpretation according to (Baharuddin 2014):

Table 3. Normalized N-Gain Interpretation

Gain score interval	Assessment criteria
$g > 0,7$	High
$0,3 < g \leq 0,7$	Medium
$g \leq 0,3$	Low

Giving Pretest and Posttest tests in the Powtoon animation video-based learning media test material System of Linear Equations Two Variables is stated to increase understanding concept when students reach grades  $g > 0.7$ .

## RESULTS AND DISCUSSION

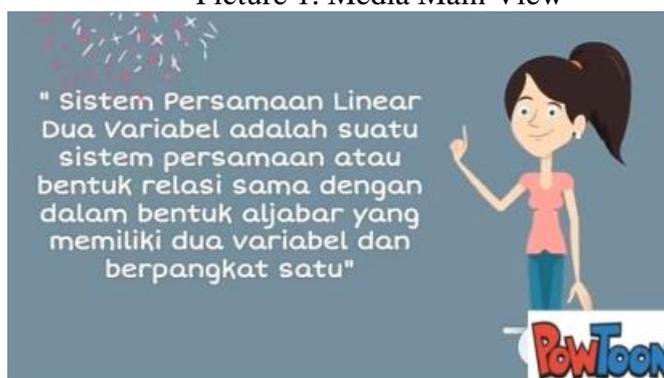
Mathematics learning by applying Powtoon animation learning videos on the subject matter of Two-Variable Linear Equation Systems and held in two meetings at SMP NEGERI 1 NGIMBANG. Regarding the data obtained by the researchers on the study results, it was about testing the effectiveness of using Powtoon animation video-based mathematics learning media.

In research activities, due to the current situation of COVID-19, the school implemented student restrictions; this resulted in the classroom consisting of half of the number of students. So that in the implementation, the researchers held two meetings, namely on March 24, 2021, and March 31, 2021, in class VIII A, totalling 32 students. Then for the first meeting on March 24, 2021, the researcher's activities before implementing and testing the Powtoon animation video-based mathematics

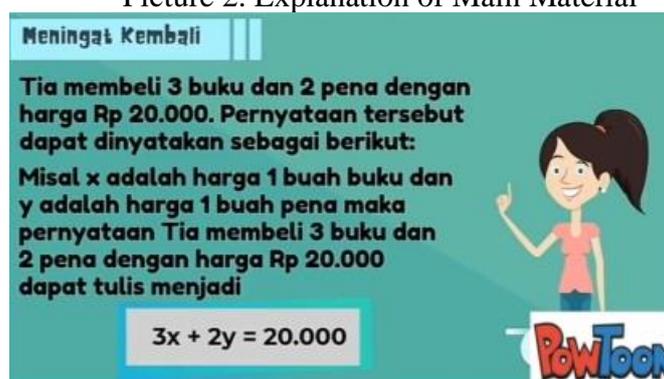
learning media, the researchers conducted a pretest by giving 3 essay questions with a processing time of 30 minutes. Then,



Picture 1. Media Main View



Picture 2. Explanation of Main Material



Picture 3. Example of Subject Matter

In table 6, the following is the percentage result data from expert test validation, media expert validation, and student response questionnaires, namely as follows:

Table 6. Test & Media Validation Percentage, and Questionnaire

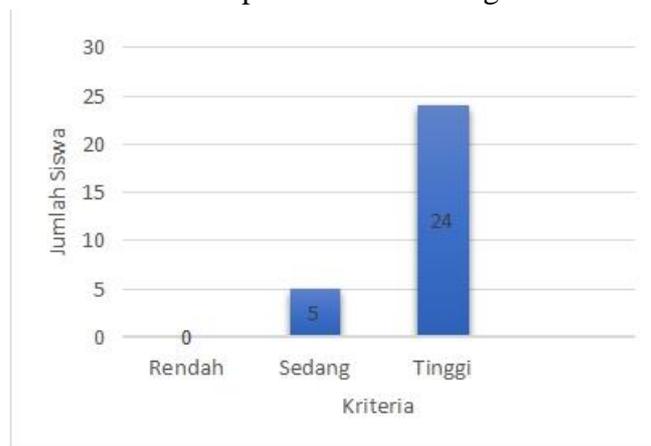
Aspect	Percentage	Criteria
Test Expert Validation	85%	Very good
Media Expert Validation	83,75%	Very good
Student Response Questionnaire	81,29%	Very good

Table 6 shows that the results of the percentage of expert validation tests are included in the outstanding category, meaning that the test is feasible to measure concept understanding through student tests consisting of pretest and posttest. The validation of media experts is included in the outstanding category, meaning that the media can be applied during the learning process. At the same time, the percentage of student responses is included in the outstanding category, which means that students accept the learning method well.

Table 8. Average of Pretest, Posttest, and N-Gain

Aspect	Average	Criteria
Pretest	36,41	Very low
Posttest	92,58	High
N-Gain	0.88	High

Table 8 shows a much higher difference between the average pretest and posttest scores by obtaining an average of reaching the high category. It can be said that the application of animation video media based on powtoon can increase the understanding of the concepts of class VIII A students on the material of Two-Variable Linear Equation Systems. The application of animation videos based on Powtoon can also make the atmosphere more exciting and avoid student boredom.



Picture 4. Normalized N-Gain Result Bar Chart

Based on the bar chart above in Figure 4, two criteria were obtained based on the normalized n-gain calculation formula. 5 students get moderate criteria with a gain score interval of  $(17\%) 0,7 \geq g > 0,3$  and 24 students get high criteria with gain score intervals  $(83\%) 1,0 \geq g < 0,7$ .

Based on the assessment results of the understanding of the concept carried out based on the value of the students' pretest and posttest results. The analysis of the results of the Pretest and Posttest scores is shown in table 7. In table 7, it can be

said that the percentage of students' mastery of knowledge competence using Powtoon animation video-based learning media shows a rapid increase.

Based on the results of understanding the concept of the Two-variable Linear Equation System material, it can be seen from the normalized n-gain analysis results presented in table 7. In table 7, it is stated that it has increased, which can be seen from the average score of the Pretest and Posttest, which is as much as. It can be seen that the normalized n-gain average is 0.88, which means that it includes high criteria. In this case, it has been proven that the Powtoon animation video-based mathematics learning media can make students look active in learning which results in being tested effectively in the high category when learning the Two-variable Linear Equation System learning takes place and gets additional new information from before 56%.

Based on the results of this study, it is in line with the research (Yusuf et al., 2020) who said that applying the audiovisual powtoon media has been proven effective by obtaining so that there is a difference in learning motivation between using media and without media than making it attract the attention of students and become more enthusiastic in the learning process. Similar to research  $0,000 < 0,05$  (Yusuf et al., 2020), research results from (Wijayanti & Hasan, 2018) said that applying the Video Scribe learning media with the help of whiteboard animation has been proven effective by obtaining that there is a difference in learning outcomes between using media and without media which makes students more active during learning so that animation-based learning media is feasible to be applied as a medium for learning mathematics. Equal to  $t_{hitung} > t_{tabel} 8,12 > 1,99834$  (Wijayanti & Hasan, 2018) research from (Indayani, 2019) said that the sparkol learning media assisted by Video Scribe had been proven effective by obtaining a percentage of 60%, which means that it includes the moderate criteria so that it is proven effective and makes students experience an increase in learning outcomes. While research from (Anggraeni et al., 2020) said that applying the Sparkol Videocrib-assisted learning media has been proven to be effective by obtaining a percentage of 56.30%, which means that it includes moderate criteria so that there is a difference in improving learning outcomes using animated video learning media compared to applying conventional media.

## CONCLUSION

Regarding the final results of the research that the researchers have described. Hence, the researchers conclude (1) learning using Powtoon animation video-based mathematics learning media was able to make class VIII students in the Two-Variable Linear Comparison System material get a difference in the increase in the results of mastery that started before using Powtoon animation video media to get an average of 36.41 while after using video media Powtoon animation by obtaining an average of 92.58 so that the average obtained by students has

increased by 56.17. (2) In applying mathematics learning media based on Powtoon animation video, it is proven effective when applied to learning in the Two-Variable Linear Equation System material. The effectiveness can be known based on the results of the expert test and media validation by obtaining 85% and 83, respectively. 75%, which means that it belongs to the outstanding category, while through the results of the student response questionnaire of 81.29% it belongs to the outstanding category, then through the test results, students get an average of 0.88% obtained from n- gain which means it shows high classification.

Thus, researchers' suggestions are that: (1) Teachers can apply mathematics learning media based on Powtoon animation videos during mathematics learning because it has been proven effective from the results of students' mastery after using these learning media. (2) Making additional references to other researchers to be even better than those in the current research. 29% of it belongs to the outstanding category, and then through the test results, students get an average of 0.88%, which is obtained from the n-gain, which means it shows a high classification. Thus, researchers' suggestions are that: (1) Teachers can apply mathematics learning media based on Powtoon animation videos during mathematics learning because it has been proven effective from the results of students' mastery after using these learning media. (2) Making additional references to other researchers to be even better than those in the current research. 29% of it belongs to the very good category, then through the test results students get an average of 0.88% which is obtained from the n-gain which means it shows a high classification. Thus the suggestions that will be put forward by researchers are that: (1) Teachers can apply mathematics learning media based on Powtoon animation videos during mathematics learning because it has been proven effective from the results of students' mastery after using these learning media. (2) Making additional references to other researchers to be even better than those in the current research. Thus, researchers' suggestions are that: (1) Teachers can apply mathematics learning media based on Powtoon animation videos during mathematics learning because it has been proven effective from the results of students' mastery after using these learning media. (2) Making additional references to other researchers to be even better than those in the current research. Thus, the stions that researchers will put forward are: (1) Teachers can apply mathematics lead researchers will put forward on videos during mathematics learning because it has been proven effective from the results of students' mastery after using these learning media. (2) Making additional references to other researchers to be even better than those in the current research.

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