

Development of an E-Pocketbook to Develop Critical Thinking Skills and Problem-Solving Ability

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ABSTRACT

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Learning by utilizing technology-based media that is easy to use and attractive to students is necessary in this era. However, technology in school learning still uses static PowerPoint media, which is less attractive to students. Therefore, it is necessary to develop e-pocketbook media as an alternative learning media that is interesting and easy for students. This study aims to: (1) Describe the validity of developing E-Pocketbook media to develop critical thinking skills and problem-solving abilities; (2) Describe the effectiveness of developing E-Pocketbook media to develop critical thinking skills and problem-solving abilities; and (3) Describe the practicality of the development of E-Pocketbook media to develop critical thinking skills and problem-solving abilities. The research was conducted at SMPN 1 Batu with 22 class VIII students as subjects. The characteristics of critical thinking skills and problem-solving abilities are classified as low because the learning media is less supportive. This research is a type of development research (Research and Development) using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The approach used is a qualitative descriptive method approach. The results of this study are that e-pocketbooks get a validity value that fulfills the 'valid' category, namely 79.77.91% for media, the value of effectiveness that meets the 'effective' category according to the n-gain test is 0.87 for critical thinking skills, and 0.84 for problem-solving, the value of practicality that fulfills the 'practical' category is 87.22%.



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A. INTRODUCTION

Critical thinking is an activity that can help students to solve problems, make decisions, and find answers to a problem (Wang, 2020). Another opinion states that critical thinking is the ability to think at a high level which aims to examine phenomena to determine hypotheses and conclusions that can be certified for their truth (Perdana et al., 2017). Students who think critically can think clearly to analyze and evaluate ideas based on available facts (Kamarulzaman, 2015). According to Facione Cruz et al. (2020) that there are five stages of critical thinking skills, including (1) Interpretation, students can understand what is known and ask about the problem correctly; (2) Analysis, students can determine the right method to solve a problem in the problem; (3) Evaluation, students can conclude systematically from the problems given in the questions; (4) Inference, students can conclude systematically from the problems given in the questions; and (5) Explanation, students can write down the final results of problem-solving by giving reasons for the conclusions drawn.

Problem-solving is solving problems using previously learned knowledge to find the right solution (Rott et al., 2021). In addition, problem-solving is a way that can encourage students to find solutions to solve a problem to achieve learning goals (Changwong et al., 2018). Problem-solving abilities can help students improve critical thinking skills in everyday life in analyzing concepts to make the right decisions (Öztürk et al., 2020). The stages of problem-solving ability, according to Pratikno & Retnowati (2018) used, include: (1) Understanding the problem, where students can understand what is known and ask about the problem in the problem; (2) Devising a plan, where students can identify appropriate problem-solving strategies to solve problems in the problem; (3) Carrying out the plan, where students can solve problems by what has been planned; and (4) Looking back, where students can check whether the results obtained are by the provisions.

The 2015 Trends International Mathematics and Science Study (TIMSS) survey shows that the results of studies released have increased the average score but have yet to reach the international standard average of 500. The 2011 TIMSS results show that Indonesia has achieved an average score of 386, while the TIMSS results 2015 showed that Indonesia experienced an increase in average score, reaching 397. These results ranked Indonesia 46th out of 51 countries (Kong-chn, 2021). This shows that, compared to other countries, critical thinking and problem-solving abilities still need improvement.

The Program for International Student Assessment (PISA) survey was tasked with measuring the ability of 15-year-old children to read literacy in mathematics and science. In 2018, the results of a study released by the OECD showed that the ability of Indonesian students was still below the average score determined by the OECD team. The average math score obtained by Indonesia reached 379, while the average score determined by the OECD was 487. These results ranked Indonesia 72nd out of 79 countries (Hewi & Shaleh, 2020).

From the results of the TIMSS survey and PISA survey, the critical thinking skills and problem-solving abilities of Indonesian students are still relatively low (Benyamin et al., 2021). This is due to the still weak ability of Indonesian students to solve non-routine questions related to proof, reasoning, and determining relationships related to the facts given (Srinawati et al., 2021). One of the causes of low critical thinking skills and problem-solving abilities in mathematics is the attitude of students who think mathematics has too many formulas to be understood and memorized (Mazana et al., 2018). In addition, the media used by the teacher is PowerPoint, which only displays writing, which makes it difficult for students to understand mathematical concepts (Prasetio, 2022). In connection with this incident, teachers must find alternative and innovative ways to improve students' mathematical abilities during the learning process. One of them is the development of the media used. In the learning process, the role of the media is significant for teachers and students (Gamage et al., 2019).

Learning media is a tool arranged systematically, written or unwritten, used by teachers and students to achieve predetermined learning objectives (Lin et al., 2017). The development of science in education has entered a new digital era, as teaching and learning activities are inseparable from using digital technology such as smartphones (Kustyarini et al., 2020). One of the digital technologies that can help students learn in class is the e-pocketbook. E-Pocketbook is a digital book that has several features to help students during the learning process (Afrianti

et al., 2021). Flipbook is an animation effect learning media for a series of materials in a digital electronic book that can be flipped around like the original book (Prasetyono & Hariyono, 2020).

Some of the previous development research that has been developed is a pocket book in PDF format which is recorded and developed with the appypie website by Anita et al. (2021), an interactive android-based digital pocketbook developed with Adobe Flash Professional CS6 has a button that connects each page. There is a solution to the questions in practice questions if there is a wrong answer Tambunan & Sundari (2020), and pocketbooks which consist of text, pictures, and animations and have buttons that will connect one page to another (Princess et al., 2020). In addition, the math pocketbook needs to provide a detailed discussion of problem solutions, causing students to find it challenging to understand how to solve a math problem. From this statement, developing the material taught in learning media is necessary (Hafizhasando et al., 2021).

The math e-pocketbook plan produced in the research has a book-shaped design with a flipbook animation effect on the book pages. This e-pocketbook media can be accessed via smartphones, iPads, and laptops connected to the internet. In addition, various forms of multimedia support for learning are added, such as pictures, videos, and student worksheets. This mathematics e-pocketbook is a template containing material, discussion, practice questions, and answer keys, which can be used as a source of independent learning individually and in groups.

This research focuses on developing flipbook animation-based math e-pocketbooks on the material of a system of two-variable linear equations. This study aims to: (1) Describe the validity of developing E-Pocketbook media to develop critical thinking skills and problem-solving abilities; (2) Describe the effectiveness of developing E-Pocketbook media to develop critical thinking skills and problem-solving abilities; and (3) Describe the practicality of the development of E-Pocketbook media to develop critical thinking skills and problem-solving abilities.

B. METHODS

1. Types of research

This research is a type of development research (Research and Development) using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), because this development model has advantages in systematic work stages, each stage is evaluated and revised from the stages passed so that the resulting product becomes valid. Development research produces media that will be assessed in terms of validity, effectiveness, and practicality to determine the feasibility of using the resulting media (Widiana & Rosy, 2021). The approach and method used in this study is a qualitative descriptive method approach. The data is on developing E-Pocketbook learning media on critical thinking skills and students' problem-solving abilities in mathematics learning. This research will be carried out at SMPN 1 Batu with 22 class VIII students as subjects. At the same time, the material used in this study is SPLDV material. A summary of the ADDIE model steps is shown in Figure 1.

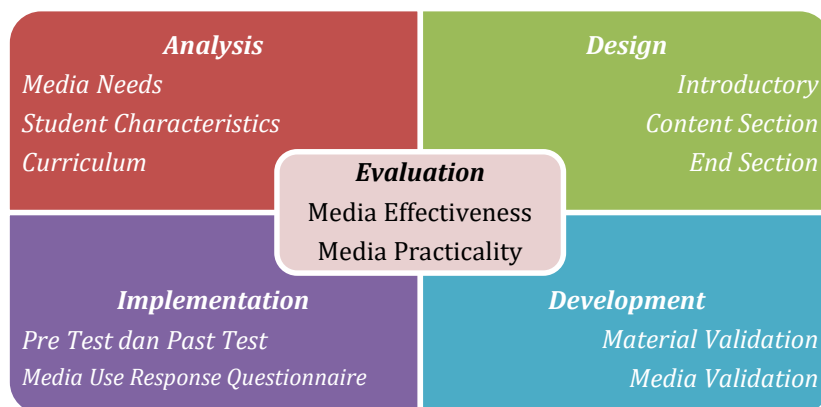


Figure 1. ADDIE Model Steps

As for a more detailed explanation of the steps, it is explained as follows: The analysis phase, three stages will be carried out: analysis of media needs, student characteristics, and curriculum analysis. Needs analysis aims to discover the multimedia students need when learning takes place. The characteristic analysis aims to determine student characteristics related to 21st-century learning. Meanwhile, curriculum analysis aims to determine core and essential competencies related to the school curriculum. The design phase, e-pocketbook media will be edited using the Canva Application and the Heyzine Web. The media display framework is divided into three parts, namely the introduction, content, and closing sections. When all sections have gone through the editing process in the Canva Application, the researcher then inputs videos and quizzes through the Heyzine Web. On Web Heyzine, researchers will provide Flipbook Animation effects on E-Pocketbooks.

The development stage, researchers produce e-pocketbook media. Before being implemented at SMPN 1 Batu, the media will be validated by material and media expert validators. This validation aims to determine the validity of the media and some criticisms and suggestions submitted by the validator to improve the media. The implementation stage, the media that has been validated will be applied to SMPN 1 Batu in two meetings. Before using the media, students are required to take a pre-test. Furthermore, students began to use the media to study the material and answer practice questions. After using the media, students are required to take a post-test. Finally, the evaluation stage. Researchers will analyze the data that has been obtained in the previous stage. Thus, researchers can conclude the media that has been developed.

2. Data collection

The data needed in this study are validity data, effectiveness data, and practicality data. Validity data was obtained from the material and media expert validator's assessment results, the validators who validate are a certified Mathematics Education Lecturer and a certified Mathematics Teacher. Effectiveness data in the form of data on critical thinking skills and problem-solving abilities were obtained from the pre-test and post-test results in the form of descriptive questions. Meanwhile, practicality data was obtained from the results of a response questionnaire to use the E-Pocketbook, which was given at the end of the meeting.

3. Research Instruments

The research instruments used in this study were material and media validation questionnaires, critical thinking and problem-solving test sheets, and response questionnaires to the use of e-pocketbook media.

- a. Material and media validation sheets are used to validate e-pocketbook media. For material validation, aspects that must be validated are content feasibility, language feasibility, presentation, and independent learning. For media validation, aspects must be validated: media engineering, learning design, and visual communication.
- b. The pre-test and post-test sheets are in the form of descriptive questions and contain indicators of critical thinking skills and problem-solving skills, as shown in Table 1.

Table 1. Pre-test and post-test

Pre-Test	Post-Test
1. The result of $3x+4y-10$ from the set of solutions $5x+2y=4$ and $2x+y=1$ is...	1. In the school cafeteria, 3 students want to buy snacks. Tania bought 2 bakwan and 1 soda for IDR 9,000.00. Egar bought 1 bakwan and 3 sodas for IDR 17,000.00. In the same canteen, Kurnia also bought 15 bakwan to take home. Kurnia pays using 2 notes of IDR 20,000.00. The refund Kania received was
2. The age difference between Bima and Rashid is 6 years. For the next 12 years, their ages will be 42. Their current age is	2. On the way home from work. 3 mothers want to buy food to eat at home. Anna's mother bought 2 sweet teas and 2 risoles for IDR 8,000.00. Mrs. Megan bought 4 sweet teas and 6 risoles for IDR 19,000.00. Meanwhile, Mrs. Lita bought 1 sweet tea and 1 risol. Mrs. Lita paid with a note of Rp. 10,000.00. The change that Ms. Lita received was ..

- c. The response questionnaire for e-pocketbooks was used to obtain practical data related to the use of e-pocketbooks. Aspects that must be met are software, learning, and visual communication.

4. Data analysis

The data analysis techniques used in this study are: For analysis of validity data and practicality, data will use the percentage formula with the achievement category as in Table 2.

$$P = \frac{\sum \text{Score in One Aspect}}{\sum \text{Score In One Question}} \times 100\% \tag{1}$$

Table 2. Media Validity and Practicality Table

No.	Percentage (%)	Category	
		validity	Practicality
1.	$75 < P \leq 100$	Valid	Practical
2.	$50 < P \leq 75$	Valid Enough	Pretty Practical
3.	$25 < P \leq 50$	Invalid	Less Practical
4.	$S \leq 25$	Invalid	Impractical

For data analysis, critical thinking and problem-solving abilities can be seen from the achievement of critical thinking and problem-solving indicators. Then, to find out the predicate of success related to critical thinking skills and problem-solving abilities, the data will be calculated using the n-gain formula. Data on critical thinking skills and problem-solving abilities will use the n-gain formula with the achievement categories, as shown in Table 3.

$$N - gain = \frac{Post\ Test - Pre\ Test}{100 - Pre\ Test} \quad (2)$$

Table 3. Table of Effectiveness of E-Pocketbook Media Based on N-gain

No.	Value Range	Category
1.	$0,70 < g \leq 1,00$	Tall
2.	$0,30 < g \leq 0,70$	Currently
3.	$0,00 < g \leq 0,30$	Low

(Nurlaili et al., 2021a)

C. RESULT AND DISCUSSION

1. Analysis

At this stage, there are three stages of analysis carried out to meet the needs needed in the development of learning media. The three stages are:

a. Needs Analysis

Based on a literature review conducted by researchers, when learning mathematics, students tend to prefer observing and listening to explanations of material being taught by the teacher because they are considered more active in receiving the information conveyed. In addition, the selection of learning media is also very influential because learning media helps students to understand the material being taught. The most influential media is audiovisual media because this media involves interaction with the auditory and visual senses to understand the material being taught. So, researchers added audiovisual media in the form of learning videos to meet the needs of e-pocketbook media.

b. Characteristics Analysis

Based on a literature review conducted by researchers related to the characteristics of students in 21st-century education who have learning and innovation skills related to critical thinking skills in a learning model. A learning model that combines face-to-face methods and digital media, so that the learning process in the 21st century must integrate information and communication technology (ICT) in learning effectively. In contrast to the learning process carried out at SMPN 1 Batu. According to student statements, the learning process at SMPN 1 Batu uses digital media other than PowerPoint. PowerPoint, which only displays writing, cannot help students receive information properly. So that during mathematics learning, many students feel bored and unenthusiastic because teachers tend to use monotonous learning media. Teachers also rarely give open problems, this causes critical thinking skills and students' problem-solving abilities to decrease. In addition, students also need help understanding the concept of SPLDV.

c. Curriculum Analysis

Based on a brief debriefing with the teacher regarding the curriculum used, SMPN 1 Batu still uses K13. In SPLDV material, K13 has essential competencies and indicators that support the development of critical thinking skills and problem-solving abilities in students. Such as solving everyday problems using mathematical models related to SPLDV, these problems can develop students' critical thinking skills and problem-solving abilities in everyday life.

Based on the needs analysis, the use of learning videos is needed by students to help students understand the material better. This is by previous research, which states that videos can help students in the learning process, understand concepts, as well as increase student learning motivation (Pamungkas & Koeswanti 2022; Fitriyana & Nursyahidah 2022; Dhaniawaty et al., 2021). Based on an analysis of student characteristics, junior high school students are currently more interested in digital-based learning media. This is in line with Ansari et al. (2022); Hayati et al. (2019), who stated that digital-based learning suits the characteristics of today's students. According by Rohmah (2022), added that it must be packaged attractively so students don't feel bored. Curriculum analysis shows that SPLDV material needs to be mastered well by students because it has wide applications in various fields and can help improve problem-solving skills. This is in line with Asri et al. (2023), who states that it is essential for students to master SPLDV material to develop problem-solving abilities.

2. Design

At this stage, the researcher created a display framework for the E-Pocketbook media, using the 'elements shape feature' found in the Canva application. Next, the media is immediately submitted using the Heyzine Web, connected directly to the Canva Application. The addition of flipbook effects is done via Web Heyzine, as shown in Fiigure 2.

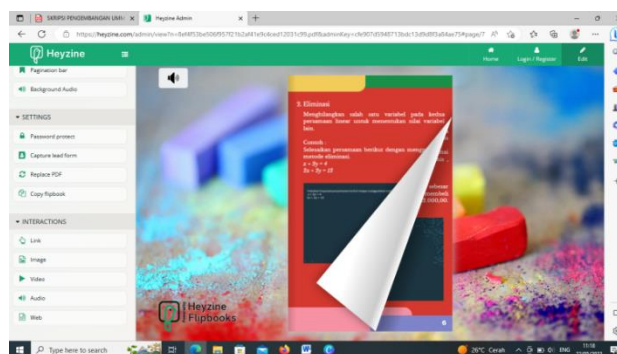


Figure 2. E-Pocketbook media editing process through the Heyzine web.

In the introductory section, there are four sub-menus, namely cover media that is displayed with a background and a combination of colors that support it, then a table of contents showing the layout of the page by the sub-chapters, then core competencies to determine learning activities that are developed through essential competencies, as well as basic competencies and

indicators, which can be used as a reference in assessing the achievement of learning outcomes, as shown in Figure 3.



Figure 3. Introductory section of E-Pocketbook media

In the content section, in addition to making media frameworks, researchers must also make learning videos needed in the media development process. Learning videos are made using ordinary videos made directly by researchers, these videos will later be uploaded on the heyzone page as learning material. So that in the content section, there is written material and material in the form of learning videos as examples of questions, as shown in Figure 4.

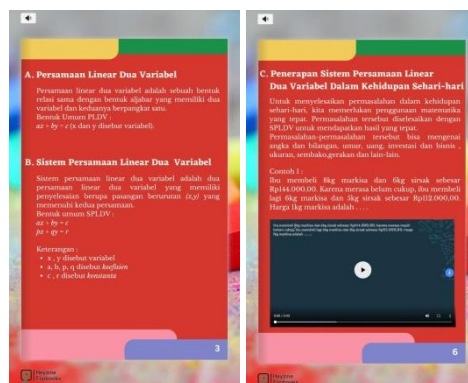


Figure 4. The Contents of the E-Pocketbook media

The closing section contains practice questions accompanied by answer keys and independent quizzes. In making independent quizzes, researchers use web quizizz, making it easier to make questions, as shown in Figure 5.

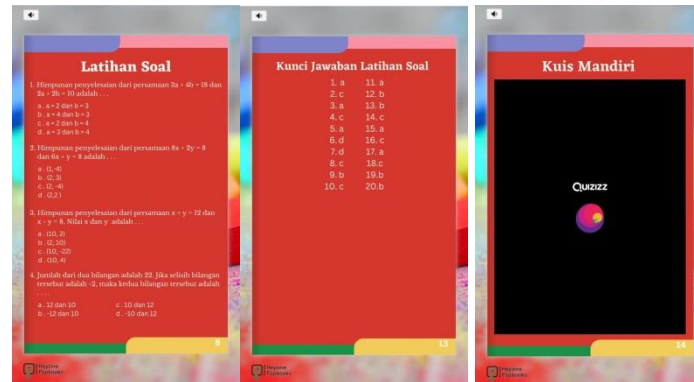


Figure 5. The Closing Section of the E-Pocketbook media

3. Development

a. Material Validation

Two material expert validators carry out material validation, including four aspects. The results of the material validation analysis are presented in Table 4.

Table 4. Material Validation Results

No.	Aspect	V1	V2	Total Score	Score Max	Percentage (%)	Category
1.	Content Eligibility	11	18	29	40	72.5	Valid Enough
2.	Language Eligibility	12	18	30	40	75	Valid Enough
3.	Presentation	14	20	34	40	85	Valid
4.	Learn to be independent	7	10	17	20	85	Valid
Total Average						79.37	Valid

Based on Table 4, shows that the total average is 79.37%. The percentage results show that the material meets the valid category. In addition, the results from the validator also indicate the need for a slight revision regarding these four aspects, especially in aspects with quite good categories.

b. Media Validation

Two media expert validators carried out media validation, including three aspects. The results of the material validation analysis are presented in Table 5.

Table 5. Media Validation Results

No.	Aspect	V1	V2	Total Score	Score Max	Percentage (%)	Category
1.	Media Engineering	10	18	28	40	70	Valid Enough
2.	Learning Design	21	38	59	80	73.75	Valid Enough
3.	Visual Communication	34	38	72	80	90	Valid
Total Average						77.91	Valid

Based on table 4 shows the total average is 77.91%. The percentage results show that the media meets the good category. In addition, the results from the validator also indicate the need for a slight revision regarding these three aspects, especially in aspects with quite valid categories. As for criticism and suggestions from the validator for the development of E-Pocketbook media before students use it. Furthermore, based on suggestions from the validator, add instructions for use in the E-Pocketbook media, justify inaccurate words, and include indicators on the basic competency page. The results are presented in Table 6.

Table 6. Revision of E-Pocketbook Media

Before Revision	After Revision
<p>Instructions for use are not written because the media is designed very simply so that students can understand and follow the flow of the media.</p>	 <p>Instructions for use are placed after the cover of the E-Pocketbook media.</p>
 <p>Essential competencies need to be more complete and by K13.</p>	 <p>Essential competencies and indicators are by K13.</p>
 <p>The words 'coefficient' and 'constant' have yet to be typed in italics.</p>	 <p>The words 'coefficient' and 'constant' have been typed in italics.</p>

Table 4 and Table 5 show the results of material and media validation. The material expert validation results were 79.37%, and the results of the media validation showed a score of 77.91%, with the 'valid' category. This shows that the e-pocketbook media developed to improve critical thinking and problem-solving abilities can be used for the trial phase. This is in line with research Arian Sah et al. (2019), which states that e-pocketbook media can be tested if it meets the valid categories in terms of material and media.

4. Implementation

A comparison of critical thinking indicators and problem-solving indicators is presented in Figure 6 and Figure 7.

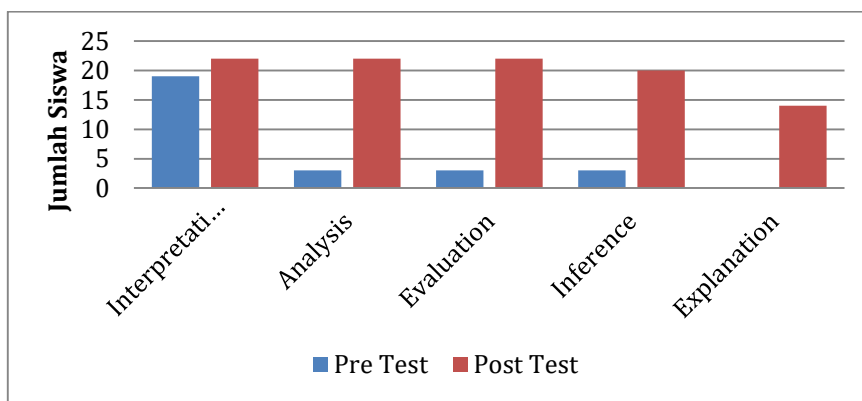


Figure 6. Comparison of Indicators of Achievement of Critical Thinking Pre-Test and Post Test

Based on Figure 6, more students fulfilled indicator 1 when carrying out the pre-test. Only a few students were able to fulfill Indicator 2 and Indicator 3. So the results of the pre-test related to the level of critical thinking skills are still relatively low. Meanwhile, during the implementation of the post-test, almost all students could fulfill the 5 indicators of critical thinking. So that, the post test results related to the level of critical thinking skills are already classified as high.

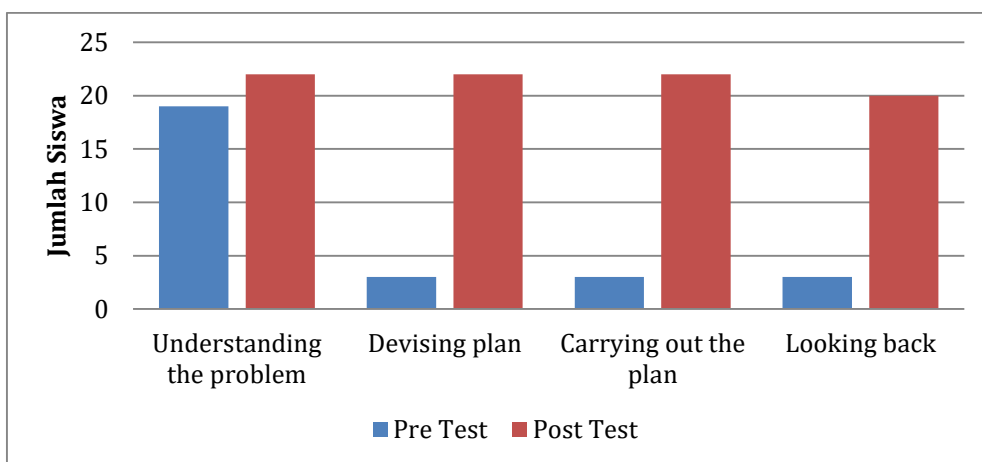


Figure 7. Comparison of Indicators of Achievement of Problem Solving Pre-Test and Post Test

Based on Figure 7, more students fulfilled indicator 1 when carrying out the pre-test. Only a few students were able to fulfill indicator 2 and indicator 3. So the pre-test results related to the level of problem-solving ability are still relatively low. Meanwhile, during the implementation of the post-test, almost all students could fulfill the 4 problem-solving indicators. So, the post-test results related to the problem-solving ability level are already classified as high.

The results of achievement indicators on students' critical thinking skills (Figure 6), indicating that the 'explanation' indicator is the lowest. Farida & Ferdiani (2021) shows that students with moderate and low critical thinking skills cannot fulfill several indicators, especially the 'explanation' indicator. It is the same with the results of the achievement of indicators on students' problem-solving skills (Figure 7), show that the indicator '*Looking back*' is the lowest indicator. This is Pramesti & Rini (2019) research, which states that students need help to check answers that have been written (looking back) when solving problems.

5. Evaluation

a. E-Pocketbook Media Effectiveness Test Results

The results of the effectiveness test of e-pocketbook media were obtained from the results of the pre-test and post-test of 22 students, the pre-test and post-test contained aspects of students' critical thinking skills. The pre-test and post-test scores were processed using the N-gain test to determine the effectiveness of e-pocketbook media. The results of testing the effectiveness of the media to support critical thinking skills are presented in Table 7.

Table 7. Critical Thinking N-Gain Test Results

Average Pre Test	Average Post Test	N-Gain	Information
25.45	90.90	0.87	Tall

Based on Table 7, shows that the N-gain test result is 0.87. These results have fulfilled the high category. The results of the achievement of each aspect of critical thinking skills based on the number of students who fulfilled the pre-test and post-test are presented in Table 8.

Table 8. Achievement of Each Aspect of Critical Thinking Skills

Aspects of Critical Thinking	The number of students		N-gain	Information
	Pre Test	Post-test		
Interpretation	19	22	1	Tall
Analysis	3	22	1	Tall
Evaluation	3	22	1	Tall
Inferences	3	20	0.89	Tall
Explanation	0	14	0.63	Currently
<i>Average</i>	5,6	20		

Based on Table 8, they are related to the achievement of each aspect of critical thinking skills. Shows that the highest N-gain test results are in aspects of interpretation, analysis, and evaluation with high criteria. Meanwhile, the lowest aspect is the explanation aspect. For the explanation aspect, the results of the N-gain test meet the medium category. The results of testing the effectiveness of the media to support problem-solving abilities are presented in Table 9.

Table 9. Troubleshooting N-Gain Test Results

Average Pre Test	Average Post Test	N-Gain	Information
28.40	88.63	0.84	Tall

Based on Table 9, shows that the N-gain test result is 0.84. These results have fulfilled the high category. The results of the achievement of each aspect of problem-solving abilities based on the number of students who fulfilled the pre-test and post-test are presented in Table 10.

Table 10. Achievement of Each Aspect of Problem-Solving Ability

Problem-Solving Aspect	The number of students		N-gain	Information
	Pre Test	Post-test		
Understanding the problem	19	22	1	Tall
Devising plan	3	22	1	Tall
Carrying out the plan	3	22	1	Tall
looking back	3	20	0.89	Tall
Average	7	21.5		

Table 10 shows the achievement of each aspect of problem-solving abilities. Shows the results of the N-gain test for all aspects that meet the high category. The results of the n-gain test showed an increase in students' critical thinking skills and problem-solving abilities after using the e-pocketbook. This is in line with Nurlaili et al. (2021b); Yulius et al. (2021), which state that the effectiveness of learning media can be seen in students' pre-tests and post-tests.

b. E-Pocketbook Media Practicality Test Results

The results of the e-pocketbook media test were obtained from the results of the response questionnaire for using e-pocketbook media from 22 students, the questionnaire contained aspects of the practicality test, namely software, learning, and visual communication. The value of the response questionnaire for using e-pocketbook media was processed using a percentage formula to determine the practicality of e-pocketbook media. The results of the practicality test of the media are presented in Table 11.

Table 11. E-Pocketbook Media Practicality Test Results

Aspect	Total Score	Score Max	Percentage (%)	Information
Software	552	660	83.63	Practical
Learning	685	770	88.96	Practical
Visual Communication	490	550	89.09	Practical
Average			87.22	Practical

Based on Table 11, regarding the practicality test of e-pocketbook media, the percentage results for each aspect meet the practical category. Thus, the media practicality test average was 87.22%, fulfilling the practical category. The results of the practicality test for e-pocketbook media show that the media meets the practical category in developing critical thinking skills and problem-solving abilities. This is in line with development research conducted by Asyhar et al. (2021), which states that media can be practical and can be measured by the positive response shown by students to learning media.

D. CONCLUSION AND SUGGESTIONS

Based on the research that has been done, using e-pocketbooks is very important in learning because there are supporting media that can improve problem-solving skills. E-pocketbook obtained a validity percentage value that fulfilled the valid category, namely 79.37% for material and 77.91% for media. E-pocketbook also gets an effectiveness score; this value fulfills the high sort based on the n-gain test, namely 0.87 for critical thinking skills and 0.84 for problem-solving abilities. E-pocketbook media is 'effective' in supporting students' necessary thinking skills and problem-solving. In addition, the e-pocketbook also gets a practicality percentage value, which fulfills the 'practical' category, which is 87.22%. Developing an e-pocketbook to develop critical thinking skills and problem-solving abilities is worthy of use. The e-Pocketbook developed can help students learn, is easy and interesting for students to use, and is by learning outcomes in SPLDV material.

Researchers can discover E-Pocketbook media's advantages and disadvantages when implementing it at SMPN 1 Batu. The need for more media is that the smoothness of video display still depends on the internet network. Meanwhile, the advantages of the media are that the media provides solutions to problems in the form of videos or clear and easy-to-understand material to solve SPLDV problems in everyday life, and the media can also be used on all electronic devices (smartphones, pads, laptops, etc.).

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