



A TEXTBOOK ORIENTED TOWARDS CRITICAL THINKING SKILLS ON THE IPAS SUBJECT (ENERGY CRISIS) FOR PRIMARY SCHOOL

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Abstract

Critical thinking is not a skill that develops on its own. This ability must be cultivated through activities that encourage individuals to think critically. Schools, as educational institutions, have a responsibility to help students develop critical thinking skills. The purpose of this study is to determine the validity of the developed critical-thinking-oriented textbook on energy crisis threats for IPAS Phase C in primary schools and to describe teacher and student responses regarding the practicality of this textbook. The research method used is Research and Development (R&D) with both quantitative and qualitative analysis. Data collection instruments included questionnaires, checklists, and interview guidelines. The study resulted in the development of a critical-thinking-oriented textbook on energy crisis threats for IPAS Phase C. The material validation score was 90.62, categorized as highly valid; the language validation score was 85, also highly valid; and the design validation score was 90, categorized as highly valid. Furthermore, the practicality response questionnaires yielded scores of 93.57 from students and 95.14 from teachers, both categorized as highly practical.

Keywords: *Textbook, Science and Social Studies, Critical Thinking, Energy Crisis.*

A. Introduction

One of the essential skills needed to face future challenges is critical thinking. (Kay & Greenhill, 2011) stated that 21st-century skills include critical thinking, solving complex problems, creative thinking, effective communication and collaboration, and technological innovation. Critical thinking is the ability to think deeply and logically, as well as to evaluate facts systematically (Lloyd and Bahr, 2010). This opinion is supported by (Ennis, 2011), who stated: *“Critical thinking is the art of analyzing and evaluating*



thinking to improve it." This means that critical thinking is the art of analyzing and evaluating a thought or the ability to develop that thought. (Ennis, 1985) identified 12 indicators of critical thinking, which he grouped into five major activities: providing simple explanations, building basic skills, drawing conclusions, giving further explanation, and organizing strategies and techniques. Providing simple explanations includes focusing on analyzing questions and answering questions about an explanation or statement. Building basic skills consists of considering whether a source is trustworthy or not, observing, and evaluating the report of observation results. Concluding consists of activities such as deducing or evaluating the results of deduction, inducing or evaluating the results of induction, and making and determining value judgments. Providing further explanation consists of identifying terms and definitions of considerations and dimensions, as well as identifying assumptions. Organizing strategies and techniques consists of determining actions and interacting with others.

According to (Tilaar & Jimmy, 2011), there are four considerations why critical thinking needs to be developed in modern education, including: (1) developing critical thinking in education means we appreciate students as individuals; (2) critical thinking is an ideal goal in education because it prepares students for adult life; (3) the development of critical thinking in the educational process is a traditional aspiration, such as what is intended to be achieved through teaching exact sciences; and (4) critical thinking is something that is highly needed in democratic life. Therefore, critical thinking must be developed during learning, and because learning is a lifelong process, critical thinking skills must also be developed throughout life.

In the framework of the Merdeka Curriculum, the competencies demanded from students are even broader, namely, reasoning. Reasoning includes logical thinking, rational thinking, critical thinking, creative thinking, and decision-making. Logical and rational thinking are part of basic thinking, while critical thinking, creative thinking, and decision-making are considered deep thinking. Critical thinking is not a skill that can develop on its own. This skill must be trained through stimuli that require a person to think critically. Schools, as educational institutions, have the responsibility to help their students develop critical thinking skills.

As a follow-up to the ideal condition expected from the Merdeka Curriculum regarding critical thinking, a preliminary study conducted at one primary school in the city of Pontianak regarding the availability of textbooks oriented toward critical-thinking skills as one of the learning resources in the learning process found that such materials are still lacking. Critical thinking is an essential skill needed to face future challenges in the 21st century, alongside problem-solving, creativity, communication, collaboration, and technological innovation (Kay & Greenhill, 2011). It involves the ability to think deeply, logically, and systematically evaluate information (Ennis, 2011). Developing

critical thinking skills must be a deliberate effort through learning activities that stimulate analysis, evaluation, and reflection.

The Merdeka Curriculum emphasizes reasoning skills, including critical thinking, as fundamental competencies students must acquire. Schools have the responsibility to support students in cultivating these abilities. However, a preliminary study conducted in several primary schools in Pontianak found a significant lack of textbooks oriented toward developing critical thinking skills, especially within the IPAS subject for fifth-grade students. Existing textbooks often do not sufficiently challenge students to engage in deep analytical thinking or connect learning materials with real-life contexts.

This gap highlights the urgent need for developing instructional materials that align with curriculum demands and specifically foster critical thinking from an early age. Learning materials, including textbooks, play a vital role in making abstract concepts concrete and accessible (Chingos & Whitehurst, 2012; Maruff et al., 2011; Opara & Oguzor, 2011). Therefore, this study aims to develop and validate a textbook oriented toward critical thinking skills, focusing on the energy crisis topic in the IPAS subject for primary school students. The ultimate goal is to provide a practical and effective learning resource to enhance students' critical thinking in line with 21st-century educational goals.

Textbooks are tools used by teachers or students to facilitate learning, enhance knowledge, and experience. A textbook presents a comprehensive image of the competencies that students are expected to master in the learning activities. Furthermore, textbooks are an essential component of the curriculum. Many factors influence the student learning process. Learning primarily occurs through interaction with others (teachers and classmates) as well as with (Chingos & Whitehurst, 2012). The role of textbooks in learning is to facilitate effective learning, improve students' abilities, knowledge, and skills, and contribute to the overall development of students in education. Students are expected to use the textbooks as a tool to help them improve their competencies. The principles in developing learning materials in textbooks include the principles of relevance, consistency, and adequacy (Darmadi, 2010; Jotia & Matlale, 2011; Tomlison, 1988). These materials refer to the cognitive, affective, and psychomotor domains (Cunningsworth, 1995; Gravoso & et.all, 2008).

Textbooks are an important part of learning implementation in schools. Through textbooks, teachers will find it easier to carry out teaching, and students will be better assisted and find learning easier. Textbooks can be created in various forms depending on the needs and characteristics of the learning materials to be presented. Without textbooks, it will be difficult for teachers to increase learning effectiveness. Similarly, students without textbooks will find it difficult to adapt to learning, especially if the teacher teaches too quickly and unclearly. Therefore, textbooks are considered materials

that can be utilized by both teachers and students as an effort to improve the quality of learning.

There are several reasons why teachers need to develop textbooks, such as the availability of textbooks that align with curriculum demands, the characteristics of the target learners, and the need to solve learning problems. The development of textbooks must consider curriculum demands, meaning that the textbooks to be developed must align with the curriculum. If textbooks that meet curriculum demands are unavailable or hard to obtain, then creating textbooks independently is a wise decision. To develop textbooks, references can be drawn from various sources, whether from personal experiences or knowledge, or information obtained from experts or colleagues. References can also come from books, mass media, the internet, and so on. However, even if curriculum-aligned textbooks are already widely available, it does not mean we should not develop our textbooks.

For students, too many textbooks often cause confusion, which is why teachers need to create textbooks that serve as a guide for students. Based on the issues identified above, the researcher is interested in developing a textbook oriented toward critical thinking skills on the IPAS subject for primary schools. The purpose of this research is to describe the level of validity and practicality of the textbook. The resulting textbook is expected to serve as a guidebook for teachers that can educate students to think critically.

B. Method

This research uses Research and Development (R&D) methodology following (Borg & Gall, 1989) to develop and validate an educational textbook. The development process involved ten stages: research and information collecting, planning, developing a preliminary product, preliminary field testing, product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination. (Sugiyono, 2021)

The product development steps in this study were adapted from (Borg & Gall, 1989) and include: (1) research and information collecting; (2) planning; (3) developing a preliminary product; (4) preliminary field testing; (5) main product revision; (6) main field testing; (7) operational product revision; (8) operational field testing; (9) final product revision; and (10) dissemination and implementation.

Participants included fifth-grade students and teachers from primary schools in Pontianak. In the main field testing, 30 students (10 randomly selected each from SDN 17 Pontianak Kota, SDN 03 Pontianak Selatan, and SDN 75 Pontianak Barat) and three teachers participated. Operational field testing involved a wider sample of approximately 90 students and their teachers from additional schools (SDN 24 Pontianak Kota and SDN

36 Pontianak Selatan). Student participants were selected via random sampling, while teachers were selected purposively based on their teaching role.

Data collection instruments comprised expert validation questionnaires (content, language, design), student and teacher practicality response questionnaires, checklists, and interview guides. Quantitative data from questionnaires were analyzed descriptively to compute validity and practicality scores.

Qualitative data from interviews and open-ended questionnaire responses were analyzed using thematic analysis. This included data transcription, systematic coding to identify themes related to textbook usability, critical thinking facilitation, and encountered challenges, and theme interpretation to enrich understanding of textbook effectiveness and improvement areas.

This mixed-method approach ensured a thorough evaluation of the textbook's validity and practicality from both numerical and experiential perspectives.

C. Finding and Discussion

1. Finding

The development of a Critical Thinking-Oriented Textbook on the Topic of Energy Crisis Threats for the IPAS Subject Phase C in Elementary School utilizes the Borg and Gall development model. The Borg and Gall model consists of ten stages: research and information gathering, planning, developing a preliminary product, preliminary field testing, revising the product, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. The explanation of the ten stages in the Borg and Gall model is as follows:

a. Research ad Information Gathering

The first stage in Borg and Gall's steps is identifying potential and problems. At this stage, the researcher found in the school that there is still a limited number of textbooks related to science literacy for fifth-grade primary school students.

b. Planning

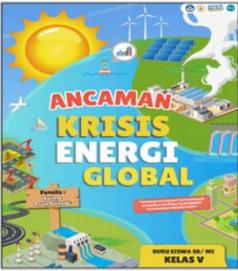
In this activity, the researcher conducted a needs analysis. The researcher obtained information from teachers that students still require reading books to educate and develop critical thinking skills. Based on this information, the researcher developed a critical thinking skills-oriented textbook on the energy crisis topics for the IPAS subject in primary school.

c. Developing a Preliminary Product

In developing the critical thinking skills-oriented textbook on the energy crisis topic for the IPAS Phase C subject in primary school, the researcher took the

following actions: (1) examined the characteristics of fifth-grade primary school students; (2) determined the content structure of the textbook; and (3) established the graphic design of the textbook.

Table 1 Graphic Design of the Critical Thinking Skills-Oriented Textbook on the Energy Crisis Topic for the IPAS Phase C Subject in Primary School

No.	Design	Explanation
1.		The Cover Design of the Critical Thinking-Oriented Textbook on Energy Crisis Material for the IPAS Subject in Primary School.
2.		Chapter Cover Design of the Critical Thinking-Oriented Textbook on Energy Crisis Material for IPAS Phase C Subject in Primary School
3.		An interactive design to stimulate students' critical thinking
4.		Activity design in the Critical Thinking-Oriented Textbook on the Energy Crisis Topics in IPAS Subject Phase C at Primary School

d. Preliminary Field Testing

At this stage, the researcher developed an initial product in the form of a rough draft. In developing the rough draft, the researcher referred to the planning that had been previously prepared. Several activities were carried out in this stage, including the need for product validation by competent experts. The development of the Critical Thinking-Oriented Textbook on the Energy Crisis Topics in the IPAS Subject Primary School, created by the researcher, must be validated by experts before being tested. Expert validation aims to assess the readiness of the developed product before testing and to make necessary improvements or revisions to address any deficiencies. The results of the validation of the Critical Thinking-Oriented Textbook on the Energy Crisis Topics in the IPAS Subject Primary School, developed by the researcher, can be seen in Tables 2 to 4.

Table 2 Content Validation Results

No.	Indicators	Skor	Category
1.	The instructional material aligns with to develop critical thinking skills.	4	Very Agree
2.	The material includes questions that encourage students to think deeply and analytically.	4	Very Agree
3.	The content presents real-world situations or problems that are relevant for consideration through a critical thinking approach.	4	Very Agree
4.	The instructional material encourages students to engage in processes of analyzing and evaluating the arguments or statements presented.	4	Very Agree
5.	The material teaches students how to assess the quality of available evidence and explore information more deeply to support or refute a claim.	4	Very Agree
6.	The instructional material includes tasks and activities that challenge students to solve problems critically	3	Agree
7.	The material facilitates reflective thinking, inviting students to evaluate their ideas and thought processes.	3	Agree
8.	The textbook should encourage discussion and feedback to enrich students' critical thinking processes.	3	Agree
Validity Skor		90,62	Very Valid

The result of the content validation in the development of the Critical Thinking-Oriented Textbook on the Topic of Energy Crisis for IPAS Subject in Primary School obtained a score of 90.62, with "very valid" category.

Table 3 Language Validation Results

No.	Indicators	Skor	Category
1.	Language conformity with the General Guidelines for Indonesian Spelling (PUEBI).	3	Agree
2.	Language used is clear and easy for students to understand.	4	Very Agree
3.	Use of communicative sentences.	4	Very Agree
4.	Clarity of sentences in the textbook.	3	Agree
5.	Ease of understanding the flow of material through language use.	4	Very Agree
6.	Consistency in language usage	4	Very Agree
7.	Language appropriateness in the textbook according to students' developmental stage	3	Agree
8.	Accuracy of spelling used	3	Agree
9.	Sentence structure accuracy	3	Agree
10.	Sentence effectiveness	3	Agree
Validity Skor		85	Very Valid

The result of the language validation in the development of the Critical Thinking-Oriented Textbook on the Topic of Energy Crisis for the IPAS Subject Phase C in Primary School obtained a score of 85, with the "very valid" category.

Table 4 Graphic Design Validation Results

No.	Indicators	Skor	Category
1.	Readability of the text (font size, font type, line spacing, text contrast with background).	4	Very Agree
2.	Use of color (color balance, consistent use of colors, meaning of colors).	3	Agree
3.	Layout and design arrangement (layout consistency, spacing management, visual hierarchy, section separators).	4	Very Agree
4.	Use of images and illustrations (relevance of images, image quality, image placement).	4	Very Agree
5.	Use of punctuation and symbols (consistency in punctuation usage and appropriate symbol selection).	3	Agree
Validity Skor		90	Very Valid

The graphic design validation result for the Development of a Critical Thinking Skills-Oriented Textbook on the Topic of Energy Crisis in the IPAS Subject Phase C at Primary School obtained a score of 90, categorized as very valid.

e. Revising the Product

Revisions will be made if, during the validation/assessment process, the qualification results are still lacking and experts provide suggestions or input. This aims to improve the previously designed *Critical Thinking Skills-Oriented Textbook on the Topic of Energy Crisis in the IPAS Subject at Primary School*. This revision stage will support the research process by minimizing weaknesses in the e-book design. These weaknesses may come from aspects such as content mismatches, language issues, or graphic and layout design flaws. Based on the validation of (1) content, (2) language, and (3) graphics design, no further revisions are needed, and the textbook can proceed to the trial stage.

f. Main Field Testing

In the product trial stage, the researcher involved 1 teacher and 5 fifth-grade students from SDN 17 Pontianak Kota, 1 teacher and 5 fifth-grade students from SDN 03 Pontianak Selatan, as well as 1 homeroom teacher and 5 fifth-grade students from SDN 75 Pontianak Barat. After conducting the product trial, the researcher distributed questionnaires to the students to determine their responses regarding the practicality of the *Critical Thinking Skills-Oriented Textbook on the Topic of Energy Crisis in the IPAS Subject at Primary School*, developed by the researcher. The following is a presentation of the results of the product usage trial.

Table 5 Student Responses on the Practicality of the Textbook

No.	Statement	Average Skor
1.	The materials in this textbook are easy to understand and not confusing.	3,46
2.	This textbook encourages deeper thinking and exploring the reasons behind the information presented.	3,67
3.	This textbook provides challenges that push students to think harder in solving problems.	3,84
4.	This textbook motivates students to think critically and actively engage in the learning process.	3,56
5.	This textbook connects the content to real-life events or everyday situations.	3,53
6.	This textbook is easy to use during learning activities without requiring much help from teachers or peers.	3,78

7.	This textbook offers many exercises or questions that help sharpen critical thinking skills such as analyzing, comparing, and problem-solving.	3,86
8.	This textbook engages students by presenting materials, such as using images, examples, or fun activities.	3,74
9.	This textbook helps students think critically, ask questions, and make logical decisions.	3,65
10.	This textbook can help students think more critically when facing real-life situations.	3,82
Practicality Skor		92,27
Category		Very Practical

The results of the student response questionnaire during the product trial phase of the Critical Thinking Skills-Oriented Textbook on the Topic of Energy Crisis for the IPAS Subject in Primary School obtained a practicality score of 92.27, categorized as highly practical.

Table 6 Teacher Responses on the Practicality of the Textbook

No.	Statement	Average Skor
1.	The textbook is easy to understand and use.	3,75
2.	The textbook is practical for classroom use without requiring complex or expensive equipment.	4
3.	Students can easily access and comprehend the material in this textbook.	4
4.	The textbook allows students to work independently or in small groups with minimal guidance.	3,3
5.	The textbook can be easily adapted to various student ability levels in the classroom.	3,6
6.	The instructions in the textbook are clear and easy to follow, supporting the development of critical thinking without causing confusion.	3,45
7.	The textbook is easily applicable in various learning situations, both in face-to-face and distance learning.	3,8
Practicality Skor		92,5
Category		Very Practical

The results of the teacher response questionnaire during the product trial stage for the practicality of the *Critical Thinking Skills-Oriented Textbook on the Topic of Energy Crisis in the IPAS Subject for Primary School* obtained a practicality score of 92.5, with "very practical" category.

g. Operational Product Revision

At this stage, the researcher made only minor revisions to the product to improve the product. This is because, during the product trial phase, the following data had already been obtained: (1) the results of the student response questionnaire indicated a very high level of practicality, and (2) the results of the teacher response questionnaire also indicated a very high level of practicality.

h. Operational Field Testing

In the product usage trial phase of the developed product, which is a Textbook Oriented Towards Critical Thinking Skills on the Topic of the Energy Crisis for the IPAS Subject in Primary School, the trial involved students and fifth-grade teachers from SDN 24 Pontianak Kota, SDN 75 Pontianak Barat, and SDN 36 Pontianak Selatan. After conducting the usage trial, the researcher distributed questionnaires to students to gather responses from both students and teachers regarding the practicality of the Teaching Book developed by the researcher. The results of the student and teacher responses are as follows.

Table 7 Student Responses on the Practicality of the Textbook

No.	Statement	Average Skor
1.	The materials in this textbook are easy to understand and not confusing.	3,67
2.	This textbook encourages deeper thinking and exploring the reasons behind the information presented.	3,82
3.	This textbook provides challenges that push students to think harder in solving problems.	3,56
4.	This textbook motivates students to think critically and actively engage in the learning process.	3,62
5.	This textbook connects the content to real-life events or everyday situations.	3,84
6.	This textbook is easy to use during learning activities without requiring much help from teachers or peers.	3,75
7.	This textbook offers many exercises or questions that help sharpen critical thinking skills such as analyzing, comparing, and problem-solving.	3,68
8.	This textbook engages students by presenting materials, such as using images, examples, or fun activities.	3,86
9.	This textbook helps students think critically, ask questions, and make logical decisions.	3,71
10.	This textbook can help students think more critically when facing real-life situations.	3,92
Practicality Skor		93,57

Category	Very Practical
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The results of the student response questionnaire during the usage trial of the Textbook Oriented Towards Critical Thinking Skills on the Topic of Energy Crisis for the IPAS Subject in the Primary School level obtained a practicality score of 93.57, categorized as very practical.

Table 8 Teacher Responses on the Practicality of the Textbook

No.	Statement	Average Skor
1.	The textbook is easy to understand and use.	3,66
2.	The textbook is practical for classroom use without requiring complex or expensive equipment.	4
3.	Students can easily access and comprehend the material in this textbook.	4
4.	The textbook allows students to work independently or in small groups with minimal guidance.	3,66
5.	The textbook can be easily adapted to various student ability levels in the classroom.	3,66
6.	The instructions in the textbook are clear and easy to follow, supporting the development of critical thinking without causing confusion.	4
7.	The textbook is easily applicable in various learning situations, both in face-to-face and distance learning.	3,66
Practicality Skor		95,14
Category		Very Practical

The results of the teacher response questionnaire during the usage trial of the Textbook Oriented Towards Critical Thinking Skills on the Topic of Energy Crisis for the Primary School obtained a practicality score of 95.14, categorized as very practical.

i. Final Product Revision

After completing the product usage test, the researcher revised the developed product based on the results of the practicality questionnaire regarding the use of the teaching book during the product usage trial phase. This was done to further improve the quality of the developed product. After the revision, the researcher then registered the Copyright for the developed teaching book under the Copyright number EC002024224609.

j. Dissemination and Implementation

After the copyright was issued, the researcher's next step was to disseminate the product to several elementary schools in Pontianak.



Figure 1. Product Dissemination

2. Discussion

The product Textbook Oriented to Critical Thinking Skills on the IPAS Subject for Primary School is considered to be very good in training students' critical thinking skills. This is based on expert assessments, which state that the evaluated textbook has very high validity in training students' critical thinking skills. Almost all validity indicators showed excellent results, with an assessment score of 90.62. This indicates that the textbook has been very well designed to achieve the desired learning objectives, namely to develop students' critical thinking skills.

The material presented is relevant, challenging, and encourages students to think actively and independently. The evaluation results also show that this textbook has great potential to improve the quality of student learning, particularly in fostering critical thinking skills. The results of content validity show that the textbook encourages students to actively construct knowledge (through analysis, evaluation, and problem-solving) in line with the principles of constructivism. Based on Piaget and Vygotsky's theories, emphasizing the importance of active experience in learning. The textbook developed by the researcher connects the material to real-life situations and encourages student reflection in line with the concept of meaningful learning proposed by Ausubel (1968). Learning becomes more meaningful when students can link new knowledge with what they already know. This also aligns with (Bransford et al., 2000) view that through textbooks that challenge students to analyze information, evaluate arguments, and solve problems, students will become more independent in learning and thinking.

The results of language expert validation concluded that the developed critical thinking textbook has very good linguistic validity. Almost all indicators showed positive results, with a score of 85. This indicates that the language used in the textbook meets the expected criteria: it is easy to understand, communicative, and appropriate to the students' developmental stage. Overall, the language validation results show that the developed critical thinking textbook meets good standards. The language used is understandable, communicative, and aligned with learning objectives. However, there are still a few minor aspects that need improvement to enhance the overall quality of the textbook. This aligns with (Ormrod, 2009) opinion that in developing a textbook, it must

meet the principles of: (1) Readability – emphasizing that textbooks should be easy for students to read and understand. Simple language, clear sentence structure, and precise terminology are key to achieving good readability. (2) Comprehensibility – focusing on how students construct meaning from the text. Ambiguous or overly complex language can hinder this meaning-making process. (3) Cognitive Processing – cognitive theories such as schema theory and information processing theory explain how information is processed by the brain. Clear and structured language helps the brain process information more efficiently.

Based on the graphic design experts' show that the design of the developed textbook is rated as very valid, with an overall score of 90. This indicates that overall, the textbook design meets the expected criteria, especially in terms of readability, color usage, layout, illustrations, and punctuation. Overall, the graphic design of the developed textbook has met good standards. With a few minor improvements, the textbook can become an effective tool to help students develop critical thinking skills in understanding the topic of the energy crisis threat. This aligns with (Clark et al., 2016) view that good design is a crucial investment in textbook development. By paying attention to aspects such as readability, engagement, comprehension, efficiency, and accessibility, we can create textbooks that are not only attractive but also effective in achieving learning goals.

Overall, the textbook used in this study was rated as very practical by students, with a total score of 93.57, in the Very Practical category. The textbook has positively influenced students' critical thinking abilities, in terms of material comprehension, the challenges presented, and its relevance to daily life. In addition, the textbook supports the development of critical thinking skills through engaging content and exercises that stimulate analytical and decision-making abilities. However, there are still areas that can be improved, such as increasing the level of challenge in problem-solving activities to further stimulate critical thinking and providing more exercises to hone those skills. The textbook is very effective in supporting the development of critical thinking skills for fifth-grade primary school students.

Based on teacher response questionnaire data regarding the practicality of using the textbook to train critical thinking skills during the trial phase, a total score of 95.14 was obtained, which in the Very Practical category. This textbook is highly appreciated by teachers for its ease of use. This score reflects that the textbook is highly effective in supporting teaching, training students' critical thinking skills, and can be applied in various situations with little or no obstacles.

The positive aspects of this textbook development include (1) Practicality – The textbook is very practical in use, in terms of content, instructions, and adaptation to various classroom needs. (2) Flexibility – The textbook can be used in various learning contexts (face-to-face or remote) and can be adapted to students' capabilities. (3)

Accessibility – Teachers believe that students can easily access and understand the material, which is essential in supporting the development of critical thinking skills. Although the scores for ease of use and adaptability to student ability are good, there is still room for improvement, such as increasing the variation or difficulty level of the material to challenge higher-ability students.

In conclusion, the survey results show that the textbook is highly practical and effective in supporting critical thinking-based learning in the classroom, making a positive impact on ease of use and the development of these skills. According to Plomp (in (Nasrul, 2018)), "A textbook is said to be practical if it can be easily used by teachers and students in learning." (Rusnilawati & Gustiana, 2017) state: "A textbook is considered practical based on student response questionnaires and teacher assessments if it at least reaches the practical category." Nieveen (in (Gravemeijer & Cobb, 2013)) states: "Practicality refers to the extent that users (teachers and pupils) and other experts consider the intervention as appealing and usable in normal conditions." Based on these opinions, the practicality of the developed product is determined by the teachers' judgment that the resulting product is usable and easy to use by both teachers and students in line with the development objectives.

D. Conclusion

This study successfully developed a textbook oriented toward critical thinking skills, focusing on the energy crisis topic for the IPAS subject in Phase C of Primary School. The textbook aligns with the Merdeka Curriculum and has been validated as highly valid and practical based on expert assessments and user responses. The positive outcomes indicate that the textbook is effective in supporting critical thinking-based learning, motivating students to engage deeply with the material, and providing teachers with a practical teaching resource.

However, several limitations should be acknowledged. First, the research was conducted in a limited geographical area involving only primary schools in Pontianak, which may affect the generalizability of the findings to other regions or educational contexts. Second, the study primarily focused on textbook validation and practicality through self-reported questionnaires and expert assessments, without longitudinal data to measure the actual impact on students' critical thinking skills over time. Third, the qualitative analysis, while adding valuable insights, was limited in scope and depth, potentially missing broader perspectives from diverse stakeholders such as parents or curriculum developers.

Future research should address these limitations by conducting longitudinal studies to evaluate the long-term effectiveness of the textbook in enhancing critical thinking. Expanding the trial to more diverse settings and involving a broader range of

participants would also strengthen the evidence base. Furthermore, integrating more rigorous qualitative methods, such as in-depth interviews and classroom observations, could provide richer data on how the textbook influences teaching and learning processes.

Despite these limitations, the developed textbook represents a meaningful contribution to primary education by filling the gap in instructional materials that actively promote critical thinking. It is recommended that elementary school teachers continue to develop and adapt such materials according to students' cognitive development and learning needs to better prepare them for the challenges of the 21st century.

Bibliography

- Borg, W. R., & Gall, M. D. (1989). *Educational Research: An Introduction*. Longman.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and School*. National Academy Press.
- Chingos, M. M., & Whitehurst, G. J. R. (2012). *Choosing Blindly Instructional Materials, Teacher Effectiveness, and The Common Core*. Brown Center on Education Policy at Brookings.
- Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2016). Digital games, design, and learning: A systematic review and meta-analysis. *Review of Educational Research*, 86(1), 79–122. <https://doi.org/10.3102/0034654315582065>
- Cunningworth, A. (1995). *Choosing Your Course Book*. Heinemann.
- Darmadi, H. (2010). *Kemampuan Dasar Mengajar*. Alfabeta.
- Ennis, R. H. (1985). *Goals for a Critical Thinking Curriculum*. In A.L. Costa (Ed.). *Developing Minds: A Resource Book for Teaching Thinking*. Association for Supervisions and Curriculum Development (ASCD).
- Ennis, R. H. (2011). *The Nature of Critical Thinking: An Outline of Critical Thinking Dispositions and Abilities*. University of Illinois.
- Gravemeijer, K., & Cobb, P. (2013). *Design Research from the Learning Design Perspective*. SLO.
- Gravoso, R. S., & et.all. (2008). Design and Use of Instructional for Student-entered Learning: A Case in Learning Ecological Concepts. *The Asia-Pacific Education Researcher*, 17(1).
- Jotia, L., & Matlale, J. (2011). Use of Instructional Materials in Social Studies: Impact on Students' Performance in Primary School Leaving Examinations in Botswana. *European Journal of Educational Studies*, 1.

- Kay, K., & Greenhill, V. (2011). *Twenty-First Century Students Need 21st Century Skills*.
- Maruff, A. O., Ojebisi, A. O., & Olosunde, G. R. (2011). Instructional Materials and Students' Academic Achievement in Physics: Some Policy Implications. *European Journal Of Humanities And Social Sciences*, 2(1).
- Nasrul, N. (2018). Pengendalian faktor risiko stunting anak baduta di Sulawesi Tengah. *Promotif: Jurnal Kesehatan Masyarakat*, 8(2), 131–146. <https://doi.org/10.56338/pjkm.v8i2.495>
- Opara, J., & Oguzor, N. (2011). Instructional Technologies and School Curriculum in Nigeria: Innovations and Challenges. *Perspectives of Innovations, Economics & Business*, 7(1).
- Ormrod, J. E. (2009). *Human Learning* (5th ed.). Pearson Education, Inc.
- Rusnilawati, R., & Gustiana, E. (2017). Pengembangan Bahan Ajar Elektronik (BAE) berbantuan flipbook berbasis keterampilan pemecahan masalah dengan pendekatan CTL pada pembelajaran Matematika kelas V sekolah dasar. *Profesi Pendidikan Dasar*, 4(2), 190–201.
- Sugiyono. (2021). *Metode Penelitian Kuantitatif Kualitatif dan R&D* (Sutopo, Ed.). Alfabeta.
- Tilaar, & Jimmy. (2011). *Pedagogik Kritis*. Rineka Cipta.
- Tomlison, B. (1988). *Material Development in Language Teaching*. Cambridge University.