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Students' Perspectives on Eco-Enzyme-Based Sustainable Lifestyle Integration

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ABSTRACT

This study aims to evaluate the understanding of students of State High School 3 Lhokseumawe about the concept of coenzyme and how they integrate sustainable practices through the Pancasila Student Profile Strengthening Project. The methodology used is a quantitative descriptive survey with a questionnaire that includes various indicators, such as understanding the concept of coenzyme, participation in the project, and motivation to apply coenzyme in daily life. The data obtained were analyzed using descriptive statistical methods. Each question item is analyzed to produce an average score and a percentage representing the respondent's level of understanding, participation, and perception. The average score of each indicator is calculated to determine students' level of understanding, perception, and motivation. The average score is compared with the assessment criteria to interpret the survey results. The results showed that student's level of understanding was relatively high (84%), and their perception of the use of coenzymes was positive (82%). The Pancasila Student Profile Strengthening Project is considered effective in increasing education about organic waste management (86%), but active participation in the project is still moderate (76%). Students' awareness of the importance of reducing organic waste after P5 activities was reflected in the motivation value of 4.0 (80%) and the impact of the Pancasila Student Profile Strengthening Project on environmental awareness (90%). Respondents are also aware of integrating Pancasila Student Profile values in this project (84%). These results indicate that the Pancasila Student Profile Strengthening Project effectively supports understanding and awareness of sustainable lifestyles. This study shows that overall, students have a positive perspective on the integration of sustainable lifestyles through the use of coenzymes.

Keywords: *Eco-Enzyme, Merdeka Curriculum, Pancasila Student Profile Strengthening Project, Sustainable Lifestyle*

INTRODUCTION

Education plays a vital role in instilling environmental awareness from an early age. Integrating sustainability principles in the curriculum is wider than theoretical teaching. Still, it must also include practices that teach students to implement sustainable lifestyles in daily activities. Education that prioritizes sustainability aspects can prepare the younger generation to face global challenges such as climate change and environmental degradation. In addition, an interdisciplinary approach is needed to integrate sustainability into existing subjects thoroughly. Associating Pancasila values, such as cooperation and love of the environment, with sustainability practices can foster a sense of collective responsibility among students (Zen et al., 2022). For example, collaborative projects involving composting or repurposing organic waste in schools can help students understand the relationship between sustainability theory and practice in more depth (Ali et al., 2024). Awareness of the importance of a sustainable lifestyle has become a global concern as one of the efforts to protect the environment and slow down the destruction of nature. The Indonesian government has sought to integrate sustainability values through various educational policies, including the Pancasila Student Profile Strengthening Project program, which is part of the Merdeka curriculum (Abdullah, 2024).

The Pancasila Student Profile Strengthening Project is designed to instill Pancasila values, such as cooperation, social justice, and love for the environment, which are expected to form the character of students who are not only intellectually intelligent but also have high social and environmental awareness (Fitriyah et al., 2022). One of the main themes in the Pancasila Student Profile Strengthening Project is a sustainable lifestyle, which aims to foster awareness and environmentally friendly behavior among students (Rachman et al., 2024). However, implementing this concept faces various challenges, especially regarding understanding and application among students.

Several studies indicate that students' understanding of a sustainable lifestyle still needs improvement, especially regarding daily actions. Students tend to see sustainability only as limited to waste reduction or reforestation, without realizing the importance of other aspects such as consumption patterns and the wise use of resources (Olabi et al., 2023), in addition, there is a gap between the knowledge they acquire in school and the application of sustainability principles in daily life, both in the school environment and at home (Steviani, 2020).

Another challenge is the need for an understood link between Pancasila values and sustainability principles. Students often do not fully realize that values such as cooperation and love for the environment are integral to a sustainable lifestyle (Utari & Afendi, 2022), even though the integration between Pancasila values and sustainability has excellent potential to form attitudes and behaviors that are more responsible for the environment. In this case, an analysis of students'

understanding of the concept of a sustainable lifestyle, as well as Assessing the impact of the Pancasila Student Profile Strengthening Project program on changes in students' attitudes and behavior in adopting a sustainable lifestyle, needs to be done.

LITERATURE REVIEW

Sustainable life is a development that meets today's needs without compromising the ability of future generations to meet their needs (Böhme et al., 2022). In education, the importance of teaching sustainable life is to foster students' awareness of sustainability and its impact on their daily lives and the global community. The Ministry of Education and Culture stated that education integrated with sustainability will prepare students to become responsible and environmentally conscious citizens who can critically and creatively solve environmental problems (Wahono et al., 2021).

The Merdeka Curriculum provides space for integrating the concept of sustainable life into the learning process, both through projects and thematic learning. Students are taught to understand environmental challenges, including environmental pollution. This learning is relevant because it supports the development of students' character to care about global issues and actively contribute to preserving the environment (Rusnaini et al., 2021), project-based learning allows students to understand the relationship between theoretical knowledge and its application in real-life situations, especially in the context of sustainability (Sidauruk et al., 2022). Sustainable lifestyles include practices that minimize negative impacts on the environment while still meeting the needs of life. This can be implemented in schools through curricula, extracurricular activities, and daily practices supporting sustainability. Ravyansah & Abdillah (2021) emphasized that education for sustainable development (ESD) should integrate action-based learning to increase students' critical awareness of environmental issues. The Independent Curriculum, implemented in 2020, places the Pancasila Student Profile Strengthening Project as one of the main elements in student character development. The Ministry of Education and Culture also stated that the Pancasila Student Profile Strengthening Project serves as a framework to help students internalize Pancasila values through real projects relevant to their environment and life. Students' involvement in sustainability programs increases their sense of responsibility and environmental awareness. Studies show that programs directly involving students in school activities such as tree planting, waste management, and energy conservation increase their understanding and concern for environmental issues. This kind of program also helps students develop leadership and teamwork skills. Implementing programs such as eco-schools, which have been implemented in various countries, shows positive results in building a school culture that cares about the environment. Students are invited to plan, implement,

and evaluate sustainability initiatives, which are further strengthened with support from the school and the community. Environmental education through this activity has succeeded in instilling sustainability values in students, increasing their awareness of the environment (Ikbal et al., 2024; Mgbechidinma et al., 2024).

RESEARCH METHODOLOGY

This research uses a quantitative descriptive survey method to collect quantitative data from specific samples to describe or explain the characteristics, phenomena, or variables studied without making cause-and-effect relationships (Aida et al., 2024). This method can be helpful because it provides descriptive data, is efficient for decision-making, and measures perceptions and experiences. The instrument used is questionnaires that include various indicators, such as understanding the concept of coenzymes, project participation, and motivation to apply coenzymes in daily life. Data was obtained from 100 randomly selected respondents based on the total number of students who participated in the Pancasila Student Profile Strengthening Project program. The data obtained were analyzed using descriptive statistical methods. Each question item is analyzed to produce an average score and a percentage representing the respondent's level of understanding, participation, and perception. The average score of each indicator is calculated to determine students' level of understanding, perception, and motivation. The average score is compared with the assessment criteria to interpret the survey results. The purpose of this study is to determine students' understanding of the concept of sustainable lifestyle and how they interpret sustainability in the context of daily life. This study provides in-depth insight into students' understanding, perception, and motivation toward integrating coenzyme in the Pancasila Student Profile Strengthening Project.

RESULT AND DISCUSSION

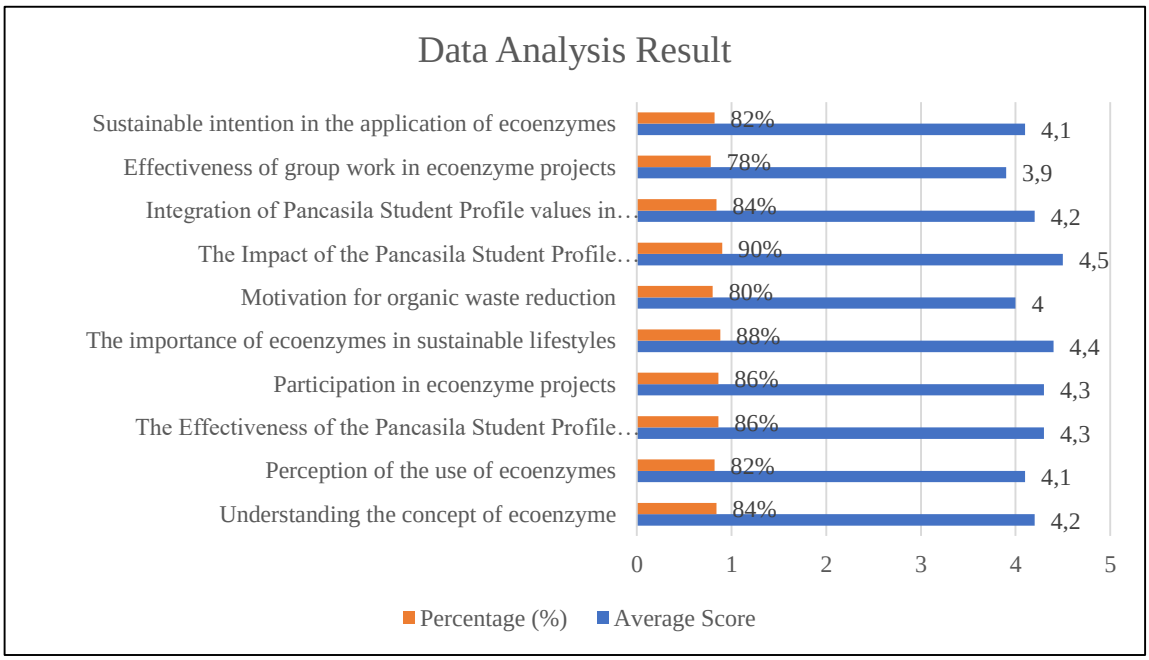

Figure 1. Data Analysis Result

Based on the data obtained, the coenzyme concept understanding indicator has an average value of 4.2 (84%). This number shows that most students understand what coenzyme is and how it is made. This good understanding shows that teaching methods, such as theoretical explanations supplemented with practical demonstrations, effectively convey information. A deep understanding of the concept of coenzymes is an essential foundation for building greater awareness of sustainability practices (Ullberg et al., 2024).

The indicator of perception of the use of coenzyme recorded a score of 4.1 (82%), which illustrates that students have a favorable view of the use of coenzyme. Their understanding and practical experience likely influenced this good perception during the project. Although this figure is slightly lower than the conceptual understanding, it still shows that students see coenzymes as a viable alternative in organic waste management. One of the reasons why this perception does not reach higher values may be related to the challenges in integrating exoenzymes into everyday habits, such as the availability of raw materials or the ease of the manufacturing process (Das et al., 2024).

The effectiveness of the Pancasila Student Profile Strengthening Project in organic waste treatment education stands out with a score of 4.3 (86%), which is one of the highest values in this study. This indicates that the Pancasila Student Profile Strengthening Project has succeeded in becoming an effective educational platform for students in understanding and practicing organic waste management. The Pancasila Student Profile Strengthening Project encourages students to actively learn and engage in meaningful projects, strengthening their understanding of social

and environmental responsibility (Nurhayati et al., 2022). With an approach combining theory and practice, it is easier for students to understand the immediate benefits of the activities. However, participation in the coenzyme project only obtained a 3.8 (76%) score, which is lower than other indicators. Although this figure is still in the excellent category, these results indicate that some challenges are faced in increasing student participation. Factors such as time constraints, diverse interests, and lack of external support can affect students' active participation (Riyanta et al., 2023). Therefore, additional strategies are needed to encourage greater engagement, such as providing incentives or creating activities that are more engaging and relevant for students. The indicator of the importance of coenzyme in sustainable lifestyle has an average score of 4.4 (88%), which shows that students are well aware of the importance of coenzyme as a solution to support sustainable lifestyles. This awareness reflects that students not only view coenzyme as a momentary project, but also as a practice that can be integrated into daily life to reduce environmental impact (Benny et al., 2023). Strengthening this awareness is very important because building a sustainability mindset in the younger generation will contribute to creating more environmentally responsible behavior.

The motivation of students to reduce organic waste also got a relatively high average score, namely 4.0 (80%). This shows that students have a solid drive to reduce waste and contribute to keeping the environment clean. However, this number indicates room for improvement, especially in turning that motivation into consistent concrete action (Samudyatha et al., 2024). One of the challenges in maintaining student motivation is to provide a concrete example of the application of coenzyme in their environment and emphasize its long-term benefits. The impact of the Pancasila Student Profile Strengthening Project on environmental awareness received the highest score among all indicators, namely 4.5 (90%). This shows that the Pancasila Student Profile Strengthening Project program is very effective in instilling environmental awareness in students. The interactive and contextual learning approach applied in the Pancasila Student Profile Strengthening Project touches on the emotional aspects of students, making them more concerned about the environment (Supriyanto et al., 2023). This awareness is a crucial first step in changing student behavior and becoming more proactive in environmental conservation efforts.

The integration of the Pancasila Student Profile value in the coenzyme project obtained a score of 4.2 (84%), which shows that this project not only focuses on technical aspects, but also strengthens the formation of student character. Values such as mutual cooperation, social care, and responsibility are reflected in student participation in this project. This is important because it forms students who are not only academically intelligent, but also have good moral and social values (Yurike Ernawati, 2020). The effectiveness of group work in the coenzyme project, which scored 3.9 (78%), indicates that collaboration between students is quite good but

still needs improvement. Effective teamwork requires clear communication, fair division of tasks, and good coordination.

Challenges in the effectiveness of group work can be related to differences in communication skills and confidence levels between students (Ida lutfi ayuningtyas & Pramono, 2023). In order to improve these outcomes, teachers can provide more in-depth guidance on how to work efficiently in groups and problem-solving strategies within teams. The continued intention to apply coenzyme in daily life scored 4.1 (82%), indicating that students have a desire to continue this practice after the project is completed. However, this desire requires continued support in the form of coaching programs or follow-up activities involving the school community (Putro, 2023). Consistency in coenzyme practice can be maintained with periodic counseling, reinforcement of actual practice examples, and support from schools and parents. Overall, this study revealed that coenzyme-based projects significantly positively impact students' understanding, perception, motivation, and awareness. The main challenge that needs to be overcome is increasing active participation and effectiveness of group work. With continuous efforts to improve these aspects, this project can be more effective in instilling awareness and sustainable behavior in students. The integration of the values of the Pancasila Student Profile in this activity adds an essential dimension to character education, which is in line with the goal of national education to form a generation of intelligence and character.

CONCLUSION

This study shows that, overall, students have a positive perspective on the integration of sustainable lifestyles through the use of coenzymes. The research results show that the coenzyme-based Strengthening the Pancasila Student Profile (P5) Project has effectively supported education and increased students' awareness of sustainable lifestyles. The level of student understanding is relatively high (84%), with a positive perception of using coenzymes (82%). This program was also considered effective in increasing education related to organic waste management (86%), although active student participation in the project was still moderate (76%). Students' awareness of the importance of reducing organic waste increased, reflected in student motivation (80%), and the project's impact on environmental awareness was excellent (90%). In addition, the integration of Pancasila Student Profile values in this project was also recognized by students (84%). Overall, this project succeeded in strengthening students' understanding and awareness of environmental issues and supporting the application of Pancasila values in everyday life. Next, a thematic learning module that integrates the concept of coenzymes and organic waste management needs to be developed to be used in the Strengthening Pancasila Student Profile Project activities and classroom learning.

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