

THE DEVELOPMENT OF CANVA ASSISTED SCIENTIFIC APPROACH TEACHING MATERIALS TO IMPROVE STUDENTS' CRITICAL THINKING ABILITY ON JUNIOR HIGH SCHOOL

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ABSTRACT

Based on research at the school that schools still use conventional learning, so students are less involved or less interactive, therefore this study aims to find out whether the development of teaching materials in the form of worksheets on flat-sided geometrical material using a scientific approach assisted by the Canva application is feasible and makes students be interactive while knowing the feasibility of the teaching materials being developed, knowing the effectiveness of the teaching materials being developed and knowing the constraints faced by researchers during the development of teaching materials. The development research model used is the 4D development model. The research location chosen was Darul Falah Middle School with random selection of subjects. The research instruments used were validation sheets, student response sheets and five critical thinking skills test instruments. The results of the development of the teaching materials themselves, namely during the limited trials the validation results reached 80% with a proper interpretation and the practical results of the teaching materials were 84% with very practical interpretations, in the extensive trials the validation results reached 93% with very feasible interpretations and the results of the practicality of the materials teaching 86% with very practical interpretation. The results of this study indicate that the process of developing teaching materials is carried out well.

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INTRODUCTION

Education is very important for humans in all aspects of their lives, this means that education has a big influence on humans to be able to survive by building good interactions with each other so that their life needs are met easily (Marwah et al., 2018). Whereas according to

Heidrachman and Husnah (1997:77) Education is an activity to improve the general knowledge of people, specifically improving the ability to master theories, skills, decide to find solutions to problems related to this activity. . work towards achieving their goals, whether it involves solving problems in the world of education or in everyday life. The function of education in general is to help students interact with a variety of environments (physical, social and cultural), especially with available educational resources, in order to achieve educational goals. optimal, for optimal education in schools cannot separate the supporting factors. plays an important role in the quality of education. These factors include school facilities and infrastructure, character building and other supportive activities such as extracurricular activities, and most importantly, the quality of learning in schools.

The availability of learning resources is what affects the quality of learning in schools. Teachers, as practitioners of learning, are expected to be able to develop innovative teaching materials as a learning resource to engage students in learning. Teaching materials are systematically arranged learning tools, which can be in the form of written or unwritten teaching materials, that assist students and teachers in learning activities. Educational material consists of a set of learning aids or tools containing learning materials, methods, and assessments that are systematically and engagingly designed to achieve a desired goal (Puspandari et al. 2019). On the basis of this opinion, it can be concluded that teaching materials are learning materials designed by teachers to help students carry out the learning process in class so that students can understand the content of the material. . Study document. by the students.

One of the problems that students find difficult is the problem of shapes with flat sides. According to Sondek (2016), most students do not understand the problem of plane geometry. This is due to the lack of interesting and interactive teaching materials for students, as the teaching materials used are textbooks only. Essential teaching aids for students are interactive teaching aids. Educational material can be said to be interactive if students not only see and hear but also interact with the educational material in a realistic way (Dewi et.al, 2018). While according to Siti (Hasibuan, 2018), the difficulty that students face when learning math about flat-sided shapes is that students struggle to understand how to determine the area of cubes, cubes, and pyramids. . and prismatic. Students also sometimes have difficulty solving questions that emphasize the concept of memorization, using formulas without knowing the source of the formula leads students to put the basic concept aside and prioritize learning outcomes. practice. reality. by memory formula. Although the most important thing for students to understand is the basic concept of matter in flat space. Considering the characteristics of the material and the characteristics of the students, the appropriate learning approach is the scientific approach.

The scientific approach identifies techniques for investigating one or more phenomena or symptoms, making it possible to gain new knowledge, or to erase and integrate previous knowledge. This approach also uses investigative methods based on evidence from observations, tests, and measurements with specific inference principles. Therefore, the scientific method contains limitations to activities of data collection through observation or experimentation, processing information or data, analysis, and then forming and testing hypotheses. Many experts believe that through a scientific/scientific approach, in addition to being able to help students be more active in cultivating knowledge and skills, it can also encourage students to fulfill their own requirements. bridge. investigation to uncover the truth of a phenomenon or event (Sukerti et al., 2014).

In the current development, learning from elementary to high school has used technology. This agrees with the opinion of Andri (2017), who explains that technology plays a very important role in improving the quality of education. Technology is an effective and efficient

tool that can be used to develop learning materials. As a result, teachers are now encouraged to develop and use technology-based learning materials. With the hope that these learning materials can improve students' interest in learning and math ability. To increase creativity in creating educational materials, one of them used the application Canva (Wijaya et al., 2020). Canva is a graphic design application that comes with a ton of attractive templates, including presentations, resumes, posters, flyers, brochures, charts, infographics, banners, and more. available in the Canva app. It increases the creativity of teachers in designing teaching aids due to the many features provided. In addition to learning materials that can increase students' interest in learning, there is also the importance of critical thinking skills that students need to master to facilitate problem solving.

According to Sumarno (2013), the importance of training students' critical thinking skills is supported by the idea that mathematics education has two directions of development, that is, meeting current and future needs. . are coming. The first vision is for today's needs, learning math leads to understanding the concepts needed to solve problems in mathematics and other sciences. The second vision concerns future needs or leads to the future, in a broader sense, it is the study of mathematics that provides the skills of logical, systematic, critical and careful reasoning as well as critical thinking. sole objection. only protest. Open-mindedness and perspective are essential in everyday life and in dealing with an ever-changing future. Many students find math abstract and difficult to learn. While the level of students' ability to solve math is still very low. Some students still have difficulty in solving math problems given by teachers, leading to low academic results in math. A student's low performance in math can be caused by a number of factors, including: (1) The content of the manual is too voluminous and difficult to follow; (2) traditional and non-interactive learning methods; (3) Ineffective learning materials; (4) The type of abstract problem.

Critical thinking skills cannot develop naturally but must be nurtured with various stimuli and environmental conditions. Thinking skills can be taught using any material (Önen & Kocak, 2010). Critical thinking skills need to be developed in students because they play an important role in learning subject matter (Huynh, Caicedo, Pierce, & Gantt, 2013). There are several approaches to teaching students critical thinking skills, either subject-specific or integrated into any course content. Although critical thinking skills and abilities are part of the learning content, they are usually not taught explicitly. In other words, critical thinking skills and abilities are not the focus of direct and explicit instruction. Instead, students are expected to acquire critical thinking skills as a natural consequence of their involvement with the subject matter (Ennis, 1989).

Robert Ennis (2011) defined critical thinking as “reasonable and reflective thinking focused on deciding what to believe or do”, that requires reflective activity and is directed towards understanding the nature of problems not just solving them. Critical thinking skills cannot develop naturally but must be nurtured by various environmental stimuli and conditions. Thinking skills can be taught through any type of teaching material (Önen & Kocak, 2010).

Based on the given problems, the researchers tried to do something innovative using the Canva app following the scientific learning model, which is an alternative for researchers. study so that students do not feel bored when participating in learning. In this study, researchers developed a teaching material in the form of a Student Worksheet (LKPD) supported by the Canva app using a scientific approach to critical thinking skills. sole objection. students' critical thinking, as this method actively engages students in the learning process to hone their critical thinking skills.

METHOD

This study was conducted at Darul Falah Middle School, located on Jl. Raya Cihampelas number 45, Kec. Cihampelas (West Bandung District). Subjects used in this study are 2 classes of 7th graders with 28 students. The 3-day study begins June 5-7, 2023. The type of research used is research and development (R&D) with a 4D development model (define, design, develop, disseminate) variable).

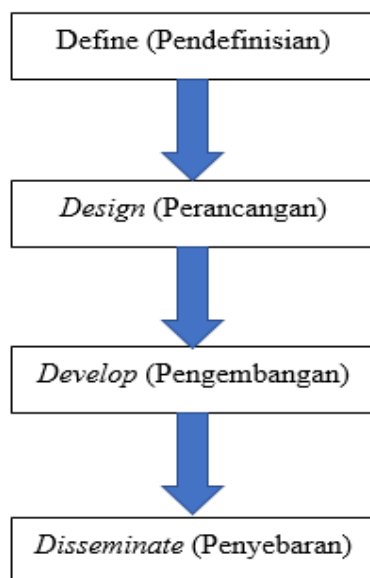


Figure 1. 4D Development Model Source: (Thiagarajan 1974)

Research using this model is limited to phase 3 (define, design, develop) due to limited research time. The interview process is completed prior to studying Canva-supported educational materials. This is to collect data related to the topic being taught, the learning objectives to be achieved, and the media used by the students to date. The study also asked for information on whether school facilities support the learning process. As the source of this interview, math teacher, curriculum representative Darul Falah Middle School. Expert validation, validation test questions of study results and textbook results for expert use. The validators are teachers from the Math Education Program, FPMS IKIP SILIWANGI, and math teachers at Darul Falah Middle School.

The test method is a measurement tool for assessing student feedback after learning with Canva. The tools of this questionnaire method include the ease of understanding of the material in the media, the level of student interest and saturation in using the learning medium, and then the repetition of learning. and students' motivation level after using learning media. media.

The data processing procedure for all data in this study was collected using Microsoft Excel as: 1) Descriptive statistics to describe the stages of the development process and the difficulties in the development process, 2) Inferential statistics to see the feasibility of the product's performance. Perform data processing analyzes that will then be used to form research findings. The results of this analysis are answers to existing problems. This in-depth data processing analysis is the result of expert validation of the Learning Document Assessment assessment tool. Analyze data from the validation results of a group of experts using the Likert scale. The percentage of valid results is calculated according to the following equation:

$$P = \frac{\sum x}{\sum x1} \times 100\%$$

Information:

P : Desired percentage

$\sum x$: Total score of respondents' answers as a whole

$\sum x1$: Maximum total score overall

100% : Constant

Benchmarks are used to present validation scores

Table 1. Product Validation Criteria

Presentase	Criteria	Inteprestasi
81%-100%	Very Worth it	The product can be used immediately without repair
61% - 80%	Worthy	The product can be used with minor repairs
41% - 60%	Decent Enough	Products can be used with many improvements
21% - 40%	Not Yet Eligible	Products can be used with many improvements
0% - 20%	So inadequate	Product cannot be used

RESULTS AND DISCUSSION

Results

The results of this study aim to develop integer teaching materials made with the help of the Canva application. In addition to producing an interactive Canva application, researchers also want to see the feasibility of learning media used in the learning process. The results of research and development with 4D models which are limited to step 3 (Define, Design, Develop) are explained as follows, namely.

Define

The analysis carried out in the mathematics curriculum for grade VIII Middle School is about flat sided shapes that will be designed using the Canva application. After careful analysis, the material that can be developed is flat sided geometric material, because flat sided geometric material must be explained with reasoning and understanding. To understand flat sided geometric shapes, it is necessary to develop interesting teaching materials so that students can understand the concept because students will it is enough to use visual aids because most students find it difficult to understand the steps that must be done with the learning media that will be developed will make students better understand the steps in building a flat sided space. This material requires an in-depth explanation of students' understanding abilities.

The personality analysis of the students was carried out by interviewing the support teachers of grade VIII. By conducting interviews with class VIII support teachers of Darul Falah Middle School i.e. Ria Sopianti, S.Pd and interviews with some students of class VIII i.e. two of them named Sanjan and Syaakhira, the interview results explain that teaching materials should be used to support the delivery of materials to students in the classroom. The methods used by teachers in learning mathematics are discussion, question and answer, group work, and teaching aids that help teachers explain material to students. But students today are satisfied with technology. Since students love technology such as computers and mobile phones, students themselves are also very curious. With study materials powered by Canva, students will enjoy learning and not get bored with the learning materials provided. Teachers' opinions about Canva-supported learning materials are quite good, as it can help teachers in the teaching and learning process easier and can improve their learning motivation. students, it is just that there are some obstacles encountered, namely the limited time in the learning

process which is very little, due to the different abilities and grasping abilities of students with students.

An analysis of students' needs was carried out to get the results that the media is really effective in learning math. The results are obtained from students who are students with all different personalities and abilities. The goal of learning to be achieved by teachers must pay attention to the needs of students according to their personality. The teacher is not the only dominant actor in controlling classroom learning, because each student has learning sensitivities, curiosity, the ability to express opinions, and needs. learning needs attract their attention so that students' interest in learning increases. The abilities that these students possess and their sensitivity to learning require learning materials. Through observing the learning process at Darul Falah Secondary School, it can be seen that during teaching hours, teachers do not use any learning aids.

Design

The design at this stage is designed as follows: 1) create a flowchart of learning materials, 2) create a database, 3) the original interface of learning materials, the design is simplified so that students do not get confused when viewing the learning materials set has been built. When designing the learning material in this study, the researcher worked through the materials following the steps the design would follow, namely 1) create a menu page on this menu page that has several options for students or teachers who want to use the material. media with the exit button, basic skills, document on straight line equations, application of straight line equations and MYSQL database connection exercises, 2) the basic skills page on this page contains basic skills that students will gain after learning how to use the media, 3) documentation pages for themselves the documentation pages have material content on line equations from solutions, formulas, steps and sample practice questions, 4) the application page of the application site itself, the researcher creates something that has never existed, namely creating a straight-line equation that will automatically allow the student to understand the steps of the method. existing line equation by entering x, y and constant values, students will understand the steps of straight line equation value, 5) registration page of this site can only be used by teachers with login have an account already registered in the database to import student data into the database so that students can access question pages where student assignment data will be automatically imported into the database, 6) Student login page so students can access question pages so that student data is neatly organized in the created database, 7) Page the review contains questions and answers made up of a drop-down list where an answer can be selected including A, B, C and D while the answer button to answer the result has been selected from the drop-down list Answered data will be automatically entered into the database. data of students who are logged in, 7) finally, there is a score review page on this page that will show the results of the answers that have been answered for each question.

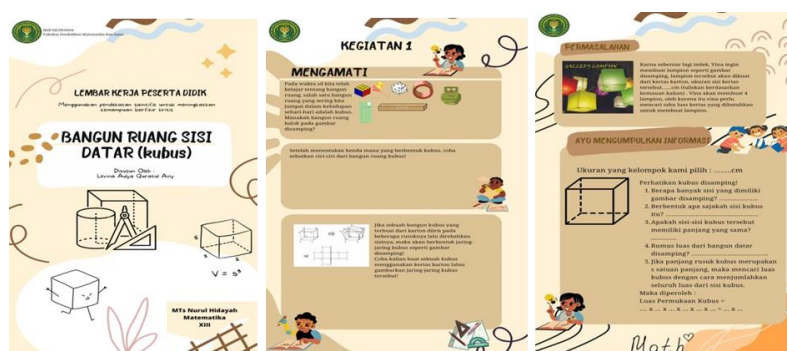


Figure 2. Canva Learning Media Design

After the creation of learning materials using the Canva app is completed and before the learning materials are made on a small scale, media professionals, materials specialists, and middle school math teachers will conduct evaluate or validate the feasibility of learning materials as a reference for making improvements. This process is useful before the product is presented to students during the field testing phase. Evaluation is conducted with media professionals to determine the feasibility of Canva-powered learning media. Aspects assessed include form, content and benefits.

Develop

The development of a 4D model is limited to step 3 (Define, Design, Develop) which includes activities for performing product design, in this case learning material. The production phase of this study involves creating and modifying learning materials. At the design stage, diagrams are created and produced as ready-to-use learning materials development products according to the learning material development goals. The evaluation results of the media experts are shown in Table 2, namely

Table 2. Media Expert's small-scale trial efficacy results

No	Criteria	Questions	Percentage
1	Useful	1,2,3,4	83%
2	Convenient	5,6,7,8,9	83%
3	Help	10,11,12	76%
4	Interesting	13,14,15	85%
AVERAGE			84%
SOLUTION			Very practical

The mean of the ratio is 84% to "very likely" with different ratios for each criterion, namely 83% for Convenience, 83% for Convenience, 76% for Convenience criteria. Supporting criteria, attractiveness criteria 85%.In addition, the Document Specialist also conducts an evaluation to determine the feasibility of the LKPD program documentation using the Canva app. The media evaluation results are shown in Table 3, including:

Table 3. Efficacy results of small-scale trials

No	Tasks Assessed	Validator			Persentase
		1	2	3	
1	LKPD equipment	4	5	4	87%
2	Writing format	6	8	8	73%
3	Content quality	20	20	20	80%
4	Concept truth	12	14	12	84%
5	Language	12	15	15	93%
6	Scientific	18	14	18	67%
7	Appearance	14	15	15	73%
8	use of letters and punctuation	11	12	15	84%
AVERAGE				80%	
Criteria				Valid	

The percentage value obtained by material experts is 80% in the "valid".

Table 4. Media Expert's large-scale test validation results

No	Criteria	Questions	Percentage
1	Useful	1,2,3,4	85%
2	Convenient	5,6,7,8,9	86%
3	Help	10,11,12	86%
4	Interesting	13,14,15	85%
AVERAGE			86%
SOLUTION			Very practical

The average value of the ratio is 86% for “very practical” with different ratios for each criterion, namely 85% for Convenience, 86% for Convenience, 86% for Convenience criteria. Supporting criteria, attractive criteria 86%.

Table 5. Material Expert comprehensive test validity results

No	Tasks Assessed	Validator			Persentase
		1	2	3	
1	LKPD equipment	5	5	4	93%
2	Writing format	10	10	8	93%
3	Content quality	22	23	20	87%
4	Concept truth	13	14	15	93%
5	Language	14	15	15	98%
6	Scientific	25	22	20	89%
7	Appearance	18	20	15	88%
8	use of letters and punctuation	15	15	15	100%
AVERAGE				93%	
Criteria				Very Valid	

The mean percentage value of the large-scale trial results was 93% with the criterion “very valid”.

Table 6. Student response results in large-scale trials

No	Respondent	Total	Maximum Scoring	Percentage %
1	S-1	63	75	84%
2	S-2	66	75	88%
3	S-3	65	75	87%
4	S-4	62	75	83%
5	S-5	66	75	88%
6	S-6	64	75	85%
7	S-7	66	75	88%
8	S-8	66	75	88%
9	S-9	62	75	83%
10	S-10	64	75	85%
11	S-11	64	75	85%
12	S-12	65	75	87%
13	S-13	63	75	84%
14	S-14	64	75	85%

15	S-15	65	75	87%
16	S-16	63	75	84%
17	S-17	63	75	84%
18	S-18	64	75	85%
19	S-19	60	75	80%
20	S-20	65	75	87%
21	S-21	66	75	88%
22	S-22	66	75	88%
23	S-23	64	75	85%
24	S-24	63	75	84%
25	S-23	63	75	84%
26	S-24	61	75	81%
27	S-25	54	75	72%
28	S-26	55	75	73%

Based on the results of the questionnaire given to the students, the result was that the developed educational material had an rating of 87% in the "Very Practical" category.

Table 7. Summary of efficacy of small-scale and large-scale trials

No	Trial Stage	Percentage Result	Interpretation
1	Limited trial	84%	Very practical
2	Wide trials	86%	Very practical

The average rate was 84% for “very likely” with different ratios for each criterion, namely 83% for convenience, 83% for convenience, 76% for convenience criterion. Supporting Criteria, Attractive Criteria 85%. In addition, the Document Specialist also conducts an assessment to determine the feasibility of documenting the LKPD program using the Canva app. The media evaluation results are shown in Table 3, including:

Discussions

The following is a comparison of my research with another study entitled "STUDENT WORK SHEET DEVELOPMENT USING A SCIENTIFIC APPROACH TO SEEING CRITICAL THINKING OF STUDENTS MATERIALS COMPARISON" by Dian Fitriana. The first is that the subject matter developed is in accordance with KI and KD in the 2013 Curriculum that differ only in the material. The second is that the constructs used are in accordance with the scientific approach and indicators of critical thinking, what is different is the indicators, the indicators of critical thinking that I use are according to Ennis. The third one both uses good mathematical language sentences and does not cause double interpretations or misunderstandings. The fourth student worksheet stated the subject matter practically illustrated based on test results. Finally, this research also produced teaching materials in the form of worksheets, while my research produced teaching materials in the form of worksheets on the Canva application.

Education is the most important thing in every country, if countries want to progress, education must be a top priority. Indonesian education still faces a number of problems every year. To support the quality of education in this country, educational supporting factors must be taken into account such as the teaching staff, curriculum and methods used, other factors such as learning materials must also be taken into account. take into account. Using learning materials can focus students' attention on lifelong learning. Students can use learning media because with the help of learning media, students can prevent students from getting bored in class to make class interesting. Learning math is learning with more formulas than other

subjects, so it is more effective to use interesting learning materials. The product developed in this study is a learning aid in the form of a desktop application containing flat side building materials. The creation of this app powered by the Canva app was done with all the help of materials experts and learning media specialists who have gone through many innovative developments by displaying more pictures with clear, concise explanations and attractive colors.

This study is one of the studies aimed at developing learning materials. The production process of learning materials begins with the selection of a material concept, then innovating the product before testing the product, communication experts, material experts verify the conformity of the product with standards respective criteria. Products are checked by media and documentary experts, and then checked for omissions or errors in the production of learning materials. The next step after the appraiser gives a feasible value above 80% proving that the correct school supplies are for 8th graders on flat geometric material.

Teaching materials are learning tools systematically organized, which can be in the form of written or unwritten teaching materials, which help students and teachers in learning activities. Educational material consisting of a set of learning aids or tools containing learning materials, methods, and assessment methods that are systematically and engagingly designed to achieve a desired goal (Puspandari et al., 2019). On the basis of this opinion, it can be concluded that teaching materials are learning materials designed by teachers to help students carry out the learning process in class so that students can understand the content of the material Study document by the students.

One of the problems that students find difficult is the problem of shapes with flat sides. According to Siti (Hasibuan, 2018), the difficulty that students face when learning plane math is that they struggle to understand how to determine the area of cubes, cuboids, pyramids, and prisms. Students also sometimes have difficulty solving questions that emphasize the concept of memorization, using formulas without knowing the source of the formula leads students to put the basic concept aside and prioritize learning outcomes. practice. favorable. by memory formula. Although the most important thing for students to understand is the basic concept of matter in flat space. Considering the characteristics of the material and the characteristics of the students, the appropriate learning approach is the scientific approach.

Technology is an effective and efficient tool that can be used to develop learning materials. As a result, teachers are now encouraged to develop and use technology-based learning materials. With the hope that these learning materials can improve students' interest in learning and math ability. To increase creativity in creating educational materials, one of them used the application Canva (Wijaya et al., 2020). Based on the given problems, the researchers tried to do something innovative using the Canva app following the scientific learning model, which is an alternative for researchers. study so that students do not feel bored when participating in learning. In this study, the researchers developed a teaching material in the form of a spreadsheet for students (LKPD) supported by the Canva app using a scientific approach because it incorporates participatory active students in the learning process to hone important skills. .

CONCLUSION

Based on the results of the research that has been done and considering the existing problem formulation, the following conclusions can be drawn: The development of teaching aids using Canva's science-based approach to plane geometric materials was within very realistic and feasible criteria. Student responses to instructional materials have met the criteria of being very effective based on student learning outcomes, which means that instructional materials are developed that are effective for grade-level students. VIII at the middle school level,

obstacles encountered in the development of educational materials using science supported by the Canva approach to flat space building materials include: 1) strong internet signal, 2) inadequate facilities and infrastructure, 3) ineffective classroom management.

Proposals for future scholars still require the development of educational materials that use technology to make the learning process more effective. In addition, it is hoped that the educational materials that have been developed will be able to see their effect on students' critical thinking skills.

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