DEVELOPMENT OF ANIMATED VIDEO-BASED MATHEMATICS LEARNING MEDIA USING *POWTOONS* ON QUADRILATERAL AND TRIANGULAR MATERIALS CLASS VII JUNIOR HIGH SCHOOL

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Abstract

This study aims to determine the validity and practicality of video-based learning media development using Powtoon on square and triangular materials in the 7th grade of SM. The type of development research uses the R&D model (Reasearch and Development) which has been modified into 7 stages, namely Potential and Problem, Data Collection, Product Design, Design Validation, Design Revision, Trial Product Testing and End Product. Research objects are video animation based learning media using Powtoon on square and triangular materials in the 7th Grade. The test subjects are 20 students in the 8th Graduate Grade State 1 Kerinci Right. A learning media product developed using Powtoon is validated by four validators. Data validation results and practicality in the analysis by determining the average of each assessment. Results from the analysis of validation data show an average of 85.92% with criteria very valid. The elevation evaluation of the teacher's response to the use of learning media obtained an average 85.33% with very practical criteria and the average elevation assessment of the student response of 86.48% with the criteria highly practical. Thus, it can be concluded that the learning media based on animated video using Powtoon on square and triangular material of grade VII SM tested its validity and practicality.

Keywords: Development, Learning Media, Powtoon, Quarter and Triangle

INTRODUCTION

Education is an effort to attract something inside humans as an effort to provide programmed learning experiences in the form of formal, non-formal, and informal education at school, and outside school, which lasts a lifetime aimed at optimizing individual abilities so that in the future they can play an appropriate life role (Triwiyanto 2014). So various kinds of updates were made to improve the quality of education. For this reason, various innovations are needed both in curriculum development, learning innovation, and fulfillment of educational facilities and infrastructure. Teachers are the most important component in learning. To improve the quality of learning, teachers are required to make learning more innovative so that it can encourage students to learn optimally.

In the world of education, mathematics plays a crucial role in the realm of education, can be seen through its existence at all levels, from elementary school to college. Moreover, mathematics ranked first in the allocation of the number of lesson hours, signifying its significance in providing a solid learning foundation. Mathematics is a basic science that has an important role in education, because mathematics learning is a means used to be able to shape students to think scientifically. Learning is a process of behavior change as a result of interaction with the environment so that learning experiences occur and learning outcomes become more meaningful (*meaningful learning).* Learning success is characterized by the acquisition of knowledge, skills and positive attitudes in individuals, as expected (Jalinus and Ambiyar 2016) The success of this learning is greatly influenced by many factors, namely the use of learning media in the learning process is an effective step to increase student interest in learning.Transformation in the world of education, making learning media innovations can support the implementation of an interactive learning process in accordance with the demands of the 2013 Curriculum (K-13). (Nofriyandi et al. 2021) revealed that learning is the main

element that is more dominant for the success of the teaching and learning system. Of course, this learning media makes it very easy for teachers to deliver material. Sudjana and Rifai (in Sukiman, 2012) The benefits of learning media in the student learning process include:

a) Teaching will attract more students' attention so that it can increase student learning motivation;
b) Teaching materials will be clearer in meaning so that they can be more easily understood by students, and allow students to master the teaching objectives better;
c) Teaching methods will be more varied, not solely verbal communication through the narration of words by the teacher, so that students do not get bored and the teacher does not burn out;
d) Students do more learning activities, because they not only listen to the teacher's description, but also other activities such as observing, doing, demonstrating and others.

The selection of learning media must be filtered, and aligned with the goals to be achieved. Therefore, learning media should be chosen that attract the attention and interest of students. Based on the results of an interview on November 20, 2020 conducted by researchers with mathematics teachers of SMP Negeri 1 Kerinci Kanan, it is known to: (1) learning outcomes that are not optimal, grade VII students find it difficult to understand and analyze Quadrilateral and Triangular material, difficulty in understanding concepts and applying them. (2) teachers have also used *slide power point* (PPT) learning media in delivering lesson materials. However, the learning media used is considered less interesting and less motivating for students. Less interesting means that there are still many students who feel bored because they use *slide power point* (PPT) learning media and teachers still use the lecture method in delivering material.

According to (Nurdiansyah, Faisal, and Sulkipani 2018)has several advantages and is very suitable for use as a learning medium because *Powtoon* is not an application that must be installed on a computer. Although made *online*, the results can be used *offline* in the form of percentages or pdfs. According to (Meianti 2018) The templates available in the *Powtoon* application can be used in making videos or can be creative by using workspaces that have not been filled, this can increase educator creativity and student enthusiasm for learning because animated videos are produced with a variety of unique features such as moving cartoon animation, handwriting animation, so that the transition The movement that occurs is very flexible and the *Timeline* settings are easy to operate, besides that users can also import audio or images.

Therefore, the role of learning media is very necessary in a teaching and learning activity. Teachers can use television movies, or images to better inform students. Through learning media, abstract things will become concrete (Sanjaya 2012) Learning is also more fun because of the real visualization compared to just reading books and listening to teacher lectures. Thus, it is expected that mathematics learning will attract more students' attention so that mathematics learning objectives will be achieved optimally.

Based on the description above, the researcher will conduct a research entitled **Development of Mathematics Learning Media Based on Animated Videos Using *Powtoons* on Class VII Junior High School Quadrilateral and Triangular Materials**

RESEARCH METHODS

Research on the development of animated video-based learning media using *Powtoon* was developed using the *Research and Development* (R&D) model (Sugiyono 2017) whose steps have been modified by researchers into 7 steps, namely potential and problems, data collection, product design, design validation, design revision, product trials and final products. Researchers limit the steps of this research due to limited time and costs owned by researchers.

Here are the research steps that have been modified by researchers. Researchers modified the development research steps as follows:

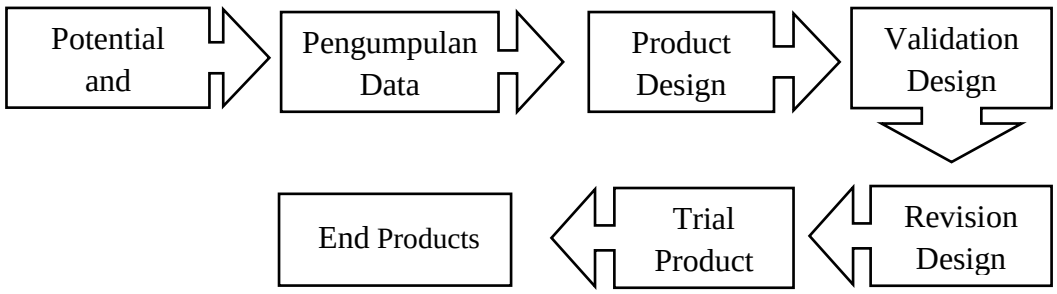


Figure 3. 1 Modification of the Steps to Use *Research and Development* (R&D) Methods

This research was conducted at SMP Negeri 1 Kerinci Kanan, Siak Regency Class VIII 2. The time for conducting the research is in the 2023/2024 academic year. The validators of this research consisted of 2 lecturers of mathematics education study program at Universitas Islam Riau and 2 mathematics teachers of SMP Negeri 1 Kerinci Kanan and the object of this research was the development of animated video media using *Powtoon.* The data collection techniques and instruments used in this study are in the form of validation sheets for animated video learning media developed in the form of sheets containing several aspects of assessment. The rating scale on the validation sheet is filled in based on **the** *linkert* **scale** as shown in the table below:

Table 1 Assessment Categories Validation Sheet

Information	**Shoes**
SB (Very Good)	4
B (Good)	3
K (Less)	2
SK (Very Less)	1

Source : Modification (Sugiyono 2017)

Table 2 Media Validity Level Criteria

No	**Validation Criteria**	**Validity/Eligibility Level**
1	76% – 100%	Very Valid
2	51% – 75%	Valid
3	26% – 50%	Less Valid
4	0% – 25%	Tidak Valid

Source: Riduwan (Adiyah et al., 2018)

The media practicality test aims to find out how students and educators respond to animated video learning media using *Powtoon*. The following is the assessment scale on the practicality sheet filled in according to the following table:

Table 3 Categories of Practicality Sheet Assessments

No	Assessment Score	Category
1.	4	Very Agree
2.	3	Agree
3.	2	Less Agree
4.	1	Disagree

Source:(Widyoko 2017)

Table 4 Categorization of Practicality of Learning Media

No	Criterion	Level of practicality
1.	81 – 100%	Very Practical
2.	61 – 80%	Practical
3.	41 – 60%	Quite Practical
4.	21 – 40%	Less Practical
5.	0 – 20%	Impractical

Source: (Yanto 2019)

RESULTS OF RESEARCH AND DISCUSSION

This learning media development model uses the R&D model developed by Sugiyono. Researchers modify into 7 consisting of Potential and Problems, Data Collection, Product Design, Design Validation, Design Revision, Product Trials and Final Products. The results of this development media are as follows:

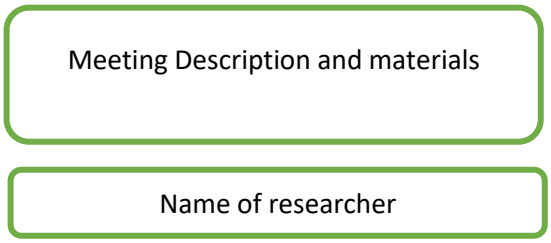
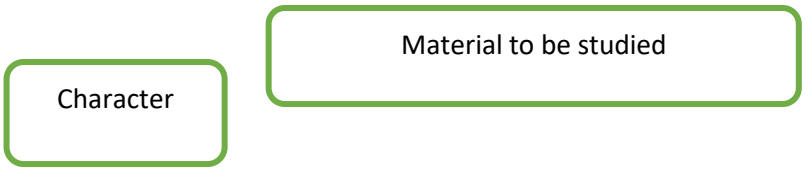
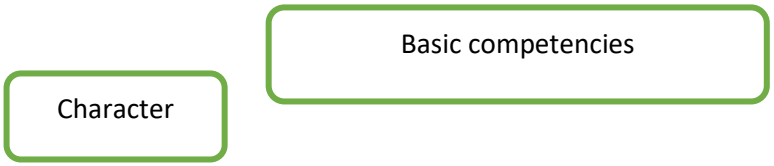
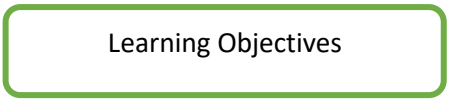
Potential and Problem Stages

In developing animated video-based mathematics learning media tools using *Powtoon* on quadrilateral and triangular material in terms of potential and problems by conducting interviews conducted with mathematics teachers of SMP Negeri 1 Kerinci Kanan. Based on interviews that have been conducted with mathematics teachers of SMP Negeri 1 Kerinci Kanan, the learning outcomes of most students have not reached the Minimum Learning Completeness (KKM) determined by the school, which is 78. This was revealed by the mathematics teacher of SMP Negeri 1 Kerinci Kanan who revealed that there were still many low scores on mathematics test scores on quadrilateral and triangular materials. The difficulty of the material is because students consider that quadrilateral and triangular material is difficult material. Interest and motivation of students who are less deep in learning, lack of variety of learning media which results in students having difficulty in understanding the material because learning is monotonous and less interesting, and students lack interest in reading printed books used, resulting in lack of student learning motivation. Schools also have supporting factors in developing learning media such as having ICT labor and projectors (*infocus*) that can be used during learning.

Data Collection Phase

After obtaining information from the potential and problem stages, then collect information used to design the product to be developed, namely learning media using

Powtoon which is expected to overcome the problem. Activities carried out in data collection are designing appropriate concepts on the learning media to be developed. The design is in the form of a *storyboard.* Here is the *storyboard* that has been designed:

Home page meeting description and materials and names of researchers

Pages of material to be studied at the meeting

Basic competencies page

Learning objectives page

Material Page

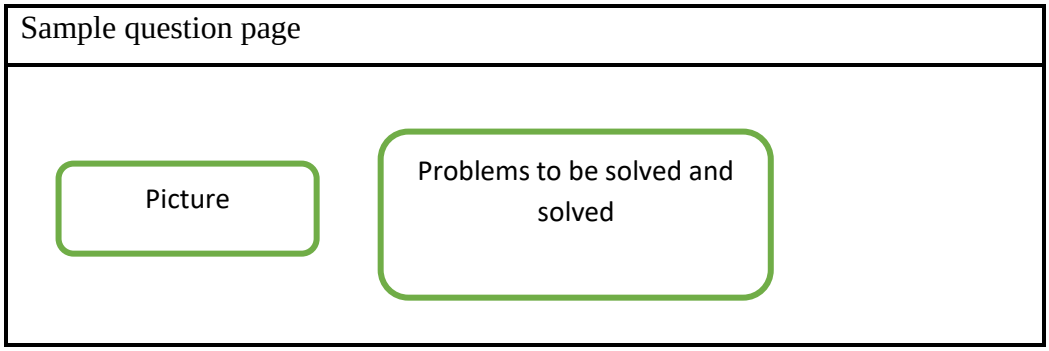
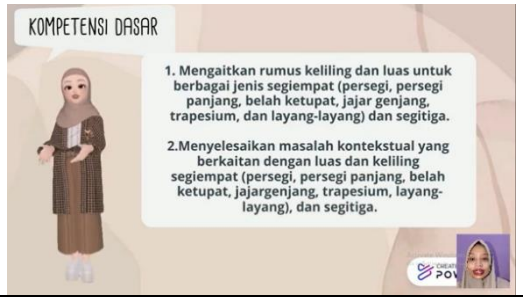



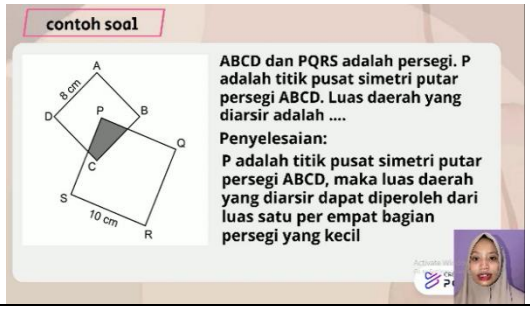
Figure 1 Learning Media Storyboard

Product Design Stage

After the media design in the form of *storyboards* has been completed, the researchers realized the design into the form of animated video-based mathematics learning media using *Powtoon*. Here are some descriptions of learning media products that have been developed before validation:

Table 1 Learning Media Display

No	Display	Information
1		On this page has been inserted an interesting background with complementary characters. This page is the initial display when the learning media is first opened and operated.
2		This page displays the material to be studied at each meeting.
3		This page displays the basic competencies.

4		This page displays the learning objectives to be achieved at each meeting.
5		This page displays the material learned at the meeting.
6		This page shows examples of problems and their solutions.

Design Validation Phase

After the learning media is completed, the next stage is carried out to find out and revise the shortcomings contained in the learning media by the researcher in accordance with the validator's suggestions. This learning media was validated by 4 validators consisting of 2 lecturers and 2 junior high school mathematics teachers. The validation sheet that has been filled in by the validator is then analyzed to determine the level of validity of the animated video learning media developed. The following are the results of learning media validation using *Powtoon* that have been assessed by validators:

Table 5 Learning Media Validation Results on Each Aspect Using the *Likert* Scale

Assessment Aspect	Validator				Average (%)	Validation Criteria
	V1	V2	V3	V4		
Media	86,92%	75%	94,88 %	80,67 %	84,36%	Highly Valid
Material	90,62%	83,85%	93,22 %	82,28 %	87,49%	Highly Valid
Combined Average					85,92%	Highly Valid

Based on the table above, the results of the learning media validation analysis by 4 validators were obtained, namely getting a percentage result of 85.92% with the category "very valid". In carrying out the validation stage, there are several comments and suggestions for improvement from each validator. Researchers revise in accordance with validators' suggestions to produce animated video learning media that are developed suitable for use.

Design Revision Phase

At the learning media validation stage, researchers get several suggestions from validators to make improvements to learning media.

Product Trial Phase

The trial of animated video learning media products using *Powtoon* was carried out and applied to grade VIII 2 of SMP Negeri 1 Kerinci Kanan. Researchers took data from class VIII 2 consisting of 20 students. After testing animated video learning media using *Powtoon*, researchers provided student response questionnaire sheets that aimed to obtain practical data from learning media that had been tested. The trial was carried out in classroom VIII 2 of SMP Negeri 1 Kerinci Kanan. The results of the learning media practicality data will be analyzed to find out how practical the animated video learning media is using *Powtoon* in the learning process. Animated video learning media using *Powtoon* on quadrilateral and triangular material is applied to the learning process as many as 4 meetings. Furthermore, the practicality data obtained from the teacher and student response questionnaires were analyzed to determine the level of practicality of learning media. The practical results of the questionnaire of student responses to learning media can be seen in the table below:

Table 6 Results of Practicality of Student Response Questionnaire

Aspects	Shoes Empirical	Max Score	Average (%)	Practicality Criteria
Material	139	160	86,87%	Very Practical
Media Presentation	345	400	86,25%	Very Practical
Use of Learning Media	554	640	86,56%	Very Practical
Language	69	80	86,25%	Very Practical
Combined Average			86,48%	Very Practical

Based on the table above, the average assessment of the results of the questionnaire of student responses to animated video-based learning media using *Powtoon* on quadrilateral and triangular material is 86.48% with the criterion of 'very practical". This shows that animated video-based learning media using *Powtoon* which was developed is practically used by students in the learning process.

While the practical data from the questionnaire of teacher responses to learning media can be seen in the table below:

Table 7 Results of Practicality of Teacher Response Questionnaire

Aspects	Shoes Empirical		Max Score		Average (%)	Practicality Criteria
	V_3	V_4	V_3	V_4		
Material	18	15	20	20	82,50%	Very Practical
Media Presentation	11	10	12	12	91,66%	Very Practical
Use of Learning Media	28	27	32	32	85,93%	Very Practical
Language	7	6	8	8	81,25%	Very Practical
Combined Average					85,33%	Very Practical

Based on the table above, the average assessment of the results of the teacher response questionnaire to animated video-based learning media using *Powtoon* on quadrilateral and triangular material is 85.33% with the criteria of "very practical".

Final Product Stage

The last stage is the final production, at this stage the learning media based on animated videos using *Powtoon* that has been validated and has been tested for practicality can be used in the teaching and learning process.

Discussion of research results

In the development of this learning media, researchers provide an interesting and easy-to-understand display, coupled with questions that hone the reasoning of students, researchers also add backsound or audio narration like a teacher explaining the material. So it is expected that students will be enthusiastic in following the learning process. As stated by Wiratmojo and Sasono (dalam Febrita and Ulfah 2019) efforts to increase the interest and motivation of learning students is the use of good and correct and interesting learning media. The use of learning media in the teaching and learning process can generate new interests and desires, generate motivation and stimulation of learning activities, and even bring psychological influences on learning. According to Mangelep (in Tiwow et al. 2022) A teacher must be creative and innovative in the selection of models, methods, strategies and learning media that match the teaching material so that the objectives of learning can be achieved.

The next step is data collection, researchers collect this information which is used to design products to be developed, namely animated video-based learning media using *Powtoon. Powtoon* is one of the learning media makers that has interesting animation features, where the use is exactly the same as power point. What distinguishes it is that in *Powtoon* there are handwritten animations of various shapes, cartoon animation adapted to the creator's character, and the transition effects of each screen can be changed as desired, and the time line can be adjusted easily. With interesting animation features, it makes it easier for teachers to implement teaching materials into classroom learning (Garsinia, Kusumawati, and Wahyuni 2020)Then the next step is product design. In this step, researchers realized the design of an animated video-based learning media using *Powtoon*. The purpose of the developer validating a product is to find out a feasibility of the developed media that has been made by educators or prospective educators. The validated data is then analyzed. The results obtained according to the table are 85.92% which shows this media is included in the "very valid" category. In line with research (Haryadi et al. 2022) entitled "development of animated video media using *Powtoon* software to improve students' critical thinking skills", stated that the validation results of learning media development showed "very valid" criteria from media experts with a score of 92% and material experts with a score of 91.5% with the category "very valid". After the researcher validated, the next stage was for the researcher to revise the animated video-based learning media product using *Powtoon* on the quadrilateral and triangular material of class VII SMP Negeri 1 Kerinci Kanan in accordance with comments or suggestions from the four validators before testing learning media products to students.

Next, researchers conducted product trials to students. This trial was conducted on grade VIII 2 students totaling 20 people with the aim of determining the level of practicality of the learning media developed by researchers by providing response questionnaires to students and teachers. Judging from table 4.4, the average assessment results of the student response questionnaire obtained a value of 86.48% with the level of media practicality that showed the criteria of "very practical" and the results of the teacher

response questionnaire obtained an average of 85.33% with the criteria of "very practical". Thus, this learning media has been tested for validity and practicality. In line with research (Awalia, Pamungkas, and Alamsyah 2019) entitled "Development of *Powtoon* Animation Learning Media in Mathematics Subjects in Grade IV Elementary School" stated that the learning media developed showed "very practical" criteria by having an average of 94.73% obtained from student response questionnaires and showed "very practical" criteria by having an average of 93.33% obtained from teacher response questionnaires. Thus, it can be concluded that the results of research on the development of animated video-based learning media using *Powtoon* on the quadrilateral and triangular material of class VII Junior High School are tested for validity and practicality so that they are suitable for use in the learning process.

CONCLUSION

Itcan be concluded that the results of research on the development of animated video-based learning media using *Powtoon* on the quadrilateral and triangular material of class VII Junior High School are tested for validity and practicality so that they are suitable for use in the learning process

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