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Enhancing Critical Thinking and Affective Skills in Elementary School Students Through the Application of Salingtemas-Based LKPD

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A B S T R A C T

This research is motivated by the need for innovative science learning approaches to improve elementary students' critical thinking skills and affective development in response to Indonesia's low science literacy achievement. This research describes the implementation of SALINGTEMAS-based Student Worksheets in improving critical thinking skills and affective aspects of grade V students at SDN 3 Ulim on Ecosystem material. Using a qualitative approach with Nvivo15 software for data analysis, the study examines how LKPD integrates Science, Environment, Technology, and Society to create contextual and meaningful learning experiences. The implementation strategy emphasizes creative, innovative, and cooperative learning activities supported by comprehensive teaching materials including lesson plans and assessment instruments. Results demonstrate positive impacts on students' critical thinking, particularly in observation, analysis, and reasoning skills. The LKPD successfully cultivates positive affective responses including active participation, creativity, willingness to experiment, and healthy competitive spirit. Despite challenges such as time constraints, limited teaching aids, and varying student abilities, SALINGTEMAS-based LKPD proves effective in enhancing Ecosystem learning quality and developing students' scientific character. This approach offers a valuable integrated learning model for elementary education.

1. Introduction

Education has a fundamental role in shaping quality human resources with character who are capable of facing future challenges. Improving the quality of education, especially in the field of science at the elementary school level, is a strategic step to build a generation that not only masters concepts but is also capable of thinking critically and applying their knowledge in daily life. Based on data from the

Programme for International Student Assessment (PISA) 2022, Indonesia ranks 71st out of 80 countries in science literacy. This condition shows the need for innovation in learning models that can foster students' higher-order thinking skills to be relevant to the demands of the times (Aini, 2020).

Natural Science (IPA) learning in Elementary Schools is an important foundation in building students' scientific knowledge and skills. Through science learning, students not only recognize natural phenomena but also learn to observe, question, experiment, and draw conclusions logically. Several active learning models such as Problem Based Learning (PBL), Inquiry-Based Learning, and Cooperative Learning have been proven to improve students' critical thinking skills and learning outcomes (Hartati et al., 2025; Nuraini et al., 2025). The main purpose of science learning is not merely memorizing concepts, but rather encouraging students to understand, connect, and apply science theory in the context of real life.

Critical thinking ability is an important competency that needs to be developed from an early age. Students who are trained in critical thinking can analyze problems, assess information accurately, and make decisions based on logic and rational evidence (Akmalia, 2019). In the context of science learning, critical thinking not only helps students understand scientific concepts but also fosters curiosity about natural phenomena and technology around them (Aini, 2020). Learning that cultivates critical thinking also contributes to the development of active and collaborative learning, where students are encouraged to actively participate in expressing ideas and solving problems.

In addition to cognitive aspects, affective aspects also have an important role in determining students' learning success. The affective domain includes attitudes, interests, motivation, and values formed during the learning process. Students who have positive attitudes toward material and the learning environment show higher intrinsic motivation and better learning outcomes (Alfiyah & Wahyuni, 2021). Therefore, teachers need to integrate learning that not only emphasizes knowledge aspects but also builds students' character, empathy, and social awareness. A learning approach that can develop both domains simultaneously will create a more meaningful and sustainable learning experience.

One approach considered effective in developing critical thinking as well as affective aspects is the SALINGTEMAS (Science, Environment, Technology, and Society) approach. This approach connects science concepts with real problems in the surrounding environment, so students can learn through contexts relevant to their lives (Anita, 2021; Rosiana et al., 2023). In the context of this research, the application of SALINGTEMAS-based LKPD is expected to improve critical thinking skills and students' positive attitudes toward science learning, especially on ecosystem material in grade V of SD Negeri 3 Ulim. Thus, SALINGTEMAS-based LKPD can become an innovative solution in creating contextual, interactive learning oriented toward solving real problems occurring in the surrounding environment.

Student Worksheets (LKPD) are one of the important tools in the learning process designed to help students understand and master lesson material through structured learning activities. According to Rozaliafransi (2015), LKPD contains a series of tasks that must be done by students with clear step-by-step guidance to achieve predetermined basic competencies. Trianto (2012) adds that LKPD functions as a guide in investigation or problem-solving activities, both in the form of experiments and demonstrations. Thus, LKPD not only serves as a learning resource but also as a means for teachers to facilitate active and meaningful learning. According to Riadi et al. (2023), LKPD also functions as a learning medium equipped with practice questions to deepen students' understanding of the material being taught.

The Salingtemas approach (Science, Environment, Technology, and Society) becomes an important basis in developing contextual LKPD. This approach emphasizes the integration between science, technology, and its application in community life and the environment. Nuryanto & Binadja (2010) explains that Salingtemas-based learning encourages students to view phenomena comprehensively through the interconnection between these components. The advantage of this approach is its ability to connect science concepts with real problems in the surrounding environment, so that students not only understand theoretical concepts but can also apply them to solve everyday life problems. Although it has advantages such as increasing creativity and social awareness, this approach also faces challenges, including limited teacher competence, laboratory facilities, and relatively longer time in its implementation (Ejiwale, 2013).

In addition, learning with the Salingtemas approach is also closely related to the development of students' critical thinking skills and affective domain. Critical thinking, according to Aslam (2021) and Ayuningtyas (2016), is an analytical process directed at rational and reflective decision-making. In the learning context, this ability helps students evaluate information, interpret data, and develop arguments logically. Meanwhile, the affective domain explained by Ariningtyas et al. (2017) includes aspects of values, attitudes, and emotions that develop through the learning process. Based on the Taxonomy of Educational Objectives theory by Chandra (2020), the development of cognitive, affective, and psychomotor domains becomes the main basis in effective learning planning. By applying Salingtemas-based LKPD, teachers can integrate these three domains in a balanced manner to achieve holistic learning objectives.

2. Methodology

The research method used in this study is a qualitative approach. This approach was chosen because it is capable of exploring deep meaning from social phenomena occurring in the context of learning in elementary schools. Qualitative research focuses on understanding the experiences of students and teachers directly through observation, interviews, and documentation studies. According to Sugiyono (2021), qualitative research is conducted in natural conditions with the researcher as the main instrument, data collection through triangulation, and research results emphasize meaning rather than generalization. This approach is relevant for

examining the application of SALINGTEMAS-based Student Worksheets (LKPD), as it allows researchers to understand contextually how strategies, affective responses, and critical thinking skills develop in real learning environments.

The research was conducted in grade V of SD Negeri 3 Ulim, Pidie Jaya Regency, during the period from February to March 2025. The subjects of this study consisted of 1 homeroom teacher and 30 fifth-grade students. The sampling technique used was purposive sampling, in which participants were selected intentionally based on their direct involvement in the implementation of SALINGTEMAS-based learning activities in the classroom. Research data was collected through direct observation of the learning process, interviews with teachers and students, and documentation related to Lesson Plans (RPP), LKPD, and student learning outcomes. Primary data includes observation results and interviews, while secondary data was obtained from documents and supporting literature. Data analysis was performed using Nvivo 15 software to facilitate the process of coding, categorization, and discovery of main themes. Data validity was tested through source triangulation, member checking, and audit trail to ensure the validity and reliability of research results. With these steps, this research is expected to produce findings that are accurate, meaningful, and can serve as a reference in developing SALINGTEMAS-based learning in elementary schools.

3. Results and Discussion

Elementary School is a formal education level that has an important role in forming the basic knowledge, skills, and attitudes of students to be ready to continue to the next level of education and able to play a role in community life. SD Negeri 3 Ulim, located in Ulim District, Pidie Jaya Regency, Aceh Province, is one of the state elementary education institutions under the auspices of the Ministry of Education and Culture. Established since January 1, 1970, this school has obtained A accreditation based on BAN-SM Decision Number 1347/BAN-SM/SK/2021, with the implementation of the Merdeka Curriculum that emphasizes contextual and student-centered learning. Overall, SD Negeri 3 Ulim has a total of 188 students with 12 study groups, consisting of 119 male students and 98 female students. Learning activities are supported by 25 teachers and 1 education staff. In terms of facilities and infrastructure, the school has 10 classrooms, a teachers' room, a principal's room, a library, a health room (UKS), and other supporting facilities. The school's vision is "The realization of students with Islamic character, innovative, skilled, globally diverse, cultured, and implementing inclusive education," with a mission oriented toward strengthening Islamic values, independence, and students' social and moral character. In this research, three main informants, namely Mrs. Rosnita, M.Pd as Principal, and two grade V teachers, Mrs. Rosidiana, S.Pd and Mrs. Juliana, S.Pd, became the main data sources through interviews conducted in the first two weeks of March 2025. This research describes the real conditions of SALINGTEMAS-based LKPD implementation at SD Negeri 3 Ulim in improving students' critical thinking skills and affective aspects on ecosystem material.

Interview results show that the main strategy in implementing SALINGTEMAS-based LKPD focuses on integration between modern curriculum and students' learning needs contextually. Teachers play an active role in designing innovative learning through practical approaches, demonstrations, and the use of relevant media to facilitate understanding of scientific concepts. The learning process also emphasizes cooperative group work that encourages students to collaborate, respect each other's opinions, and build knowledge together. The implementation of this strategy produces positive responses from students, which is evident from their high enthusiasm, active involvement in discussions, and their ability to think critically and solve problems creatively. Students not only show high interest in learning activities but also develop healthy competitive attitudes and concern for environmental issues, especially in the context of science lessons. Nevertheless, teachers face several challenges such as limited learning time, lack of teaching aids, and variations in students' level of understanding. These obstacles become important reflections for developing more effective and adaptive learning strategies in the future.

Observation results show significant improvement in students' critical thinking and affective aspects. Learning designed by integrating relevant curriculum and applying creative, innovative, and cooperative approaches proves capable of creating a dynamic and participatory classroom atmosphere. Teachers successfully manage the learning process well, from opening, theme delivery, to closing activities, including classroom management and assessment of student learning outcomes. Observations of students show that they are able to identify problems, ask critical questions, provide logical reasons, and connect concepts independently. Affectively, students show real improvement in terms of active participation, ability to work together, respect friends' opinions, environmental concern, and high learning enthusiasm. There are still some technical obstacles such as limited teaching aids and differences in understanding levels among students, but overall, the application of SALINGTEMAS-based LKPD is considered effective in building critical thinking skills and fostering students' positive attitudes in the learning environment.

Based on data analysis results using Nvivo software, this research concludes that the application of SALINGTEMAS-based LKPD on ecosystem material in Grade V of SD Negeri 3 Ulim makes a real contribution to improving students' critical thinking skills and affective aspects. The learning strategies applied by teachers include the use of relevant curriculum, creative and innovative learning, and cooperative approaches that encourage collaboration among students. Teachers also prepare mature learning materials, utilize practice and demonstration methods, and use interesting and contextual learning media. From the students' side, positive responses emerge in the form of active attitudes, willingness to try, creativity in completing tasks, and readiness to compete healthily. Overall results show that SALINGTEMAS-based LKPD is able to foster better observation, analysis, and reasoning abilities, while strengthening affective values such as cooperation and environmental concern. Although there are obstacles such as limited facilities and differences in students' understanding levels, the positive impacts produced make this LKPD model effective to be applied in thematic learning in elementary schools.

Results of Interviews, Observations, and Documentation

To strengthen the validity of the research findings, data were collected through interviews, classroom observations, and documentation studies conducted at SD Negeri 3 Ulim. Interviews were carried out with the principal and Grade V teachers to obtain information regarding the implementation of SALINGTEMAS-based LKPD, the learning strategies used, and the development of students' critical thinking and affective aspects. Observations were conducted during the science learning process on ecosystem material to examine teacher activities, student participation, and classroom interactions. In addition, documentation studies were used to support the research findings through learning photographs, teaching modules, assessment results, and SALINGTEMAS-based LKPD documents. The summary of interview questions, observation points, and documentation findings is presented in Table 1.

Table 1. Summary of Interview Questions, Observation Points, and Documentation Findings

Data Collection Technique	Main Indicators / Questions	Summary of Findings
Interview with Principal and Grade V Teachers	Curriculum implementation and Merdeka Curriculum application	Teachers have implemented the Merdeka Curriculum and adjusted learning to students' contextual needs through SALINGTEMAS-based LKPD.
Interview with Teachers	Differences between Kurikulum 2013 and Merdeka Curriculum	Teachers explained that the Merdeka Curriculum is more flexible, student-centered, and encourages active learning compared to Kurikulum 2013.
Interview with Teachers	Learning model implementation in science learning	Teachers applied cooperative and inquiry-based learning integrated with SALINGTEMAS LKPD through discussions, observation, and simple investigations.
Interview with Teachers	Preparation of learning devices	Teachers prepared teaching modules, lesson plans, LKPD, learning media, and assessment instruments adapted to ecosystem material.
Interview with Teachers	Students' critical thinking and science literacy	Teachers stated that students became more active in asking questions, analyzing problems, and connecting ecosystem concepts with environmental issues.
Interview with Teachers	Obstacles in implementation	Challenges included limited instructional time, lack of teaching aids, and differences in students' levels of understanding and participation.
Teacher Observation	Classroom opening and theme delivery	Teachers began learning with greetings, apperception, and contextual questions related to the surrounding environment.
Teacher Observation	Learning methods and media	Teachers used discussion methods, demonstrations, environmental observations, and concrete objects around the school.
Student Observation	Critical thinking indicators	Students were able to identify ecosystem problems, ask questions, provide logical reasons, and connect concepts with daily life.

Student Observation	Affective aspects	Students showed active participation, cooperation, respect for peers' opinions, environmental awareness, and learning enthusiasm.
Documentation Study	Learning documentation and assessment results	Documentation included classroom activity photos, teaching modules, SALINGTEMAS LKPD, and observation assessment results showing improvement in student participation and scientific attitudes.

The interview, observation, and documentation data indicate that the implementation of SALINGTEMAS-based LKPD contributes positively to students' critical thinking skills and affective development. The triangulation of these data sources strengthens the validity of the findings, particularly regarding students' active participation, environmental awareness, and collaborative learning behavior during ecosystem learning activities.

Strategy for Implementing SALINGTEMAS-Based LKPD



Figure 1. Coding Results of SALINGTEMAS-Based LKPD Implementation Strategy

The implementation of the Merdeka Curriculum at SD Negeri 3 Ulim shows strong alignment with the principles of SALINGTEMAS-based LKPD. This curriculum provides flexibility in designing learning according to local context through Learning Outcomes (CP) and Learning Objective Paths (ATP). This approach allows teachers to connect learning with students' real lives, aligned with the philosophy of "teaching at the right level." With the support of SALINGTEMAS LKPD, the learning process becomes more contextual, interactive, and fosters critical thinking skills and science literacy. This view aligns with Riadi et al. (2023) who emphasize that LKPD not only serves as a learning guide but also as a medium that encourages student independence and creativity.

In the context of creative and innovative learning, SALINGTEMAS-based LKPD successfully transforms classroom dynamics to become more active and student-centered. Teachers now serve as facilitators, while students learn through direct experiences that connect material with the surrounding environment. For example,

the ecosystem topic is connected to real conditions such as rice fields, gardens, or forests around the school. This approach strengthens students' emotional and cognitive involvement, as stated by Sudarmawan (2020) that innovative learning emphasizes adaptation to the development of the times and utilizes technology. As a result, students show improvement in scientific thinking skills and environmental concern.

Cooperative learning strategy becomes an important element in SALINGTEMAS LKPD, where students learn to work together, share ideas, and solve problems collaboratively. Group discussions not only strengthen cognitive aspects but also train empathy, communication, and social responsibility. Each student is given a different role to ensure active participation. Samsidar (2021) state that cooperative learning increases motivation and learning interest through direct interaction. In the SALINGTEMAS context, this cooperation creates a constructive environment where students build their knowledge through exploration and reflection together.

The success of SALINGTEMAS LKPD implementation is inseparable from the readiness of well-planned learning materials. The preparation of Annual Programs, Semester Programs, Teaching Modules, and Merdeka Curriculum-based assessment instruments becomes the main foundation. Teachers adjust materials according to local context and student characteristics to create relevant and effective learning. According to Safitri (2021), learning strategies must integrate activity sequences, material organization, and synergistic resource utilization. In practice, authentic assessment integrated into LKPD helps teachers evaluate students' science literacy development and critical thinking skills comprehensively.

Practical activities become the core of SALINGTEMAS-based science learning. Through direct observation of ecosystem components around the school, students gain real and meaningful learning experiences. Although laboratory limitations are a challenge, teachers are able to overcome them by utilizing local materials. This approach instills values such as scientific honesty and environmental concern. In line with the view of Surata & Arjaya (2018), science does not stand alone but develops in social and cultural contexts. SALINGTEMAS learning emphasizes the importance of science as a human activity rooted in social reality.

The demonstration method also plays an important role in supporting students' understanding. Teachers use real objects from the surrounding environment to visually explain ecosystem concepts. SALINGTEMAS LKPD guides students in observing and analyzing phenomena, helping them understand cause-and-effect relationships. Through guide questions in LKPD, students are trained to think critically and reflectively. Nuryanto & Binadja (2010) emphasizes that SALINGTEMAS-based learning provides space for students to build their knowledge based on their own experiences and contexts, aligned with constructivism principles.

Creativity in the use of learning media also enriches the application of SALINGTEMAS LKPD. Teachers utilize pictures, videos, and concrete objects from the surrounding environment to create interesting and varied learning

experiences. This media not only improves conceptual understanding but also develops students' affective aspects, such as concern for environmental issues. LKPD functions as an interactive medium that integrates text, illustrations, and observation activities. This approach supports all student learning styles and encourages them to actively build meaning from learning experiences. As a result, students show improvement in critical thinking, collaboration, and positive attitudes toward science and the environment.

Student Response to the Use of SALINGTEMAS-Based LKPD

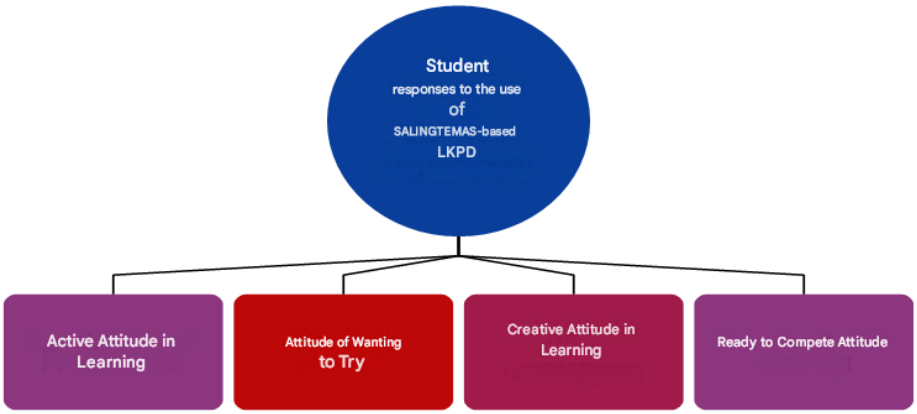


Figure 2. Coding Results of Student Response to the Use of SALINGTEMAS-Based LKPD

The application of SALINGTEMAS-based LKPD has a significant influence on improving student learning activity. Previously passive learning becomes interactive through group discussion activities, LKPD completion, and direct observation in the school environment. This approach generates student enthusiasm and curiosity because ecosystem material is directly connected to their daily lives, such as gardens and rice fields around the village. The use of concrete media and visual stimuli also strengthens this activity. Although there are still some passive students, differentiation strategies and positive reinforcement can help optimize their participation. These findings align with Susilo (2020) view that critical thinking develops through active, reflective, and evidence-based learning experiences.

Students' positive response is also evident from the increased willingness to try. Through simple scientific investigation activities, students show high curiosity and courage to experiment. SALINGTEMAS LKPD provides space for students to directly experience the inquiry process, from observation to data analysis. Cooperative learning creates a mutually supportive atmosphere so students feel safe to try and learn from mistakes. The relevance of the SALINGTEMAS context to environmental and technology issues makes the learning process more meaningful. In line with Wardani (2021), critical thinking in this context emerges when students consciously regulate their thinking processes to understand, assess, and conclude scientific phenomena based on concrete evidence.

In addition to increasing activity and willingness to try, SALINGTEMAS LKPD also fosters student creativity. Open-ended questions in LKPD encourage them to think divergently, connecting ecosystem concepts with real issues such as plastic waste and recycling. Group discussions provide space for students to share ideas, argue, and propose solutions. Although creativity is not yet evenly distributed among all students, continuous and contextual learning can foster their cognitive flexibility. Wati (2022) emphasizes that critical and creative thinking go hand in hand in learning processes that demand intellectual integrity and deep reflection, as seen in students who are able to apply scientific concepts to real situations.

Meanwhile, readiness to compete becomes another important indicator of successful SALINGTEMAS LKPD implementation. Learning that encourages logical analysis and problem-solving helps students develop academic competitiveness. Although achievement in science competitions is not yet prominent, students show improvement in higher-order thinking skills. LKPD also trains students to work together in groups while fostering a spirit of healthy competition. This aligns with Winandika (2020) affective domain, which emphasizes the importance of response values, appreciation, and characterization in forming learning motivation and perseverance. Thus, SALINGTEMAS LKPD not only strengthens cognitive aspects but also instills scientific values and positive character that support competitiveness development in the modern era, aligned with Bloom's theory framework on educational objectives.

Results of SALINGTEMAS-Based LKPD Implementation

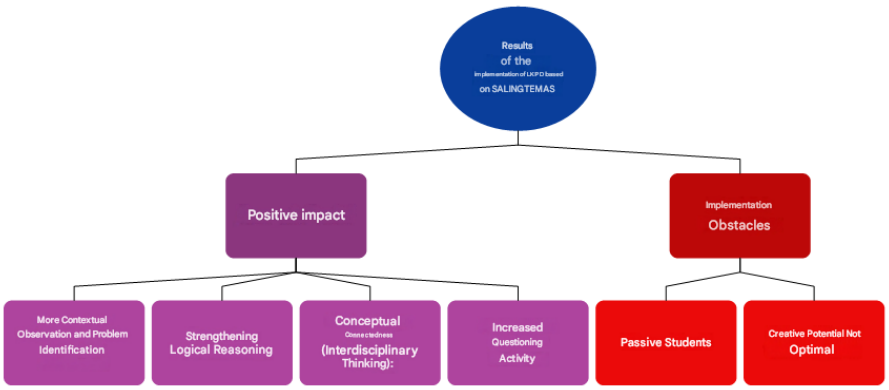


Figure 3. Coding Results of SALINGTEMAS-Based LKPD Implementation

The application of SALINGTEMAS-based LKPD shows various positive impacts on improving the quality of learning in grade V of SD Negeri 3 Ulim. Through direct observation activities in the school environment, students not only understand ecosystem concepts theoretically but are also able to connect them with real phenomena around them. This activity helps students identify various simple environmental problems, such as water pollution or plastic waste, relevant to daily life. These results align with Akmalia (2019) research which proves that the Science, Environment, Technology, and Society (SETS) approach can improve science literacy and students' ecological awareness. Thus, SALINGTEMAS LKPD

plays an important role in building scientific thinking skills based on direct experience and social context close to students' lives.

In addition, the application of SALINGTEMAS LKPD proves to strengthen students' logical reasoning abilities. They begin to be able to provide reasons based on facts and scientific concepts, such as explaining the function of plants in maintaining ecosystem balance. This logical thinking ability shows that students are not just memorizing but have internalized concepts and applied them in new contexts. These findings are consistent with Rahayu (2022) research which emphasizes that SETS-based learning approaches can improve learning outcomes and students' reflective abilities. Through SALINGTEMAS LKPD, the learning process becomes more meaningful because it requires students to connect information, think analytically, and reflect on their own learning outcomes.

Learning results also show improved classroom interaction that is more active and reflective. Although initially some students were still passive, the application of LKPD and direct practical activities successfully fostered courage to ask questions and discuss. Students begin to ask critical questions about ecosystem balance and the role of each component in it. This change shows that SALINGTEMAS LKPD is not just a learning aid but also a means of transforming learning behavior toward activity and scientific curiosity. Puspitasari (2020) research supports these findings, showing that SALINGTEMAS-based learning models are effective in improving science process skills through contextual and collaborative activities.

However, the application of SALINGTEMAS LKPD is not without obstacles that need attention. Some students still show passive attitudes, lack confidence, and are not yet accustomed to creative and independent thinking. Teachers note that only a small portion of students actively ask questions, while others tend to wait for instructions. Other challenges include limited time and learning media that support contextual activities. Nevertheless, Pramesthi (2020) research results emphasize that comprehensively applied SETS approaches can significantly improve learning outcomes and science process skills. Therefore, optimization of SALINGTEMAS LKPD needs to be accompanied by more participatory classroom management strategies, affective training, and the use of creative media relevant so that students' critical and creative thinking potential can develop maximally.

4. Conclusion

Based on research results conducted at SD Negeri 3 Ulim, it can be concluded that: The application of SALINGTEMAS-based LKPD is an effective strategy in developing critical thinking skills while building students' affective aspects. This implementation strategy works optimally because teachers are able to integrate relevant curriculum with real life through creative, innovative, and cooperative learning. The support of contextual learning media and the use of practice and demonstration methods help students understand ecosystem concepts more meaningfully. In addition, the readiness of teaching materials such as lesson plans

and assessment instruments further strengthens the successful implementation of this LKPD in the classroom.

Students' response to the application of SALINGTEMAS-based LKPD shows high enthusiasm and positive attitudes. Students appear more active in learning activities, brave to try new things, and show creativity in solving given problems. Collaborative learning also fosters a spirit of cooperation and healthy competition among them. This proves that LKPD not only enriches cognitive knowledge but is also able to touch students' affective domain, especially in terms of curiosity, responsibility, and concern for the surrounding environment.

The results of SALINGTEMAS-based LKPD application have a positive impact on improving students' critical thinking skills and affective attitudes. Students show progress in sharper observation, analysis, and reasoning abilities, as well as increased concern for environmental issues in the context of ecosystems. Although there are still some obstacles such as limited time and teaching aids, the research results show that the SALINGTEMAS approach is worth continuing to develop as an integrated learning model that not only fosters intellectual intelligence but also character and social empathy in elementary school students.

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