JURNAL ILMIAH PENDIDIKAN DASAR

Developing *kurikulum merdeka* textbooks to teaching critical thinking skills for elementary school students

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Keywords:	Abstract
textbooks; critical thinking; elementary school	*Students tend to use fewer thinking activities in learning. Consequently, learning is often dominated by conventional learning models. In addition, learning only uses available textbooks and causes students to be less involved in learning. Students mostly take the role of listeners, take notes on what the teacher says, and work on the questions given according to the examples. This study aimed to develop textbooks based on the Kurikulum Merdeka that can improve the critical thinking skills of elementary school students. The method used in this study is the ADDIE development model which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation. Data collection techniques used are observation, testing, and documentation. This study uses teaching module validation instruments, question validation, and textbook feasibility tests. The results of the study show that the use of this textbook can have a positive impact on students' critical thinking skills significantly, as well as provide positive feedback from teachers and students on the learning process as evidenced by the t count value of 8.513> t table 1.724. It is hoped that this research can contribute to learning in elementary schools and be a reference for the development of other teaching materials in the Kurikulum Merdeka.*

INTRODUCTION

Background of the Study

Education in Indonesia currently faces significant challenges in preparing students to face ever-changing global dynamics. One of the important skills that students need to have is the ability to think critically. This ability is not only important for analyzing information but also for making informed decisions in everyday life. However, observations in the field show that many students at the elementary school level still experience difficulties in critical thinking. This is caused by a learning approach that tends to prioritize memorization and less emphasis on analytical skills. Education is a key factor in forming a competent and competitive future generation (Haerudin et al., 2023)(Sandoval et al., 2024). Elementary school is the initial stage in formal education, where students begin to develop the basic knowledge and skills that will help them in the subsequent learning process (Achmad et al., 2024). Therefore, it is important to pay attention to curriculum development and appropriate learning approaches to create an adequate learning environment for elementary school students.

The Merdeka Curriculum was launched as an effort to create an education system that is more flexible and responsive to student needs. Through this curriculum, it is hoped that learning can focus more on developing students' skills and competencies, including critical thinking abilities (Könings & Seidel, 2025). Critical thinking ability is one of the essential competencies that students must have (Anggraeni et al., 2022). During the rapid development of information technology and the complexity of the problems faced by society, this ability has become very important to help individuals analyze information objectively, submit arguments, and make rational decisions.

The ever-changing social and economic environment requires students to be able to adapt quickly. They must be able to identify problems, find solutions, and innovate to face challenges (Sucahyo et al., 2023). Students who are astute at critical thinking will be better prepared to face unexpected situations and make the right decisions. Critical thinking skills support the development of other important skills, such as creativity, collaboration, and communication. This not only enriches their learning experience but also builds social skills necessary for everyday life (Srivastava et al., 2024).

Through the development of innovative and interactive open materials, it is hoped that students can be actively involved in the learning process so that their

critical thinking abilities can grow and develop optimally. However, challenges arise in implementing this curriculum, especially in providing appropriate and effective learning resources. One solution that can be taken is the development of textbooks specifically designed to support the *Kurikulum Merdeka* (Salonen-Hakomäki & Soini, 2023). A good textbook must be able to integrate activities that stimulate students' critical thinking, as well as provide context that is relevant to their lives (Ismiyanti et al., 2024). The ADDIE development method (Analysis, Design, Development, Implementation, and Evaluation) can be used to design the textbook in a systematic and structured manner.

With this background, this research focuses on developing textbooks that can improve elementary school students' critical thinking skills following the principles of the *Kurikulum Merdeka* (Deng, 2022). It is estimated that the resulting textbook will not only be a learning aid but will also encourage students to be more active and creative in the learning process.

The Problem of The Study

Initial observation results found a problem at SD Negeri 200103 that students tended to use fewer thinking activities in learning. The learning carried out is still dominated by the use of conventional learning models. Furthermore, according to observations, teachers use available textbooks which causes students to be less involved in learning where students' activities are only as listeners, listeners and taking notes on what the teacher says and working on the questions given according to the examples.

Learning using appropriate textbooks will motivate students to participate in learning. In this case, textbooks that are interesting to students will make students more motivated. Textbooks are learning resources that are systematically designed to be used in the learning process (Amina et al., 2023). This book functions as a guide for students and teachers in understanding the subject matter. The use of textbooks in the learning process has various benefits, namely, textbooks provide a framework organized for learning material, making it easier for students to understand the concepts being taught. This structure helps students follow the learning flow better.

Textbooks that include a variety of media, such as pictures, graphs, and practical activities, can cater to a variety of student learning styles. This helps all students, regardless of how they perceive the information. Many textbooks are equipped with quizzes, tests, and exercises that allow students and teachers to

streamline learning progress (Shofiyani & Lazib, 2023). This provides useful feedback to improve the learning process. Using appropriate textbooks can have a major positive impact on improving the quality of learning, developing important skills, and preparing students to face future challenges (Susanto et al., 2023). Textbooks that focus on developing critical thinking skills can create a dynamic and interactive learning environment. With the right approach, this textbook not only helps students understand the material but also prepares them to face challenges in the real world by thinking critically and analytically.

Research's State of the Art

This research is related to previous research conducted by Sutrisno that it is better to develop textbooks to make them more interesting. Students can be motivated when participating in learning (Fromm & Ifenthaler, 2024). Textbooks are needed to facilitate the learning process of understanding subject matter, especially in teaching students critical thinking skills. Other research also shows that developing textbooks that are under the *Kurikulum Merdeka* and using the ADDIE method can improve elementary school students' critical thinking abilities (Safitri & Aziz, 2022). This research makes an important contribution to the development of open materials that are relevant and effective in the educational context in Indonesia (Trinick & Heaton, 2021) (Sucahyo et al., 2021). The similarity of this research shows that research on developing textbooks to support the *Kurikulum Merdeka* and students' critical thinking skills has a consistent and structured approach. This strengthens the argument that the use of systematic methods such as ADDIE can help produce effective and relevant open materials. This research was conducted based on the fact that not many researchers have studied the development of textbooks in elementary schools by teaching students critical thinking skills (Nguyen et al., 2022). Therefore, this research was conducted to determine the effectiveness and practicality of using *Kurikulum Merdeka* textbooks on primary school students' critical thinking abilities.

Novelty, Research Gap, & Objective

This research focuses on the implementation of *Kurikulum Merdeka* textbooks, which provide freedom in learning. This novelty lies in how textbooks are designed to reflect curriculum principles that emphasize student-centered learning and the relevance of the material. The use of the ADDIE method in the context of developing textbooks for elementary school students provides a systematic and structured approach (Lestariyana & Nurkamto, 2022). This novelty lies in the adaptation of

each stage of ADDIE to meet the specific needs of students and the Indonesian educational context. This research emphasizes not only increasing knowledge but also developing critical thinking skills that are relevant to needs. In this case, it presents a new way of preparing students to face future challenges (Møller-Skau & Lindstøl, 2022). The textbooks developed integrate interactive elements, such as discussions, case studies, and collaborative projects. This novelty provides a more interesting learning experience and encourages active student involvement in learning (Ferguson et al., 2023). In general, the novelty in this research contributes to the development of education in Indonesia by providing real solutions to improve students' critical thinking skills through the development of innovative and adaptive textbooks. It is hoped that the results of this research can become a reference for the development of other teaching materials in the context of the *Kurikulum Merdeka*.

The gap in this research focuses on exploring in depth the use of *Kurikulum Merdeka* textbooks in improving elementary school students' critical thinking skills. This research contributes to the development of innovative and relevant teaching materials with the *Kurikulum Merdeka*. The resulting textbook can be an effective learning resource to improve the quality of education at SD Negeri 200103 Padangsidimpuan. By focusing on developing critical thinking skills, this research helps students become more analytical and evaluative. This is important in preparing students to face challenges (McMaster et al., 2023). The ADDIE method provides a systematic and structured framework for developing textbooks. This research shows how this approach can be applied in a basic education context, guiding future research and development (Trinick & Heaton, 2021). This research has a significant role in improving the quality of education at SD Negeri 200103 Padangsidimpuan. By focusing on developing critical thinking skills through relevant and innovative textbooks, this research is expected to have a positive impact on students, teachers, and the education system as a whole.

METHOD

Type and Design

The methods should be described with sufficient details to allow others to replicate and build on the published results. Please note that the publication of your manuscript implies that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose any restrictions on the availability of materials or information at the submission stage.

New methods and protocols should be described in detail, while well-established methods can be briefly described and appropriately cited.

Research manuscripts reporting large datasets deposited in a publicly available database should specify where the data have been deposited and provide the relevant accession numbers. If the accession numbers have not yet been obtained at the time of submission, please state that they will be provided during review. They must be provided before publication. The following is the research flow.
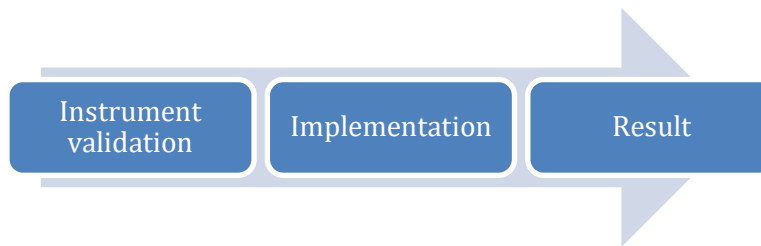

Figure 1. Research Flow

Data and Data Sources

This research is development research which aims to develop *Kurikulum Merdeka* textbooks to improve elementary school students' critical thinking. To produce good textbook development research products, the criteria must be valid, practical, and effective. Furthermore, to achieve the research objectives, development was carried out using the ADDIE development model, namely: Analysis, Design, Development, Implementation, and Evaluation (Fitriyah et al., 2021). The following presents the development of the ADDIE model.
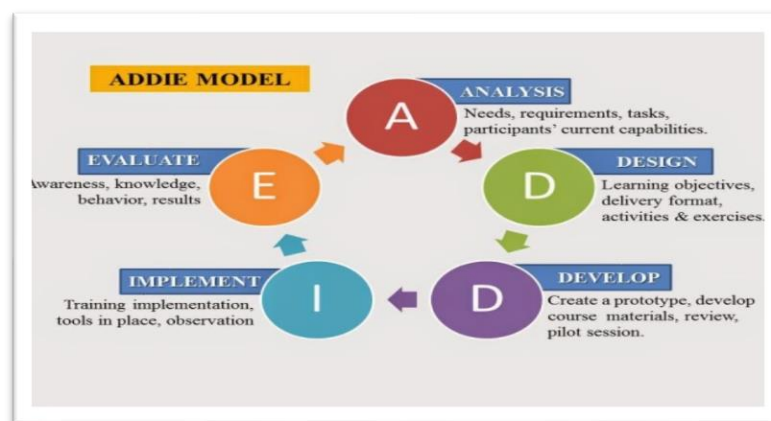

Figure 2. ADDIE Model

The following is the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model that can be used in developing *Kurikulum Merdeka* textbooks for teaching critical thinking to elementary school students: Analysis; Carry out an

analysis of the needs of students, teachers, and the educational context related to textbook development. Identify weaknesses in existing textbooks and students' needs in developing critical thinking. Design; determine the specific learning objectives to be achieved through the use of textbooks. Make sure the objectives follow the principles of the *Kurikulum Merdeka*. Development; create textbooks based on previously designed instructional design and content development. Make sure textbooks cover a *Kurikulum Merdeka*, including activities that encourage students' critical thinking. Implementation; conducting trials of textbooks and additional learning resources that have been developed on groups of elementary school students. Observe and record student and teacher responses to the textbook and learning activities presented. Evaluation; based on the evaluation results, identify weaknesses and improvements that need to be made to textbooks and develop students' critical thinking. Make revisions and improvements to the textbooks and learning processes that have been developed.

Data Collection Technique

The data in this study used data collection techniques in the form of critical thinking ability tests and practicality tests of *Kurikulum Merdeka* textbooks. Tests are tools or methods used to measure knowledge, skills, abilities, or certain characteristics of individuals or groups. Tests are often used in the context of education, psychology, and various other fields for a variety of purposes (Kumar et al., 2022). Apart from that, tests are also an important tool in evaluating education and various other fields. With proper design, tests can provide valuable insight into an individual's abilities and understanding, as well as assist in the learning and development process. This is then followed by a practicality test of the textbook, which is an evaluation process carried out to assess the extent to which the textbook can be used effectively in the learning context. The purpose of this practicality test is to ensure that the open book not only meets academic standards but is also easy for students and teachers to understand and apply. Test the practicality using a questionnaire given to teachers and students.

Data Analysis

Data analysis in this research was obtained from processing the results of students' critical thinking ability tests and then generalizing the results into statistical calculations to see how the use of textbooks affects students' critical thinking abilities. In research on textbook development, practicality tests are also carried out. In this stage, data collection must be processed by categorizing it

systematically. Practicality test results data were obtained from questionnaires given to teachers and students and then analyzed using statistics. Furthermore, the ADDIE method is a holistic and data-based approach to developing learning materials. By following each stage systematically, developers can ensure that the materials created are not only relevant and effective but can also be adapted to meet the needs of different students and educational contexts.

RESULTS

This research was carried out to develop a *Kurikulum Merdeka* textbook with a constructivist approach to critical thinking for elementary school students using ADDIE model development research. The stages of research activities include the **Analysis** stage; which includes an analysis of student needs and the educational context related to textbook development. **Design**; In this case, create learning objectives and plans to be achieved. **Development**; make textbooks according to a predetermined design. **Implementation**; Carry out textbook trials before conducting research. **Evaluation**; see the effectiveness of textbooks on learning. The textbook being developed is a *Kurikulum Merdeka* textbook for fourth-grade elementary school students where the learning material is adapted to the implementation of the existing curriculum in the school. The research location is at SD Negeri 200103 which is located at Jln. Suprato No. 1 WEK II Subdistrict Kec. Padang Sidimpuan Utara City Padang Sidimpuan Prov. North Sumatra postal code 22718. The activities, analysis results, and interpretation of research data are described as follows.

Analysis Stage

In the analysis stage, an analysis was carried out on the learning curriculum for grade IV elementary school students, especially the school where the research was conducted. In learning at school, students use textbooks published by the Center for Curriculum and Books, the Research and Development and Bookkeeping Agency of the Ministry of Education, Culture, Research and Technology. Learning activities are carried out for 35 minutes for 1 class hour and ideally, learning is carried out in 2 class hours (2x35') per meeting. One lesson hour and 35 minutes is the rule that applies at the elementary school level.

Design Stage

The Design Stage aims to design all learning tools and research instruments needed in the development of research activities carried out. However, specifically this stage is to design textbook products that can foster elementary school students' critical thinking. The textbook is a book aimed at learning Indonesian language subjects, Pancasila education, and mathematics for class IV semester 1 students. The textbook is designed with a focus on developing students' critical thinking skills. Apart from that, learning tools and research instruments were also designed to streamline the research process.

Development Stage

In this stage, textbooks and critical thinking ability test instruments are designed and developed. The development carried out is by validating the product with a validator. The products developed are checked by validators to provide assessments, suggestions, and input for improvement. The component achievement categories in percentages are interpreted in terms of very good criteria 86≤PR≤100, good 76≤PR<85, fair 66≤PR<75, poor 56≤PR<65, and not good 0≤PR<55 (2). Validated components meet valid criteria if the Mean Percentage (PR) is ≥66 or at least in the sufficient category. The acquisition and analysis of product validity based on the validator's assessment are as follows.

Validation of Textbook Products by Teaching Elementary School Students to Think Critically

The assessment of textbooks in improving elementary school students' critical thinking skills was carried out by 4 validators. The assessment is carried out by reviewing the format aspect of 4 components, the content suitability aspect of 5 components, and the language suitability aspect of 4 components. The following is the validator's assessment of textbooks in terms of format, content, and language.

Table 1. Validator Assessment of Aspects of Textbook Format

No	Format Aspect Components	Validator Assessment				PR	Interpretation	Category
		1	2	3	4			
1	Numbering is clear	5	4	5	5	95	Very Good	Valid
2	Appropriate font type and size	4	4	4	4	80	Good	Valid
3	Textbook sizes comply with ISO standards	4	4	4	5	85	Good	Valid
4	Suitability of margin and paper size in textbooks	4	4	5	4	85	Good	Valid
	Average value	4,3	4	4,5	4,5	86,25	Very Good	Valid

Based on the assessment given by the validator of the components of the textbook format aspects, the assessments obtained include good and very good.

When viewed from the average value, the validator assessment in general is very good. Furthermore, the validation carried out on textbooks is reviewed from the aspect of content suitability. The assessment of the suitability aspect of the content through existing components is overall in the valid category. The results of the validator assessment on the content feasibility aspect can be seen in Table 2 below.

Table 2. Validator Assessment of Content Suitability Aspect

No	Content Feasibility Aspect Components	Validator Assessment				PR	Interpretation	Category
		1	2	3	4			
1	Suitability of material to Learning Outcomes and learning objectives	5	4	5	4	90	Very Good	Valid
2	Completeness of learning materials in a systematic sequence and arrangement	4	5	4	4	85	Good	Valid
3	The material in the textbook is easy for students to understand	5	4	5	5	95	Very Good	Valid
4	The material in the textbook uses a constructivist approach	4	5	5	5	95	Very Good	Valid
5	The material in textbooks stimulates students' critical thinking abilities	5	4	5	4	90	Very Good	Valid
	Average value	4,6	4,4	4,8	4,4	91	Sangat Baik	Very Good

By paying attention to Table 2, the highest validity value is for the material components in easy textbooks. Students' understanding and material in textbooks use a constructivist approach. Where these two components have the highest average percentage value with a score of 95. The results of the assessment given by the validator on the components of the appropriateness aspect of the content in the textbook, are good and very good. If we look at the results of the average value of the assessments carried out by the validators, it can be categorized as very good. Next, the validation of the textbook is reviewed from the aspect of linguistic appropriateness. Assessment of language aspects is carried out according to the components contained in the content aspect. The results of the validator's assessment of textbooks in terms of language aspects according to the components being assessed can be seen in Table 3 below.

Table 3. Validator Assessment of Aspects of Linguistic Appropriateness

No	Components of Linguistic Feasibility Aspects	Validator Assessment				PR	Interpretation	Category
		1	2	3	4			
1	The language used is easy for students to understand	4	4	5	4	85	Good	Valid
2	The sentences used to explain the material are easy to understand	4	4	3	4	75	Enough	Valid
3	The sentences used do not give rise to double meanings	4	5	5	4	90	Very Good	Valid
4	Conformity with good and correct Indonesian language rules	4	4	4	4	80	Good	Valid
	Average value	4	4,3	4,3	4	83	Good	Valid

From the assessment given by the validator regarding the appropriateness aspect of the language, it can be seen that the assessment given includes fair, good, and very good. When viewed from the average value, the validator assessment is generally good.

Implementation Stage

At this stage, a limited trial of the product being developed is carried out. The trial was carried out basically to see the validity and reliability of the product, especially the use of textbooks on the critical thinking abilities of elementary school students. This implementation activity was carried out on class V students of SD Negeri 200103 Padang Sidimpuan. Textbook products are given to students, both individually and in groups. The textbooks provided were responded to well by students and can be read well by students. Likewise, the Critical Thinking Ability Test Instrument is composed of 12 questions, where the questions are given to class V students to carry out test trials to obtain validity and reliability, and questions that are valid and reliable can be taken as test instruments that are suitable for use in data collection when carrying out actual evaluations or research. The results of the validity and reliability analysis of the student's critical thinking ability test instruments can be seen in Table 4 as follows.

Table 4. Analysis of the Results of the Question Validity Test

No	r_{hitung}	r_{tabel}	Information
1	0,563	0,423	Valid
2	0,572	0,423	Valid
3	0,431	0,423	Valid
4	0,799	0,423	Valid
5	0,634	0,423	Valid
6	0,519	0,423	Valid
7	-0,129	0,423	Invalid
8	0,463	0,423	Valid
9	0,455	0,423	Valid
10	0,493	0,423	Valid
11	0,519	0,423	Valid
12	0,799	0,423	Valid

Based on the data above, the basis for taking the validity test is that if the value of r_{count} > r_{table} then it can be concluded that the question is valid, whereas if r_{count} < r_{table} then the question is invalid. Validity test calculations were carried out using Ms Excel 2016. Looking at the data presented, there was one question that was invalid. In this way, the questions will be discarded and valid questions will be taken. Researchers took 10 questions out of 11 that were valid. This is because the 10 questions are considered to represent a test of elementary school students'

critical thinking abilities. Next, test the reliability of the questions. The reliability test results are as follows.

Table 5. Analysis of Question Reliability Test Results

r$_{hitung}$	r$_{tabel}$	Keterangan
0,728	0,423	Reliable

Based on the data above, the basis for taking reliability is that if the value of $r_{count} > r_{table}$ then it can be concluded that the question is reliable, whereas if $r_{count} < r_{table}$ then the question is not reliable. Validity test calculations were carried out using MS Office 2016. From the results of the validity and reliability analysis, it can be concluded that the questions are valid and reliable so they can be used as a suitable instrument.

Evaluation Stage

The evaluation stage aims to determine the practicality and effectiveness of the learning tools used. To see the practicality of developing teaching materials, it is measured through a questionnaire on the practicality of teaching materials which is filled out by all students involved in the evaluation stage. Next, to see the effectiveness in terms of learning management and the achievement of students' critical thinking skills in learning by applying textbooks in teaching students' critical thinking skills. The following describes in detail the evaluation of textbooks in terms of effectiveness and practicality. The following are the normality test results of the student's critical thinking ability test results.

Table 6. Normality Test of Students' Critical Thinking Ability Tests

	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
V-A Pretes	.145	20	.200*	.944	20	.285
V-A Posttes	.207	20	.205	.887	20	.203

The normality test used is Shapiro Wilk normality. Based on the data obtained, the pre-test sig value was 0.285 <0.05 and the post-test sig value was 0.203 <0.05. So it can be concluded that the pretest and posttest results of students' critical thinking abilities are normally distributed. Next, homogeneity will be tested. The homogeneity test results can be seen in Table 7 as follows.

Table 7. Homogeneity Test of Students' Critical Thinking Ability Tests

Levene Statistic	df1	df2	Sig.
3.643	1	38	.064

Judging from the homogeneity test table, it shows a sig value of 0.064<0.05 so it can be concluded that the homogeneity test data is homogeneous. Next, an independent sample t-test will be carried out to see the average difference between the pretest and posttest scores. Following are the results of the independent sample t-test which can be seen in tables 8.

Table 8. Independent Sample T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kemampuan Berpikir Kritis	Equal variances assumed	3.643	.064	-8.513	38	.000	-33.000	3.876	-40.847	-25.153
	Equal variances are not assumed.			-8.513	32.295	.000	-33.000	3.876	-40.893	-25.107

From the data that has been presented, the t_{count} value is 8.513> t_{table} 1.724. So it was concluded that there was a difference between the pre-test and post-test scores. Judging from the tests that have been carried out, the use of textbooks with a constructivist approach to teaching critical thinking is effectively used at SD Negeri 200103 Padangsidimpuan. In line with Saputro & Pakpahan's research, their research found that students who used constructivism-based textbooks experienced a significant increase in critical thinking skills (Saputro & Pakpahan, 2021). This method also increases student participation in class, which contributes to the development of their thinking skills as evidenced by student learning results with an average score of 87, which already exceeds the KKM score.

DISCUSSIONS

Integration of the use of textbooks helps students understand concepts in depth. Students can apply critical thinking in real situations, showing that well-designed textbooks can support an effective learning process (Subarjo et al., 2024). Wibowo, et al.'s research shows that students who learn using textbooks not only improve their critical thinking skills but also show a positive attitude toward learning as evidenced by the N-Gain test and paired sample t-test obtaining a significant value of <0.05 (Faraut et al., 2023). The use of learning with textbooks makes students more active and involved in class discussions. Research that has been conducted shows that the use of textbooks can significantly improve elementary school students' critical thinking abilities (Mello & Joanpere, 2022).

These results encourage the importance of implementing the use of this textbook in the educational curriculum to produce more critical students.

When learning using textbooks, they often contain various interactive activities that encourage students to collaborate and discuss (Kosberg et al., 2023). This helps them to think more deeply about the material being studied. Apart from that, this textbook usually presents real problems that are relevant to students' lives. Thus, students are encouraged to find solutions, which trains their critical thinking skills. In textbooks, there are facilities for personal reflection and group discussion allowing students to study their point of view and learn from the points of view of others (Deng, 2022). The use of real examples and case studies in textbooks helps students explain theory with practice, strengthening their understanding and ability to think critically (Midteide et al., 2023). Students who use textbooks show significant improvements in critical thinking skills. They are better able to identify problems, analyze information, and provide logical arguments.

CONCLUSION

Based on the results and discussion of the research, it was concluded that the application of textbooks in teaching critical thinking skills was effective in the very good category. Learning using textbooks creates an active, enthusiastic and enthusiastic atmosphere. Thus, it is recommended that teachers in carrying out learning to pay attention to/and choose appropriate learning resources in teaching students in elementary schools (Kosberg et al., 2023). The textbook developed successfully meets the criteria of practicality and effectiveness in improving students' critical thinking abilities. The material presented is not only relevant to the *Kurikulum Merdeka* but is also designed to encourage active student involvement in learning. Overall, this research shows that the development of *Kurikulum Merdeka* textbooks using the ADDIE method can effectively improve students' critical thinking skills at SD Negeri 200103 Padang Sidimpuan. It is hoped that the results of this research can become a reference for developing subject matter at the basic education level and make a positive contribution to the implementation of the *Kurikulum Merdeka*.

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