

THE DEVELOPMENT OF PROBLEM BASED LEARNING CANVA-ASSISTED TEACHING MATERIALS TO IMPROVE MATHEMATICAL PROBLEM SOLVING ABILITY ON INTEGER

Qistina Fifiana¹, Martin Bernard², Anik Yuliani³

¹IKIP Siliwangi, Jl. Terusan Jendral Sudirman, Cimahi, Indonesia.

¹qistinafifi86@gmail.com

²IKIP Siliwangi, Jl. Terusan Jendral Sudirman, Cimahi, Indonesia.

bernard@ikipsiliwangi.ac.id

³IKIP Siliwangi, Jl. Terusan Jendral Sudirman, Cimahi, Indonesia.

anik_yuliani070886@yahoo.com

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ABSTRACT

This study aims to define the process of developing educational materials in the form of workbooks for students across the entire document using a Canva-supported problem-based learning approach to determine the feasibility of educational materials developed, determine the effectiveness of the educational materials developed, and identify limitations. encountered by researchers during development. instructional materials, collect data on teaching materials, learning objectives to be achieved, and media used by students to date. The study also asked for information on whether school facilities support the learning process. The type of research used is research and development (R&D) with a 4D development model (Define, Design, Develop, Dissemination). The selected study site was MT Nurul Hidayah Batujajar. Due to the evolution of the educational material, especially in limited testing, the correct result is 89% with the most likely internal material is 83% with the interpretations very realistic and in extensive testing the confirmatory result is 91% with most likely interpretations, the actual result of the teaching material 86% with very realistic interpretations. The results of this study show that the process of developing teaching aids is well conducted. This study can be used as a reference for further studies as this study meets the very feasibility criteria.

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Corresponding Author:

Qistina Fifiana,
Department of Mathematics Education,
Institut Keguruan dan Ilmu Pendidikan Siliwangi,
Jl. Terusan Jend. Sudirman, Cimahi, Indonesia
Email: qistinafifi86@gmail.com

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INTRODUCTION

According to Marwah et al. (2018) Education is very important for people in all aspects of life, that means education has a great influence on human existence by establishing good interactions with each other to meet needs. This is consistent with what has been revealed by Hasmori, Sarju, Norohan, Hamzah & Saud (2011), education is the process of forming human potential so that this potential can realize certain abilities. to ensure a balanced and normal human life. The function of education in general is to help students interact with different environments, especially with different educational resources available, in order to achieve optimal educational goals, for optimal education in family. One of the factors affecting the quality of learning in schools is the availability of learning resources. It is hoped that teachers, as learners, can develop innovative teaching materials as learning resources. Achieving quality learning requires instructional materials, such as instructional materials that teachers will use as guidelines when delivering instructional materials.

Teaching aids are one of the supporting devices that play an important role in helping teachers carry out the teaching and learning process in the classroom. This is consistent with what Eliza (2013) said that instructional material is a systematic set of materials, written and unwritten, in a way that creates an environment or atmosphere that allows students to learn. practice. In addition, Chomsin and Jasmadi (Puspandari et al., 2019) state that the guide includes a set of learning aids containing specially designed systematic learning materials, ways and methods interesting, systematic and systematic to achieve desired goals. The goals mentioned in the educational materials include the acquisition of skills or sub-skills. Based on this opinion, teaching materials can be a guide for teachers in providing materials so that learning can be communicated systematically and effectively. learning materials are made specific, systematic, systematic, systematic and interesting methods and means to achieve the desired goal. Targeted goals in educational materials include the acquisition of skills or sub-skills. Based on this opinion, teaching materials can be a guide for teachers in providing materials so that learning can be communicated systematically and effectively.

According to Nike (2019), one of the main problems of education is related to the quality of education. Quality education can be achieved if educators can improve the curriculum, for example, by providing materials on learning methods and how to engage students in learning and behavior. assessed according to the PAP (Basic Reference Assessment) guidelines. In addition, the world of education still has problems, one of which is the use of teaching materials, but due to the limited number of teaching materials used by teachers, the quality of learning may be limited. regime. Therefore, teaching aids are necessary. interesting and can be used to help students in the learning process and not complicate students in the learning process.

Student sheet (LKPD) is one of the teaching aids used in some schools Student worksheets (LKPD) is one of the teaching aids used in some schools. However, the LKPD used was not produced by the school itself. This forces teachers to study the LKPD and adapt it to the subjects being taught. The LKPD comes in the form of a pamphlet with less material and more practical questions, less color and less fun, and less variety of questions. Therefore, teaching aids play an important role in the teaching and learning process. Based on this, the educational material developed in this study is LKPD.

According to O'Connel (2007), math is one of the materials that is considered difficult for students because most students consider math to be a process of memorizing facts and the process of entering numbers into formulas. One of the math learning materials that is considered difficult to do manually is integers. According to Drajat and Ismadi (Amaliyah, et al. 2022), an integer is a set of numbers with positive, zero and negative values. In addition,

according to Glover (2006), integers have other words, namely integers that mean numbers with positive, negative and zero values. The number 0 is neither positive nor negative. From there, it can be seen that learning mathematics According to Bruner (Hudoyo, 1990: 48) learn mathematical concepts and structures contained in the material being studied, as well as look for relationships between concepts and structures. There are many mathematical abilities that can be developed in students, including problem solving. Problem solving ability is one of the abilities that students have. It is very important that every student has the ability to solve problems because (a) problem solving is a common goal of mathematics education, (b) problem solving includes methods, procedures and Strategy is the central and primary process of mathematics curricula, and (c) problem solving is the basis of competence in learning mathematics (Branca, 1980).

Looking at the characteristics of the material and the characteristics of the students, the right approach to use in this learning is the problem-based learning approach. According to Suyadi (2013:14) problem-based learning is a plan or model used as a guide to planning learning. Furthermore, according to Ratumanan, (Trianto 2009:92) Problem-based learning is an effective method for teaching higher-order thinking processes. This learning helps students process the information available to them and synthesize knowledge about the social world and its environment.

Technology has been used in the development of learning from primary to upper secondary technology has been used, consistent with Rahmasari, et al (2021:166) Canva is a free design platform that can easily help users create designs with professional results. To increase creativity in creating teaching materials, one solution is to use the Canva application (Wijaya et al., 2020). Furthermore, according to Andri (2017), who argues that technology plays an important role in improving the quality of education. In terms of design, one of them is to create educational materials (LKPD) with animation features to make educational materials more interesting.

What teachers need to do develop students' positive attitudes, namely to make learning interesting, to give the right tasks student performance and student motivation also understand the meaning of math Its daily use related to problem solving (Permatasari, 2018).

Starting from the problem context, researchers are trying to do something innovative using the Canva app using a problem-based learning model. This is an alternative that the researchers come up with so that students do not get bored when participating in learning. In this study, researchers developed a Student Worksheet (LKPD) powered by Canva using a holistic problem-based learning approach.

METHOD

This study was conducted at MTs Nurul Hidayah located in Sukamaju Block, Kec. Batujajar (West Bandung government). Subjects used in the study are 2 students of grade VII with a total of 36 students, the research period is 3 days, from May 25 to May 29, 2023. The type of research used is research and development (R&D) with 4D development. Models (Define, Design, Develop, Deliver)

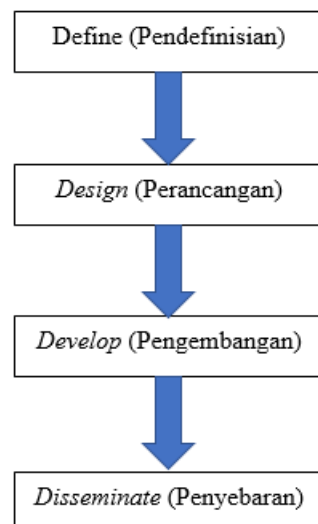


Figure 1. Source 4D development model (Thiagarajan 1974)

The interview process precedes research into Canva-supported educational materials. It aims to collect data related to the subjects taught, the learning objectives to be achieved, and the material that the students have used so far. The study also questioned whether school facilities support the learning process. The contact person for this interview was a representative of the school's math teacher, MTS Nurul Hidayah Batujajar. Expert test, study result test and textbook result for expert use. Validators are Math Education Program Instructor, FPMS IKIP SILIWANGI and MTS Math Teacher Nurul Hidayah Batujajar.

Quiz method is a tool to measure and evaluate students' feedback after studying with LKPD provided by Canva. The tools of the multiple-choice approach include the readability of the communication material, the student's interest and enthusiasm for the use of the instructional materials, the repetition of learning, and the motivation level of the students. students after using the learning materials.

Data processing procedure All data in this study were collected using Microsoft Excel software as follows:

1) Descriptive statistics to describe the stages of the development process and the difficulties of the development process, 2) Inferential statistics to see the feasibility of product performance. Perform analytical processing of the data that will then be used to form research results. The results of this analysis are answers to existing problems. This data processing in-depth analysis is the result of expert validation of the educational literature review tool. Analyze the results of data validation from a group of experts using the Likert scale. The percentage of valid results is calculated according to the following equation:

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

Keterangan :

P : Search rate

$\sum x$: Total response points from respondents in general

$\sum x1$: Total Maximum Score

100% : Konstanta

Tolak ukur yang digunakan untuk mempresentasikan skor hasil validasi

Tabel 1. Product Validation Criteria

Range	Criteria	Interpretation
81% - 100%	Very valid	Product can be used immediately without repair
61% - 80%	Qualified	product usable with minor improvements
41% - 60%	Satisfactory	product can be used with many improvements
21% - 40%	lumens Valid	product can be used with many improvements
0% - 20%	Very Unsuitable	Product Unusable

RESULTS AND DISCUSSION

Results

The results of this research are aimed at the development of all educational materials created with the Canva app. In addition to producing Canva-supported teaching materials, the researchers also wanted to see the feasibility of teaching materials used in the learning process. The results of R&D with 4D modeling limited to Stage 3 (Define, Design, Develop) are explained as follows, viz.

Define

The analysis performed in the 7th grade math program involving integers will be designed using the Canva app. After careful analysis, the document can be developed into a complete document, because the entire document must be interpreted with reason and understanding. Difficult to understand the steps in the learning material structure Students will better understand the steps to generate integers. This text should be easy to understand for students.

The analysis of students' personality is done through interviews with class VII tutors. By conducting interviews with Grade VII MTS teachers Nurul Hidayah, especially Ms. Nicky Mayasari, S.Pd. and interviewed some seventh graders, two people named Rama and Sirod to be exact. The results of the interviews explain that instructional materials should be used to support student communication in the classroom. Methods used by teachers in learning mathematics are discussion, question and answer, group work, and visual learning to help teachers explain material to students. But students today are content with technology. Because students love technology like computers and mobile phones, students themselves are also very curious. With the learning materials provided by Canva, students will enjoy learning and not get bored with the learning materials provided. The opinion of teachers about teaching materials supported by Canva is quite good, as it can facilitate the teaching and learning process of teachers and can increase student motivation. The learning process is still very weak, because the student's ability to absorb is different from other students.

Analyze the needs of students with different personalities and abilities. To achieve educational goals, teachers must pay attention to the needs of students' personality development. Teachers are not the only dominant actors in controlling classroom learning, because each student has learning sensitivities, curiosity, expression of views, and needs. The abilities that these students possess and their sensitivity to learning require learning materials. Through observation when studying at MTs Nurul Hidayah Batujajar, it can be seen that in the learning process, teachers do not use teaching materials.

Design

Analyze the needs of students with different personalities and abilities. To achieve educational goals, teachers must pay attention to the needs of students' personality

development. Teachers are not the only dominant actors in controlling classroom learning, because each student has learning sensitivities, curiosity, expression of views, and needs. This student's ability is design. The design at this stage is carried out as follows: educational products, student boards, all devices are provided in the following order: (1) cover page with login information, learning topics, and engaging illustrations (2) learning objectives, core skills, and study guides to help students complete the LKPD because it uses the problem-based learning and hence problem-based learning steps, namely: (1) Orienting students to solve problems, (2) Organizing learning for students, (3) Orienting individual or group learning, (4) Developing and presenting exercises, (5) Analyze and evaluate the problem solving process. Its sensitivity to learning requires learning materials. Through observation when studying at MTs Nurul Hidayah Batujajar, it can be seen that in the learning process, teachers do not use teaching materials.



https://www.canva.com/design/DAFW2pgfIKI/V-6hTxMTh9cGJTKEY1vLFA/edit?utm_content=DAFW2pgfIKI&utm

Once the development of the LKPD teaching materials is completed using the Canva app and before the instructional materials are limited, the media specialists, materials specialists, and middle school or TM math teachers will proceed. assess or confirm eligibility during the probationary period. document as a reference for making improvements. This process is useful before the product is presented to students during the field testing phase. Evaluation was conducted with media professionals to determine the feasibility of LKPD teaching materials using Canva. Aspects assessed include form, content and benefits.

Develop

The development of 4D models is limited to step 3 (Define, Design, Develop) containing product design manufacturing activities, in this case educational material. These stages of conducting research involve creating and modifying educational materials. At the design stage, the cover is produced and manufactured as a product for the development of ready-made educational materials suitable for the production of educational materials. The evaluation results of the media experts are presented in Table 2, specifically:

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

No	Criteria	Questions	Percentage
1	Useful	1,2,3,4	86%
2	Convenient	5,6,7,8,9	83%
3	Help	10,11,12	79%
4	Interesting	13,14,15,16,17,18	82%
Average			83%
Solution			Very practical

The average value of the rate is 83% at “very likely” with different ratios for each criterion, namely 86% for the Convenience criterion, 83% for the Convenience criterion, 79% for the Convenience criterion. criteria of Support, 82% of criteria of attractiveness. In addition, materials specialists also perform assessments to determine the feasibility of LKPD program materials 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		
		1	2	3
1	Document	16	19	19
2	Overview Of Teaching Materials	26	31	34
3	Language Options	15	20	20
Percentage		76%	93%	97%
Average		89%		
Criteria		Very Eligible		

The mean percentage value of the large-scale trial results was 89% with the criterion “very viable”. The result of the #1 validator's small scale test is 76% with the "fair" criterion, by the second validator, namely 93% with the "very viable" criterion, by the validator third, MTs Professor of Mathematics Nurul Hidayah , namely 97% with the criterion of “very feasible”.

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

No	Criteria	Questions	Percentage
1	Useful	1,2,3,4	89%
2	Convenient	5,6,7,8,9	87%
3	Help	10,11,12	86%
4	Interesting	13,14,15,16,17,18	82%
Average			86%
Solution			Very Practical

The average value of the rate is 86% at “very possible” with different ratios for each criterion, namely 89% for the Convenience criterion, 87% for the Convenience criterion, 86% for the Convenience criterion. criteria of Support, 82% of criteria of attractiveness.

Table 5. Material Expert comprehensive test validity results

No	Tasks Assessed	Validator		
		1	2	3
1	Document	16	19	19
2	Overview Of Teaching Materials	29	31	34
3	Language Options	16	20	20
Persentase		81%	93%	97%
Average		91%		
Criteria		Very Eligible		

The mean percentage value of the large-scale trial results was 91% with the criterion “very viable”. The result of the 1st validator's small scale test was 81 with the criterion "very

viable", by the second validator i.e. 93 with the "very viable" criterion, by the MTs math professor Nurul Hidayah of third validator is 97 with "workable" criteria.

Table 6. Student response results in large-scale trials

No	Respondent	Total	Max Score	Percentage %	Average
1	S-1	74	90	82%	86%
2	S-2	80	90	89%	
3	S-3	78	90	87%	
4	S-4	74	90	82%	
5	S-5	78	90	87%	
6	S-6	76	90	84%	
7	S-7	75	90	83%	
8	S-8	77	90	86%	
9	S-9	75	90	83%	
10	S-10	77	90	86%	
11	S-11	77	90	86%	
12	S-12	79	90	88%	
13	S-13	77	90	86%	
14	S-14	76	90	84%	
15	S-15	81	90	90%	
16	S-16	77	90	86%	
17	S-17	76	90	84%	
18	S-18	79	90	88%	
19	S-19	77	90	86%	
20	S-20	80	90	89%	
21	S-21	79	90	88%	
22	S-22	79	90	88%	
23	S-23	76	90	84%	
24	S-24	78	90	87%	
25	S-25	77	90	86%	
26	S-26	78	90	87%	

Based on the results of the questionnaire given to the students, the result was that the developed educational material had an rating of 86% in the "Very Practical" category.

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

No	Trial	Percentage	Interpretation
1	Limited Trials	83%	Very Practical
2	Wide Trials	86%	Very Practical

As a result, the mean response value in the small-scale trials was 83% including the "very practical" category, while the mean response value in the larger trials was 86% including the "very practical" category, so response rates for both small and large trials were as high as 83–86% with a 3% increase in validation value.

Discussions

Education is the process of developing human potential, which is necessary for this potential to realize certain abilities in order to ensure a balanced and normal human life. In addition to developing the inherent potential of the individual. Indonesian education still faces a number of problems every year. To support the quality of education in this country, educational support factors such as teaching staff, curriculum and methods of use must be considered, other factors such as learning materials must also be taken into account. arrive. The use of didactic materials can draw students' attention to lifelong learning. Students can use educational materials, because with the help of educational materials, students can prevent students from getting bored in class to make class fun. Learning math means learning with more formulas than other subjects, so it's more effective to use interesting material. The product developed in this study is an educational document in the form of an LKPD that contains all the materials. Canva application supports creating spreadsheets for students. This app was created with all input from media and materials experts who have gone through many innovative developments to show more images with clear explanations. The colors are clear, simple and attractive.

This research is part of research aimed at developing educational materials products. The production process of learning materials begins with the selection of material ideas, followed by product innovation, before the product is verified by media experts and material experts against the criteria of each product. . Products are reviewed by media experts and hardware experts, then checked for omissions or errors when creating learning materials. The next step after validators give 61% is to prove that the learning material is actually used by 8th graders in integer form.

According to Puspendari et al., (2019) suggests that teaching materials consist of a set of learning aids containing learning materials, methods, and assessment means that are systematically and interestingly designed to achieve desired goal. Furthermore, according to Eliza (2013), teaching material is a set of materials systematically arranged, written and non-written, in a way that creates an environment or atmosphere for students. allow students to learn.

According to Lasmiyati & Harta (2014) reported that his research results using validation tests, homogeneity tests, normality tests and univariate tests based on his findings, the results development has a positive effect on a student's academic success, so they are suitable for use in training. mathematics, so that it is suitable for use in math learning in schools that involve math students' interest in math from the first cycle of middle school.

Tambajong et al. (2021) showed that the application of topography in general has a positive effect on math learning. This is reflected in students' academic performance on previous tests, including increased scores on later tests. Siwi & Puspaningtyas (2020) states that after developing proven teaching materials and making improvements, as a result students can understand the material clearly and can explain it to other students. other students.

Canva app is an online app that provides various graphic designs like infographics, ppts, resumes, brochures, posters etc. (Cap & Faiza, 2019). The advantage of the Canva application according to Tanjung and Faiza (2019) is that it has a diverse and attractive design, which can increase the creativity of teachers and students in designing educational materials by providing many functions. , save time in teaching practice and design. does not necessarily attract students' creativity.

CONCLUSION

Based on the results of the research that has been done and considering the current problem solving approach, the following conclusions can be drawn: The process of developing teaching materials according to the teaching method of teaching math by solutions for students of grade 8 of lower secondary school is included in the criteria of teaching materials for students in period 1 and cycle 8 and included in the criteria. financial criteria for teaching materials. The developed spreadsheet form is very functional and practical. In eighth grade, challenges encountered when developing Canva-based educational tools include: 1) limited tools to view teaching materials, 2) Canva app is difficult to use, 3) poor classroom management.

The recommendation for future researchers is to develop teaching materials that use technology to make the learning process more effective. In addition, it is expected that the teaching materials developed will affect the mathematical abilities of the students.

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