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PRACTICALITY TESTS OF TEACHING MATERIALS ON SERIES AND SEQUENCES USING CANVA MEDIA THROUGH REALISTIC MATHEMATICAL APPROACH

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ABSTRACT

This research is a study that focuses on the development of realistic-based mathematics teaching materials on high school students' mathematical communication skills on sequences and series material. Research and Development (R&D) is the research used, the model to support this research is using the ADDIE model which has 5 stages in its application, the stages of analysis, design, development, implementation, and evaluation. However, the discussion in this article only extends to the practicality test which is the advanced stage of the Development stage. The instrument used in this study was a questionnaire (validation and response). Validation was carried out by material experts, ICT experts, and responses were obtained from teachers and students. Material expert validation results reached a percentage of 85.10% of the average interpretation of "very feasible", ICT expert validation results were at 83.80% with the final statement "Very Feasible", student and teacher responses in the product test were obtained successively of 85.62% ("Very Practical") and 94.38% ("Very Practical"), the conclusion is that the mathematical material based on canva-assisted realistic is "Very Appropriate" and "Very Practical" in use for learning mathematics in senior high school.

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INTRODUCTION

As a developing country, Indonesia must have skills in its development process so that it becomes a strong country. The skills needed to maintain this country are inseparable from

several aspects, especially education. Education is an aspect that is very impossible to separate in this life, if we look at the Law of the Republic of Indonesia concerning the National Education System it is clear that the purpose of National Education is to educate the life of the nation. The government expects all students in Indonesia to be able to protect this nation both verbally and non-verbally.

Development in the educational process will certainly be able to have a positive impact on the sustainability of life. Mathematics education is no exception, which is of course beneficial for life, Widiani (2019) mathematics can be used in life, for example in the production process, from harvesting to product production.

Communication skills are skills that must be possessed by all students. This is in learning mathematics, students must master skills that require intelligence. and patterns of forming generalizations obtained by manipulating mathematics, explaining ideas, presenting mathematics and constructing evidence, communicating ideas and ideas using tables, diagrams and other forms when explaining situations and understanding the meaning of mathematics in everyday life that will be carried out, Ministry of Education and Culture (Hendriana & Kadarisma, 2019).

The concepts of sequences and series play a very important role in everyday life as well as in science and technology. For example, when measuring a vehicle's speed with a speedometer, the speedometer contains several rows of numbers in a certain pattern that form an arithmetic sequence. In addition, this material can be used in economics to calculate population and food growth, measure production costs and income, and calculate interest rates in the banking world. This is in line with Kharisma's research (2018) which states that the subject matter of sequences and series is very important for students to learn.

Many factors become obstacles in learning mathematics, one of which is revealed by Cowan (2006). One of the factors that causes low student achievement in mathematics is the mismatch between what is taught and the material being taught. In this context, both the learning process and students' access to learning resources must be improved and further developed so that the results achieved are more optimal. It is also proven when the authors conducted research on the low ability of mathematical communication in one of the high schools in Cianjur district most students are passive in learning.

Something that is needed in the process of developing mathematics education is to prepare a strategy. According to Rohmah (2021), in the learning model, there are strategies for achieving student competence with certain approaches, methods and learning techniques. One of the strategies in learning is to determine the approach. One approach that is often used is a realistic approach. Realistic Approach in Afsari et al. (2021) The realistic approach tends to provide explanations related to realistic matters, so that students can easily digest the lessons conveyed by educators. From this understanding, it can be concluded that a realistic approach means an approach that is "related" to the lives of the students themselves.

Life in the 20th century is inseparable from the rapid developments in technology. The rise of technological developments in every field is inevitable in the 21st century (Megahantara, 2017) in line with Rahayu et al. (2022) 21st century learning is very popular with rapid changes in Science and Technology (Science and Technology). It is very unlikely that existing technology will be abandoned by mankind, rather than being abandoned basically technology will develop over time. In these developments we must be able to follow and even be able to use the availability of this technology as a means of facilitating things, including in the learning process.

One example of utilizing technology in learning is the use of video as a medium in the teaching and learning process. In line with Hadi (2017), the video is very effective for elementary school children who are still in the real action stage. The benefits of using video may lie behind the effectiveness of using video as a tool for students. From this description it can be seen that the application of video media in learning is very effective.

Not only using video media, the use of other applications as learning support materials is very necessary. In addition to skills in making learning videos, of course there must be skills in making slides so that presentations look cheerful and don't seem stiff. One application that is often used in making slides is the Canva application. Without realizing it, the activity of making interesting slides can make students seem in line with what was stated by Nurfadhillah et al. (2021) Students also feel that Canva-based interactive media is easier to understand than other media, besides that this media is more practical to use and does not require large amounts of internet access.

Based on the explanation above, the researcher wanted to know the validity and practicality of the teaching materials developed regarding mathematical communication skills in the subject of Canva-assisted Sequences and Series with a realistic approach to high school mathematics.

METHOD

The type of research used in this research is development research. The research stages refer to the ADDIE development and research model which consists of: Analyze, Design, Development, Implementation and Evaluation Stages. However, the discussion in this article is only up to the practicality test which is the advanced stage of the Development stage.

This research was conducted at Budi Bakti 2 High School which is located in Cidaun District, Cianjur Regency, West Java Province. The product trial involved 30 class XI students and 1 math teacher. The product is in the form of teaching materials that have been validated by 6 validators from material experts and ICT experts.

The data collection instruments consisted of: a) validation sheets to assess the substance of the material, product visualization, grammar, product design and utilization and b) response questionnaires to assess product usability in learning. Validation sheets were given to validators, while response questionnaires for practicality analysis were given to teachers and students.

Validity was measured using a Likert Scale calculation. Next is the Likert scale which is divided into two measurements, positive and negative measurements. The validity is in a positive Likert scale, namely, "strongly agree = 4", "agree = 3", "disagree = 2", and "strongly disagree = 1". Conversely, for negative measurements on the Likert scale a score will be formed, "strongly agree = 1", "agree = 2", "disagree = 3", and "strongly disagree = 4". Then calculate the acquisition score from the distribution of the questionnaire to the expert validator. The formula used in calculating the validity value is as follows (Sugandi, et al., 2021):

$$V = \frac{f}{N} \times 100\%$$

Information :

V : final value

f : Score acquisition

N : Maximum score

The interpretation of the results of the calculations that have been carried out is obtained by using the value information in the following categories:

Table 1. Validity Category

Intervals	Category
$81\% < x \leq 100\%$	Very valid
$61\% < x \leq 80\%$	Valid
$41 < x \leq 60$	Valid Enough
$21 < x \leq 40$	Invalid
$0 < x \leq 20$	Very Invalid

Source: (Arikunto, 2012)

Teaching materials based on a realistic mathematical approach that uses canva video are included in high value descriptions or are called practical if students can understand what has been given in the form of material on learning tools, and students can construct (rearrange) the realistic approach with the help of canva video properly . Analysis of the scores obtained through a practicality questionnaire based on a realistic approach using Canva video was obtained by using a response questionnaire that had good criteria for positive and negative statements. Positive statements in the questionnaire have the following scoring criteria, “strongly agree = 4”, “agree = 3”, “disagree = 2”, and “strongly disagree = 1”. For negative statements in the questionnaire, the scoring scores have the criteria, "strongly agree = 1", "agree = 2", "disagree = 3", and "strongly disagree = 4". Furthermore, the calculation of the responses that students put forward through a questionnaire is given with the calculation of the total score. This practicality has the following formula in its calculations (Sugandi, et al., 2021):

$$P = \frac{f}{N} \times 100\%$$

P : final value
f : Score acquisition
N : Maximum score
The interpretation of the practicality questionnaire total score calculation refers to the following categories:

Table 2. Practicality Category

Intervals	Category
$81\% < x \leq 100\%$	Very Practical
$61\% < x \leq 80\%$	Practical
$41 < x \leq 60$	Pretty Practical
$21 < x \leq 40$	Impractical
	Very Impractical

$$0 < x \leq 20$$

Source: Riduwan (Rismini et al., 2019)

If the results of the validity test or practicality test on the criteria are invalid or impractical, it is necessary to revise the product quality again. Revisions were made with reference to the suggestions of validators and math teachers. Testing is completed when it has produced teaching materials that are suitable for use and have been tested for their validity and practicality.

RESULTS AND DISCUSSION

Results

In this study, the activities carried out up to the third stage, the following details the activities:

The first stage is the Analyze Phase.

The Analyze phase begins with conducting a preliminary study and literature study to find out the learning problems faced by teachers and students at school and their solutions. Based on the results of a preliminary study through interviews with the Mathematics Teacher at SMA Budi Bakti 2, an interesting teaching material is needed using Canva so that it can be studied anytime and anywhere and to motivate students to study even harder.

The second stage is the Design Stage.

After knowing the solutions to teacher and student problems in schools, the next stage is the Design stage. The activities carried out at this stage are selecting material, compiling evaluation instruments and designing teaching materials in the form of LKS (Student Activity Sheets) and learning videos that contain explanations of learning materials and activities carried out by students. The making of this design is adjusted to the core competencies, basic competencies, learning objectives, realistic learning approaches, material characteristics, student characteristics and other supporting factors.

Here are some views of the LKS design as well as screenshots from the learning videos:

Figure 1. Canva Video layout

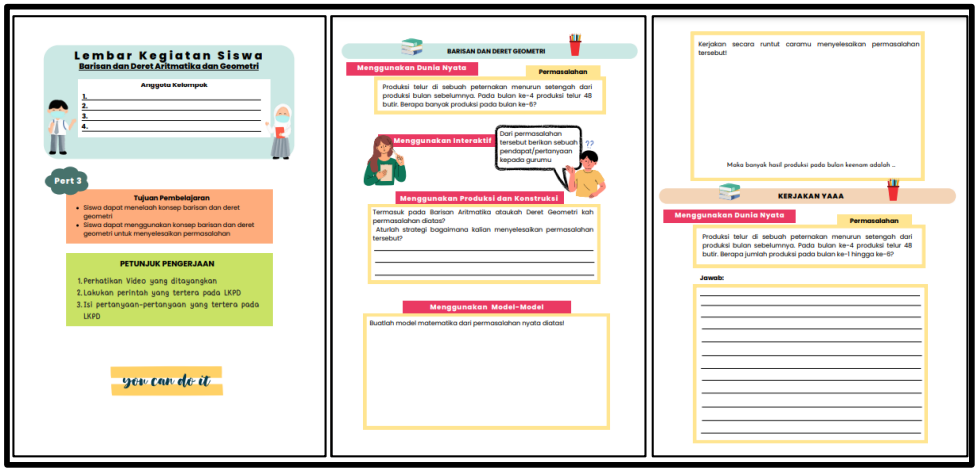

Figure 2. Student Worksheet Design

The third stage is the Development Stage.
At this stage, the researcher uses Canva media, a realistic approach, and the material for Rows and Series as the variables. After the LKS teaching materials and learning videos have been made, they are then validated by several validators, namely material experts, then they are carried out on ICT experts to find out what things need to be improved. The validation results from the two experts are written in Table.3 and Table. 4 following:

Table 3. Material Expert Validation Assessment Recapitulation Based on the Aspects Observed

Aspects Observed	Average	Percentage	Category
Suitability of material	4,34	86,80%	Very Eligible
Suitability of didactic requirements	4,25	85,00%	Very Eligible
Compliance with construction requirements	4,30	86,00%	Very Eligible
Compliance with technical requirements	4,13	82,26%	Very Eligible
Average	4,25	85,00%	Very Eligible

Based on Table 3, it can be seen that the average percentage of the assessment from the validation of material experts, the aspects in the teaching materials are at a percentage of 85.00% in the "Very Eligible" category, no comments are given on each aspect, thus the teaching materials are in the form of LKS and learning videos have no revisions and are ready to use.

Table 4. Recapitulation of Media Expert Validation Assessment Based on Observed Aspects

Observed Aspects	Average	Percentage	Category
Visual display	4,39	87,80%	Very Worth it
Accessibility and education	4,18	83,60%	Very Worth it
audio element	4,00	80,00%	Worthy
Average	4,19	83,80%	Very Worth it

Based on Table 4, it can be seen that the average percentage of the assessment from the validation of ICT experts, the percentage of all aspects assessed is at 83.80% with the "Very Eligible" category, such as the observation above that comments on each aspect do not exist, making teaching materials in the form of LKS and videos do not require revision, then they can be used immediately.

After validation, teaching materials do not require revision, so they do not need to be repaired. Then the researcher conducted a product trial to see the practicality of the teaching materials that had been developed in the form of worksheets and canva videos which contained sequences and series material. This product test was carried out at Budi Bakti 2 High School, class XI was the place where the research was carried out. The class is an experimental class with 8 meetings on sequences and series material. This is done by researchers to be able to see the practicality of teaching materials. The test results in looking at the practicality of materials by conducting product tests are:

Table 5. Recapitulation of Student Responses to the Practical Test Results of Teaching Materials on Rows and Series Materials in Product Tests

Observed Aspects	Number of Statement	$\bar{x}$	%
Have interest and passion in learning	2, 3, 4, 12, 16, 17	21,13	88,06%
Able to overcome difficulties and dare to try new things (Usability)	6, 9, 13, 19	13,63	85,21%
Able to understand the learning material	1, 8, 11, 18	13,63	85,21%
Convenience, suitability, and sufficient time	5, 7, 10, 14, 15, 20	20,17	84,03%
Average Percentage			85,62%
Interpretation			Very Practical

The average percentage of student answers as written in Table 5 is 85.62% with the interpretation of "Very Practical". With the interpretation obtained, that student responses have a positive response, seen based on the average percentage of learning using realistic mathematics-based teaching materials assisted by canva video, meaning that the teaching materials are very practical.

Table 6. Recapitulation of Teacher Responses to the Practical Test Results of Teaching Materials on Rows and Series Materials in Product Tests

Observed Aspects	Number of Statement	$\bar{x}$	%
The quality and completeness of teaching materials to the material	1, 2, 3, 4, 5	3,80	95,00%
Effectiveness, efficiency, attractiveness of teaching materials	6, 7, 8, 9, 10, 11, 12, 16, 17,18, 19, 29, 30	3,54	92,31%
Accessibility and ease of use and management	13, 14, 15, 20, 21, 22, 23, 24, 25, 26, 27, 28	3,83	95,83%
Average Percentage		3,72	94,38%
Interpretation			Very Practical

The teacher's answers have an average percentage of 94.38% with the interpretation of "Very Practical". With that, the teacher gave a positive response to learning using teaching materials with Realistic Mathematics assisted by Canva video, practical teaching materials were used when product tests were carried out.

Discussions

Referring to data processing from the development of teaching materials in the form of worksheets and canva videos, it can be seen that the results obtained by teaching materials are based on a realistic mathematical approach assisted by canva video in sequence and series material, the results of validation by material experts with the percentage of each indicator, namely the suitability of the material equal to 86.80%, suitability of didactic requirements 85.00%, suitability of construction requirements 86.00%, and suitability of technical requirements 82.26%, with an average of 85.10% having the "very feasible" category. The validation results by ICT experts reached the category of "very feasible" with the percentage of each indicator namely visual appearance 87.80%, educational accessibility 83.60%, and audio elements 80.00% with an average of 83.80%.

Based on the practicality test conducted, student responses were obtained with the statement that the teaching materials in the development process were in the "very practical" category with the following details having an interest and enthusiasm for learning 88.06%, being able to overcome difficulties and dare to try new things (usefulness) 85, 21%, able to understand learning material 85.21%, ease of suitability and adequacy of time 84.03% with an average percentage of 85.62%. The teacher's response to the observed aspects of the quality and completeness of teaching materials to the material is 95.00%; effectiveness, efficiency, attractiveness of teaching materials 92.31%; accessibility and ease of use and management 95.83%; the average overall aspect is 94.38% with the criteria of "very practical".

From the data that has been interpreted, it is found that the development of teaching materials based on a realistic mathematical approach assisted by Canva video is very well used to improve mathematical communication skills on sequences and series material. This is in accordance with research conducted by Nasution & Ahmad (2018), a mathematical realistic-based learning device developed in the very good category so that students get high marks on tests of mathematical communication abilities. The teaching material in the form of a mathematical module based on Realistic Mathematics Education (RME) on students' mathematical communication skills in the line and series material for class XI SMA is said to be feasible and very practical to use as teaching material in learning mathematics (Munawarah et al., 2023)

CONCLUSION

By reviewing the assessments of the material expert validators and validators from media experts, Rows and Series teaching materials are included in the "Very Eligible" category as well as student and teacher responses to learning product tests that use teaching materials with a realistic approach assisted by Canva on sequences and series material are included in the criteria of "Very Practical" are used in learning mathematics, especially the material for sequences and series.

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