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Development and Evaluation of Sasak Local Wisdom-Based Instructional Materials Integrated with the Science, Environment, Technology, and Society (SETS) Learning Model to Enhance Elementary School Students' Critical and Creative Reasoning Skills

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ABSTRACT

Critical and creative reasoning skills are essential twenty-first-century competencies that elementary school students need to develop. However, evidence from the Trends in International Mathematics and Science Study (TIMSS) and preliminary field studies indicates that Indonesian elementary students continue to demonstrate relatively low levels of these competencies. This study aimed to develop and evaluate the validity, practicality, and effectiveness of Sasak local wisdom-based instructional materials integrated with the Science, Environment, Technology, and Society (SETS) learning model to enhance elementary school students' critical and creative reasoning skills. This research employed a Research and Development (R&D) approach using the Four-D (4D) model, consisting of the Define, Design, Develop, and Disseminate stages. The study involved elementary school students from Cluster 03, Jonggat District, Central Lombok Regency. The effectiveness of the developed instructional materials was examined using a quasi-experimental design with experimental and control groups. The product developed was a Grade IV Phase B science instructional material entitled "Lingkunganku Bersih Desaku Lestari", integrating the SETS learning process with visual elements reflecting Sasak local culture. Expert validation indicated that the instructional materials were highly feasible in terms of content, language, media design, and assessment instruments. Teacher and student responses also demonstrated that the materials were highly practical for classroom implementation. Furthermore, the instructional materials significantly improved students' critical and creative reasoning skills, as indicated by independent- and paired-samples t-tests ($p < .001$). The N-gain analysis showed high improvement in critical reasoning (0.72) and moderate improvement in creative reasoning (0.57) in the experimental group, while the control group demonstrated low improvement. These findings demonstrate that integrating Sasak local wisdom into the SETS learning model provides an effective contextual learning approach for improving elementary school students' critical and creative reasoning skills.

A. INTRODUCTION

Critical reasoning is a rational, reflective thought process focused on making decisions about what to believe or do. As stated by Ennis (2011), a critical thinker will formulate a plan accompanied by actions or experiments consistent with their thinking, define terms precisely according to context, and ultimately draw conclusions. Students who possess critical reasoning skills will be able to make timely decisions to address the problems they face (Arifin, Miftachudin, & Muttaqin, 2024). Students are considered to possess critical reasoning skills when they are able to articulate their reasoning using sound arguments from a logical and systematic perspective to solve problems (Wijayanti, Fatmaryanti, & Ngazizah, 2025).

Based on the results of the Trends in International Mathematics and Science Study (TIMSS), which assessed the mathematics and science proficiency of fourth-grade elementary school students from 2003 to 2015, Indonesia's ranking and scores showed a downward trend each year during that TIMSS period. The data show that in 2003, Indonesia ranked 35th with an average score of 411 and continued to decline, eventually ranking 44th with an average score of 397 in 2015 (Hamzah, Turmudi, & Dahlan, 2023). Preliminary study results indicate that students' critical reasoning skills remain weak, with test scores below 50% for 12 out of 16 students (Hayati & Setiawan, 2022). Students struggle to critically evaluate information and tend to accept opinions without questioning them (Yuliantari & Astuti, 2024). Students' low critical thinking skills are attributed to the prevalence of conventional, teacher-centered instruction (Barus, 2026). Only 23% of students were able to answer questions correctly and in sequence based on reasoning indicators, while 77% of students had difficulty understanding long sentences in word problems with real-life contexts and were unable to connect the available information to develop problem-solving strategies (Iswanda & Purnomo, 2025).

Creativity is a student's ability to generate and develop new ideas or solutions to learning problems in order to produce alternative answers or actions that are useful and worth testing, including cognitive aspects such as fluency of ideas (fluency), flexibility of thinking (flexibility), originality of ideas (originality), and the ability to elaborate or develop ideas (elaboration) (Ruslan, Hamda, & Rahayu, 2023). Creative reasoning enables students to develop high intrinsic motivation in learning and self-confidence as a foundation for solving future problems that require creative ideas (Aflah, Ananda, Surya, & Sutiyan, 2023). Creativity enables students to generate new ideas, solve problems innovatively, and develop ideas in detail (Kartika, Darmiany, & Ermiana, 2025). Creative reasoning skills support students in understanding concepts more deeply through innovative approaches to solving their academic problems (Humairoh, Kumala, & Yasa, 2025).

However, preliminary studies indicate that the average score for creative reasoning skills among fifth-grade elementary school students is only about 34%, indicating low levels of creativity in science learning (Cahyaningsih & Purwanto, 2023). Teachers still rely on conventional methods that are not optimal for stimulating student creativity, resulting in students who are uncreative and tend to be passive, rarely asking questions or proposing new ideas (Rosita, Marwoto, & Setiawan, 2024). Students are less active in constructing knowledge and lack strong problem-solving skills (Sari, Afifah, & Gufron, 2025). A preliminary study was conducted in four elementary schools in Cluster 03 Jonggat, Central Lombok Regency, through classroom observations, interviews with Grade IV teachers, and an analysis of students' learning outcomes. The findings indicated that students' initial critical reasoning achievement was relatively low, with an average score of 60.10, while their creative reasoning score averaged 66.18 before the intervention. Classroom observations also revealed that teachers primarily relied on government-issued textbooks and commercially available worksheets, which contained limited contextual examples related to students' local environment and culture. As a result, learning activities tended to emphasize factual knowledge rather than encouraging students to analyze problems, generate creative ideas, or connect scientific concepts with their daily lives. Interviews with teachers further revealed several challenges, including limited availability of contextual teaching materials integrating Sasak local wisdom, difficulties in implementing the SETS learning approach, and the lack of instructional resources specifically designed to foster students' critical and creative reasoning skills.

These findings demonstrate the need to develop contextual teaching materials that integrate Sasak local wisdom within the SETS learning model.

An alternative solution is to innovate learning by developing instructional materials that incorporate Sasak local wisdom into the Science, Environment, Technology, and Society (SETS) learning model—a model that employs a local-context-based approach. The development of these teaching materials not only improves the quality of science education in elementary schools but also contributes to the preservation of Sasak cultural values.

Based on (Ministry of Education, Culture, Research, and Technology, 2022) and (Facione, 2000), the indicators of critical reasoning for Phase B used in this study are: (1) Asking simple and relevant questions; (2) Gathering and selecting information; (3) Comparing and categorizing information; (4) Reasoning about cause-and-effect relationships. Meanwhile, the indicators of creative reasoning according to (Ministry of Education, Culture, Research, and Technology, 2022) and Guilford (1950), as cited (in Fasko, 2001) in Phase B selected for this study are generating more than one idea or answer to a simple problem (Fluency), presenting ideas from different perspectives or in different ways (Flexibility), and proposing new or rarely encountered simple ideas (Originality). The SETS learning model in this study involves the following steps: (1) the Initiation Stage, in which the teacher presents a relevant real-world issue or problem; (2) the Concept Formation Stage, in which students conduct investigations to master the scientific concepts underlying the problem or issue; (3) Concept Application Stage, in which students apply the concepts they have learned to design solutions or actions to resolve a problem or issue; (4) Concept Consolidation Stage, in which the teacher provides reinforcement; and (5) Evaluation Stage, in which students' understanding is assessed (Pratiwi, Soekamto, & Sahrina, 2023).

Teaching materials that incorporate local wisdom and are systematically integrated into the SETS learning model are highly relevant and reflect the students' local context. These teaching materials must include elements of local culture in environmental, social, traditional technological, and sociocultural aspects. The application of Sasak local wisdom values in elementary schools includes: mutual respect and appreciation, and bedadayan (collaboration) (Tahir, Zain, Sobri, Novitasari, & Anar, 2023). "Bedadayan" or "Besesiru" is a pattern of interaction manifested in group work and mutual assistance in completing tasks, thereby avoiding individualistic behavior (Rejeki & Amin, 2023). According to Rejeki, "Bedadayan" or "Besesiru" is also implemented through environmental cleanup activities, which are the shared responsibility of community members.

Research conducted by Musniar, Arafah, & Palloan (2025) shows that the average N-Gain score was 0.55, which falls into the moderate category; this suggests that teaching materials based on local wisdom are quite effective in the learning process. Another study shows that the effectiveness of instructional materials using the SETS learning model is evident from a 60% increase in pretest-posttest scores—classified as a moderate N-Gain—as well as positive feedback from both teachers and students (Rini, Widodo, & Budijastuti, 2020). The development of SETS-based instructional materials has proven effective in enhancing creative thinking skills, with an N-Gain value of 0.60 (moderate category) (Nurazizah, Uswatun, & Nurasiah, 2025). The uniqueness of this study lies in the integration of the SETS learning model with instructional materials incorporating Sasak local wisdom. Previous studies have largely applied the SETS learning model in general science and technology contexts; however, this study integrates aspects of the Sasak community's local wisdom.

This study offers a unique approach by simultaneously measuring and developing both of these abilities through contextual instructional materials that incorporate Sasak local wisdom within the SETS learning model. The development of these instructional materials is based on Gagne's reverse design theory, which involves first determining the learning outcomes (Sukardi, 2016), and the design of these materials follows the three components of learning according to Reigeluth and Merrill's variables: Objectives, Instructional Procedures (organizing materials, delivering instruction, managing the learning process), and Assessment. With this approach, it is hoped that students will not only understand scientific concepts but also be able to apply them practically in their creative projects. This research will make a new contribution to the field of education by providing a learning experience enriched with local wisdom and SETS aspects that can be widely applied in elementary schools.

The developed teaching materials are designed based on the Science, Environment, Technology, and Society (SETS) learning model, which promotes meaningful learning through contextual problem-solving. In the initiation stage, students are introduced to authentic environmental issues closely related to Sasak local wisdom, such as the traditions of Bedadayan and Besesiru in maintaining environmental sustainability. During the concept development stage, students construct scientific understanding through observation, discussion, and inquiry. The application stage encourages students to design creative solutions for managing organic and inorganic waste by integrating scientific concepts with appropriate technologies. Finally, the concept consolidation stage enables students to communicate, evaluate, and refine their ideas collaboratively. This learning mechanism actively engages students in analyzing problems, generating alternative solutions, and reflecting on the relationship between science, technology, the environment, and society, thereby fostering both critical and creative reasoning skills.

The theoretical contribution of this study lies in extending the application of the SETS learning model by integrating Sasak local wisdom into the development of elementary school teaching materials. While previous studies have demonstrated the effectiveness of SETS-based teaching materials in improving critical thinking or local wisdom-based materials in enhancing specific learning outcomes, few studies have combined these two approaches within a single instructional framework to simultaneously develop students' critical and creative reasoning skills. Therefore, this study contributes to the literature by proposing a contextual instructional model that connects scientific concepts with local cultural values, providing a conceptual foundation for integrating indigenous knowledge into contemporary science education.

This study was conducted with the following research questions: (1) How was a prototype of instructional materials incorporating Sasak local wisdom within the SETS learning model developed to enhance the critical and creative thinking skills of elementary school students? (2) How was the validity of instructional materials incorporating Sasak local wisdom within the SETS learning model assessed to enhance the critical and creative thinking skills of elementary school students? (3) How practical are the teaching materials containing Sasak local wisdom within the SETS learning model, which were developed to enhance the critical and creative thinking skills of elementary school students? (4) How effective is the use of teaching materials containing Sasak local wisdom within the SETS learning model, which were developed to enhance the critical and creative thinking skills of elementary school students?

Based on the identified research gap and the findings of the preliminary study, this research aims to develop teaching materials integrating Sasak local wisdom within the Science, Environment, Technology, and Society (SETS) learning model for elementary

school students. Specifically, this study seeks to examine the validity, practicality, and effectiveness of the developed teaching materials in improving students' critical and creative reasoning skills. Furthermore, the study is expected to contribute to the development of contextual teaching materials that integrate local cultural values into science education and provide empirical evidence supporting the implementation of culturally responsive learning in elementary schools.

B. METHODS

This study falls under the category of R&D (Research and Development) with the 4D (Four-Dimensional) development model (Thiagarajan, Semmel, & Semmel, 1974). This model consists of four main stages: Define, Design, Develop, and Disseminate. The 4D development model (Define, Design, Develop, and Disseminate) is illustrated in the figure below:

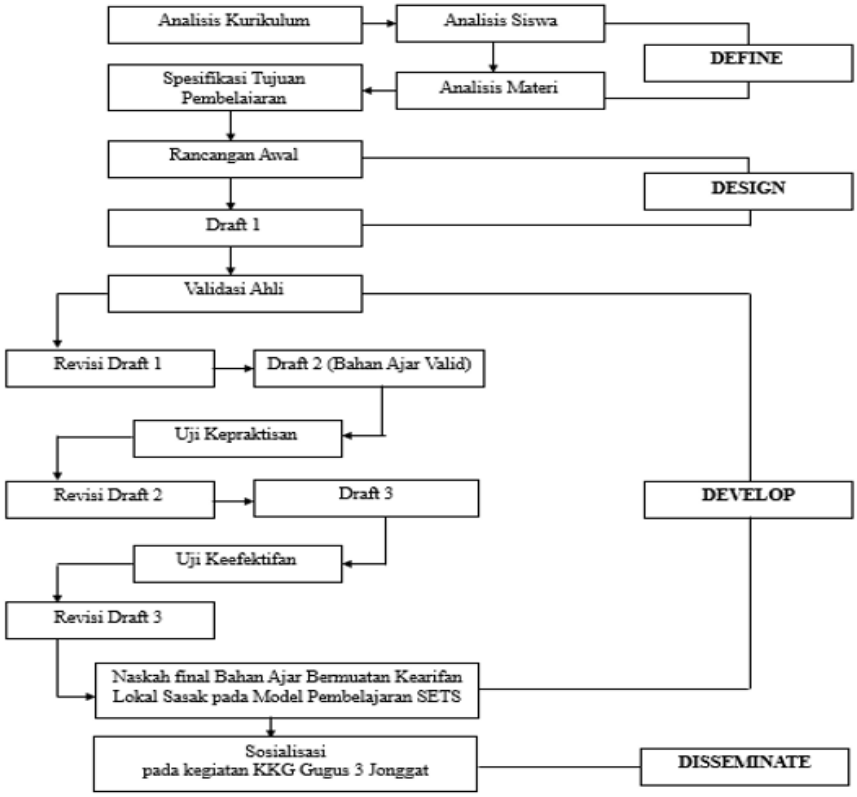

Figure 1. Development of Teaching Materials Containing Sasak Local Wisdom in the SETS Learning Model Based on the 4D Research Flow (Define, Design, Develop, and Disseminate).

As shown in Figure 1, this study adopted the Four-D (4D) development model proposed by Thiagarajan et al. (1974), consisting of four stages: Define, Design, Develop, and Disseminate. During the Define stage, curriculum analysis, learner analysis, task analysis, concept analysis, and preliminary field studies were conducted to identify students' learning needs and instructional problems. The Design stage involved preparing assessment instruments, selecting learning media, designing the teaching materials, and developing the initial product prototype based on the SETS learning model integrated with Sasak local wisdom. In the Develop stage, the prototype was validated by experts in content, language, and media, followed by revisions, limited-scale implementation, practicality testing, and field testing to evaluate the validity, practicality, and effectiveness of the product. Finally, the Disseminate stage involved introducing the finalized teaching materials to elementary school teachers through the Teacher Working Group (Kelompok

Kerja Guru/KKG) in Cluster 03 Jonggat, Central Lombok Regency, as an effort to promote wider implementation.

The research design used in this study is a quasi-experimental design with a non-equivalent control group, also known as a pretest-posttest control group design. This design involves an experimental group and a control group that are selected non-randomly, and the differences between the two groups are measured before and after the intervention (Anantasia & Rindrayani, 2023). This design is presented in Table 1 below.

Table 1. Quasi-Experimental Design

Group	Pretest	Treat	Posttest
A (Control Class)	O_1	Conventional	O_2
B (Experimental Class)	O_3	SETS Contains Sasak Local Wisdom	O_4

Source: Sukmadinata (2017:209)

A purposive sampling technique was employed in this study because the selected schools met the criteria required for the development and implementation of the teaching materials. The schools were chosen based on their implementation of the Merdeka Curriculum, the availability of Grade IV classes, and the identified need for contextual teaching materials integrating Sasak local wisdom. The limited trial involved Grade V students to evaluate the practicality of the developed teaching materials, while the field trial was conducted with Grade IV students to examine the effectiveness of the product in improving critical and creative reasoning skills.

The object of this study was the use of teaching materials incorporating Sasak local wisdom in the SETS learning model. The subjects of the study were teachers and students in Cluster 03 Jonggat, Central Lombok Regency. A limited pilot test was conducted with 10 students at SDN Galang Bulan and 10 students at SDN Selanglet. The field trial was conducted at SDN Selanglet and SDN Galang Bulan (experimental classes) with 20 respondents, and the conventional model was tested at SDN 2 Nyerot and SDN Selanglet (control classes) with 20 respondents. Teacher response assessments were conducted with 4 teachers (2 teachers in the pilot study and 2 teachers in the field trial), while student response assessments were conducted with 60 students (20 students in the pilot study and 40 students in the field trial) in the experimental classes. Data were collected through questionnaires and tests. Teacher and student response questionnaires were used to analyze the practicality of the teaching materials in science instruction at school. In addition, these questionnaires were used for validation by subject matter experts, language experts, media experts, and practitioners, using product feasibility parameters. Knowledge tests were administered to students to measure improvements in their critical and creative thinking skills. Data were analyzed descriptively and quantitatively, while the results of the experimental tests were analyzed descriptively, statistically, and comparatively. The statistical tests used included the Shapiro-Wilk Normality Test, the Homogeneity Test, Hypothesis Testing (Independent t-Test and Paired t-Test), and N-Gain, which were then analyzed to determine the effectiveness of the instructional materials in improving students' critical and creative reasoning skills.

C. RESULT AND DISCUSSION

1. Results of the Analysis of Science Learning Needs

The results of the analysis of the needs of science learning indicate that there is a need for a match between the curriculum and the real needs of students and learning conditions in elementary schools. The current curriculum refers to the Independent Curriculum which emphasizes the holistic development of student competencies, including aspects of knowledge, skills, and attitudes. Science learning is designed in an

integrated manner by integrating the concepts of natural science and social science in the context of everyday life. In line with Tampubolon's opinion in Sukardi (2016: 116) that the research begins with conducting a problem analysis through a preliminary study that includes people, materials, procedures, equipment, and the environment. Based on the results of observations and needs assessments, several findings were obtained, namely that elementary school students need learning that is contextual and close to everyday life, using real examples from the surrounding environment, providing opportunities for active questioning, discussion, and exploration, and students also find it easier to understand the material when it is linked to local culture that they are familiar with, such as local Sasak wisdom in everyday life. Teachers need teaching materials that are in accordance with the curriculum and learning outcomes, easy to use and practical in implementing learning, contain clear learning steps, are able to integrate innovative learning models such as SETS, and require guidance in developing learning that is able to train students' high-level thinking skills.

Prototype of Teaching Materials Containing Sasak Local Wisdom in the SETS Learning Model

The prototype design of this teaching material containing Sasak local wisdom was developed using Gagne's reverse design, namely by determining the learning outcomes first (Sukardi, 2016). The results of the design preparation became the basis for compiling a product prototype in the form of sharpened Learning Objectives (TP), textbooks, learning guidebooks, media, Teaching Modules, and assessment tools. However, in this study the focus of the development was teaching materials in the form of printed books. The components of this teaching material consist of three components, namely objectives, learning procedures (organization of material, delivery of material, and learning management), and finally, assessment. The design of the teaching material is presented in Table 1.

Table 2. Design of Teaching Materials Containing Sasak Local Wisdom in the SETS Learning Model

No.	Model Components	Explanation
1.	Objective	Contains Learning Outcomes (CP), Learning Objectives (TP), and indicators for achieving learning objectives. The objectives emphasize improving critical and creative reasoning skills through the construction of teaching materials containing Sasak local wisdom using the SETS learning model.
2.	Learning Procedures	
	a. Organizing Material	Includes material selection, presentation of learning outcomes and indicators, text design and image illustrations, provocative questions and learning activities that stimulate students' critical and creative reasoning abilities, conclusions, summaries, student activity sheets, evaluation questions, and a glossary. The ordering of the material is based on critical reasoning skills first, followed by creative aspects.
	b. Material Presentation	The material is delivered using a social reconstruction approach by applying and understanding the traditional values of the Sasak people, for example: the Bedadayan and Besesiru traditions that have the values of cooperation and mutual assistance. The text in the teaching materials is communicative to establish interaction with readers, there is also direct experience. The implementation is in the form of face-to-face, group learning, structured assignments in class through the practice of creating works.

	c. Learning Management	The learning stages follow the SETS syntax with five stages, namely: (1) Initiation (*Initiation*): presentation of problems; (2) Concept formation (*Concept Formation*); (3) Application of concepts (*Concept Aplication*); (4) Concept strengthening (*Concept Consolidation*); (5) Evaluation (*Evaluation*).
3.	Evaluation	The assessment is guided by the aspects to be achieved, namely critical and creative reasoning, so the questions are structured according to the HOTS (Higher Order Thinking Skills) and AKM (Minimum Competency Assessment) question types. The assessment is also project-based, encompassing group assignments, assessment criteria for each aspect (planning, implementation, results/products, and reporting), instruments, and assessment rubrics.

Based on the design in table 2 above, a product in the form of a prototype teaching material was produced. The design of the prototype teaching material used the application Word And Canva as a design medium with A4 size HVS paper (21 x 29.7 cm) using the font type of *Arial*. The prototype of the teaching material can be seen in Figure 2 below:

Figure 2. Prototype of Teaching Materials Containing Sasak Local Wisdom in the SETS Learning Model

2. Validity Test of Teaching Material Products

First, the prototype teaching material product underwent a series of expert validity tests to verify its content and construction. Gultom (2017) stated that validation testing is necessary to produce a product that meets standards and is suitable for use, as well as to identify product weaknesses. Expert testing was conducted by involving two experts each from a material expert, a language expert, and a media expert. The results of these tests can be seen in Table 3 below.

Table 3. Summary of Test Results for Subject Matter, Language, and Media Experts

No	Testing Aspects	Member 1	Member 2	Assessment Categories
1	Material	94%	87%	Highly Feasible
2	Language	93%	91%	Highly Feasible
3	Media	80%	90%	Highly Feasible

Validation was also conducted on the critical and creative reasoning questions instrument with the assessment results from expert 1 being 100% (Very Appropriate) and expert 2 giving a score of 90% (Very Appropriate). The product feasibility criteria refer to Arikunto (2009:35) (in Ernawati & Sukardiyono, 2017). Thus, based on the test results, it was concluded that the teaching materials containing Sasak local wisdom in the SETS learning model are suitable for use in elementary schools.

3. Practicality Test of Teaching Material Products

The practicality test of the teaching materials was conducted by practitioners consisting of teachers and students. The practicality of the teaching materials was assessed based on the responses of teachers and students during both the limited trial (2 teachers and 20 students) and the field trial (2 teachers and 40 students). The summary results of the practicality test of the teaching materials can be seen in Table 4 below:

Table 4. Summary of Teaching Material Criteria According to Teacher and Student Response Tests

No.	Response	Number of Respondents	Average Rating	Criteria
1.	Teacher	4 people	94%	Highly Practical
2.	Student	60 students	90,58%	

Based on the analysis of the table above, the teaching materials containing Sasak local wisdom based on SETS that were developed meet practical criteria because they are easy to use, interesting, and help the learning process so that they can be used for learning in elementary schools.

4. Product Effectiveness Test of Teaching Materials

This test was conducted to determine the effectiveness of the model in improving students' critical and creative reasoning abilities. This test was conducted using the t-test and N-Gain. Two requirements must be met before this test is carried out: normality and homogeneity. The normality test shows the significance value of each group shows a number above 0.05 or a Sigmoid value > 0.05, which means that the data comes from a normally distributed population. Thus, it can be concluded that the data in this study are normally distributed. The homogeneity test was conducted using Levene's Test to determine whether the variance between groups is homogeneous. The significance value of both variables indicates homogeneity. In the critical reasoning posttest, the Sigmud (Sig.) value was obtained 0.173, which means that 0.173 > 0.05, so it can be concluded that the variance between groups is homogeneous. Likewise, in the creative posttest, the Sigmud (Sig.) value was obtained 0.777, which means that 0.777 > 0.05, so it can be concluded that the variance between groups is homogeneous. This means that the data meets the homogeneity assumption for further parametric tests.

Hypothesis testing is used to determine the difference in the average posttest scores of the control group and the experimental group using Independent T-Test. Test results of Independent T-Test can be seen in Table 4 below:

Table 4. Summary of Independent T-Test Results

Variables	Class	N	Mean	Std.	T-value	Sig. (2-tailed)
Critical Reasoning	Control	40	68,75	9.173	-10.862	**.000**
	Experiment	40	88,95	7.362		
Creative	Control	40	65,70	9.871	-8.990	**.000**
	Experiment	40	84.55	8.855		

Based on table 4 above,critical reasoning ability obtained a Sig. (2-tailed) score of 0.000 which means that 0.000 < 0.05 and in creative ability obtained a Sig. (2-tailed) score of 0.000 which means that 0.000 < 0.05 then there is a significant difference in the results of the posttest of critical and creative reasoning between the control group and the experimental group.

Paired T-Test is done to compare the average of two groups of paired data that come from the same subject to find out whether there are significant differences, such as comparing the pretest and posttest scores (before/after treatment) in the experimental class. Test results of Paired T-Test can be seen in Table 5 below:

Table 5. Summary of Paired T-Test Results

Variables	Experimental Class	N	Mean	Std.	T-value	Sig. (2-tailed)
Critical Reasoning	Pretest	40	60.10	12.9	-14.124	**.000**
	Posttest	40	88.95	19		
Creative	Pretest	40	66.18	7.39	-15.713	**.000**
	Posttest	40	84.55	6		

Based on table 5 above, the results obtained on critical reasoning ability obtained a Sig. (2-tailed) score of 0.000 which means that 0.000 < 0.05 and on creative ability obtained a Sig. (2-tailed) score of 0.000 which means that 0.000 < 0.05. Based on the score results above, it can be concluded that there is a significant difference between the pretest and posttest results of critical and creative reasoning in the experimental group.

The N-Gain test is used to assess the improvement in normalized learning outcomes or the effectiveness of the developed product in improving students' critical and creative reasoning skills.*N-Gain*can be seen in Table 6 below:

Table 6. Summary of Test Results*N-Gain*Percent

Group	Critical Reasoning		Creative	
	N-Gain (%)	Interpretation	N-Gain (%)	Interpretation
A (Control)	-13,18 %	Ineffective	18,42%	Ineffective
B (Experiment)	72,4 %	Quite effective	56,95%	Quite effective

Based on table 6 above, in critical reasoning ability, the N-Gain test results prove that the control class obtained a score of -0.13 with a “low” category and the experimental class obtained a score of 0.72 with a “high” category. In creative ability, the N-Gain test results prove that the control class obtained a score of 0.18 with a “low” category and the experimental class obtained a score of 0.57 with a “medium” category. The level of effectiveness of the use of teaching materials containing Sasak local wisdom in the SETS learning model can be seen in the N-Gain percent score, namely in critical reasoning skills, the results of the N-Gain test prove that the control class obtained a score of -13.18% with the category "ineffective" and the experimental class obtained a score of 72.4% with the category "quite effective". In creative abilities, the results of the N-Gain test prove that the control class obtained a score of 18.42% with the category "ineffective" and the experimental class obtained a score of 56.95% with the category "quite effective".

The magnitude of the improvement observed in this study is comparable to, and in some aspects exceeds, findings reported in previous studies. The experimental group achieved an N-Gain of 0.72 for critical reasoning and 0.57 for creative reasoning, indicating high and moderate improvement, respectively. These results are higher than those reported by Rini et al. (2020), who found an N-Gain in the moderate category after implementing SETS-based teaching materials, and are also slightly higher than the findings of Musniar et al. (2025), who reported an average N-Gain of 0.55 for local wisdom-based teaching materials. Likewise, Nurazizah et al. (2025) reported an N-Gain of 0.60 for students' creative thinking skills, which is comparable to the creative reasoning improvement obtained in the present study. The relatively greater improvement observed in this research may be attributed to the integration of Sasak local wisdom with the SETS learning model, enabling students to connect scientific concepts with familiar cultural practices and everyday environmental issues, thereby promoting deeper conceptual understanding and more meaningful learning experiences.

Despite these positive findings, several limitations should be acknowledged. First, this study was conducted only in elementary schools within Cluster 03 Jonggat, Central Lombok Regency, limiting the generalizability of the findings to schools with different cultural and educational contexts. Second, teacher competence and experience in implementing the SETS learning model may have influenced the effectiveness of the teaching materials, as differences in instructional delivery can affect student engagement and learning outcomes. Third, variations in school facilities, classroom environments, and students' prior learning experiences may also have contributed to differences in learning achievement. Therefore, future studies are recommended to involve a larger number of schools from different regions and examine the influence of teacher professional competence and school characteristics on the effectiveness of teaching materials integrating local wisdom.

The experimental group showed a higher increase in critical and creative reasoning abilities compared to the control group, so it can be concluded that the use of teaching materials containing Sasak local wisdom in the SETS learning model is quite effective in improving the critical and creative reasoning abilities of elementary school students.

D. CONCLUSION AND SUGGESTIONS

Based on the explanation above, it can be concluded that teaching materials containing Sasak local wisdom in the SETS learning model were successfully developed through systematic research and development stages, resulting in science and natural science teaching materials that are appropriate to the characteristics of elementary school students.

The teaching materials that were developed met valid criteria based on the results of assessments by subject matter experts, linguists, and media experts on the feasibility of content, language, presentation, and graphics, so they were suitable for use in learning IPAS in elementary schools.

The teaching materials containing Sasak local wisdom in the SETS learning model meet practical criteria because they received positive responses from teachers and students in limited trials and field trials. Teachers and students gave positive responses to the ease of use of the teaching materials, the integration of the material with everyday life, and interesting and contextual learning activities. This indicates that the integration of Sasak local wisdom in science teaching materials can support more contextual learning.

The developed teaching materials meet the criteria for effectiveness in improving elementary school students' critical and creative reasoning skills. This is evident in the improved learning outcomes based on pretest and posttest scores, as well as their ability to analyze problems, provide logical reasoning, express creative ideas, and find solutions to contextual problems.

Despite the encouraging findings, this study has several limitations. First, the research was conducted only in elementary schools within Cluster 03 Jonggat, Central Lombok Regency, involving a relatively limited number of participants. Therefore, the findings may not fully represent elementary school students from different geographical, cultural, or educational contexts. In addition, variations in teacher competence, classroom management, and school learning environments may have influenced the implementation and effectiveness of the developed teaching materials. Future research is recommended to evaluate the teaching materials using a larger and more diverse sample from different regions, educational settings, and school characteristics. Further studies may also investigate the long-term impact of integrating Sasak local wisdom into the SETS learning model on students' higher-order thinking skills and other 21st-century competencies.

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