

## **The Infusion of Science into Sustainable Lifestyles Project: A Case Study of Implementing a Merdeka Curriculum at Six Sekolah Penggerak in West Java**

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### **Abstract:**

The Infusion of Science into Sustainable Lifestyles Project was a case study conducted in six elementary schools in West Java, Indonesia to examine the implementation of a Merdeka Curriculum. A project aimed at increasing students' awareness of the principles of Pancasila, a set of national values, and promoting sustainable lifestyles. The study used a case study research method, including observations, interviews, and document analysis, to understand the development and implementation of the project. The results showed that the project included a variety of activities, such as games, simulations, and discussions, to engage students and help them understand the principles of sustainable living. The study also found that integrating science content, such as information about ecosystems and the environment, was an effective way to enhance the sustainability theme of the project. The researchers concluded that the Infusion of Science into Sustainable Lifestyles Project was successful in promoting sustainable lifestyles among students and recommended continued implementation and evaluation of the project in the future.

### **Keywords:**

Science, Merdeka Curriculum, Sekolah Penggerak, Project Profil Pelajar Pancasila'

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## Introduction

The Strengthening Pancasila Student Profile Project in the Merdeka Curriculum is a project that aims to increase student's awareness of the principles of Pancasila and instill the values contained in Pancasila in students' daily lives (Hamidah, 2022; Nurasiah et al., 2022). This project may be part of the government's efforts to promote Pancasila as the country's foundation and increase students' awareness of the importance of Pancasila in social life.

The implementation of project-based learning is a fundamental choice in the Merdeka curriculum, which is believed to support the recovery of character learning in students through the Pancasila Student Profile (Irawati et al., 2022; Nurtrianik, 2022). In project-based learning, students learn by actively participating in the process of planning, carrying out, and evaluating a project (Hartoyo, 2022; Nurasiah et al., 2022). This approach allows students to apply their knowledge and skills to solve real-world problems, develop critical thinking and problem-solving skills, and foster creativity and innovation (Sholeh et al., 2021; Rizal et al., 2022). The Merdeka curriculum emphasizes the importance of character education in fostering responsible and democratic citizens, and the use of project-based learning is seen as an effective way to support the development of these values in students (Lubaba & Alfiansyah, 2022).

The Pancasila student profile strengthening project takes up 20-25% of the total number of class hours in school. The project activities can be carried out using a block system, partial system, or a combination of both. This is determined by each school. One of the themes carried out in the curriculum is a sustainable lifestyle (Kemdikbudristek, 2022). Sustainable lifestyles are those that consider the needs of the current generation without compromising the needs of future generations. This can be achieved by managing resources wisely and minimizing negative impacts on the environment (Annur & Sari, 2022).

Infusing science can help students understand the basic principles of sustainable lifestyles (Songer & Linn, 1991), such as energy efficiency, reducing plastic use, and reducing waste (Rahmawati et al., 2022). Through engaging and fun learning, students can learn how to apply these principles in their daily lives, such as by conserving energy at home, reducing plastic use, and properly managing waste. Sustainable lifestyle, also known as sustainable living, is an effort to base one's behavior on sustainable living. It is not only about personal health and lifestyle, but also about the lifestyle and patterns related to the process of preserving the natural environment (Ayu et al., 2019; Nurhayati et al., 2016). The pattern of sustainable living is based on the principles of sustainability, which aim to meet the needs of the present without compromising the ability of future generations to meet their own needs. This includes reducing the use of non-renewable resources, minimizing waste and pollution, and adopting practices that are environmentally friendly.

There have been numerous studies conducted on ESD in Indonesia, with a primary focus on classroom and university learning, predominantly in the field of science, there is still a need for a fresh perspective. It would be highly valuable to explore new insights and strategies for integrating a more balanced approach to science education in non-curricular activities, such as the Pancasila Student Strengthening Project within the Merdeka Curriculum. Examining the development of modules and the integration of ESD content within these projects.

In addition, infusing science can also help students understand how sustainable lifestyles can improve their quality of life and the overall well-being of society, as well as how it can help preserve the sustainability of the environment in the future. The purpose of this study was to explain the steps for developing the Project Module for Strengthening Pancasila Student Profiles by the Mobilizing School

Community and integrating science content into Project activities for Strengthening Pancasila Profiles on the theme of a sustainable lifestyle.

### **Research Method**

This research was conducted in six schools in the West Java Province. These schools implemented the Merdeka Curriculum in the first year and it was implemented in grades 1 and 4. The study involved six school principals, six of grade 1 teachers, and six of grade 4 teachers. Out of the 12 participating teachers, four were male and eight were female. The teachers' ages ranged from 25 to 36 years old, with teaching experience of six years or more.

The case study method was employed in this research as it aimed to gather information from real-life situations. Thus, this study is capable of providing practical solutions for practitioners. Moreover, through the case study approach, a deep analysis of a particular situation can be conducted, leading to comprehensive information.

The research lasted for three months during the implementation of the Pancasila Student Profile Strengthening Project. The project activities were conducted regularly on Saturdays for 4 sessions of 35 minutes each. The developed projects focused on sustainable lifestyle that correlates with the local society's social, economic, and cultural conditions. Three schools focused on waste management, while the other three schools chose the theme of cultivating plants as an energy source.

Data collection techniques carried out through were observation, interviews, and documentation studies. The researchers made non-participatory observations, directly observing events such as student-teacher interactions and classroom activities. Interviews were conducted with various informants, including teachers, students, and school principals, in a structured, semi-structured, or unstructured manner, depending on the research objectives. Data related to the case studies, such as activity reports, project schedules, project flow, and teaching materials, were collected for analysis. Documentation studies provided valuable information about the conditions and processes that occur in the field.

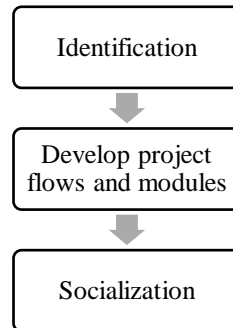
The data collected from observations, interviews, and documentation were analyzed through several steps, including data organization, data categorization, data interpretation, and data triangulation. Triangulation was performed to compare and cross-reference the research findings based on the data from observations, interviews, and documentation. Triangulation strengthened the validity of the data analysis conducted.

### **Results and Discussion**

#### **1. The steps for the development of the Project Module to Strengthen Pancasila Student Profiles by Sekolah Penggerak Community**

The research was conducted through direct observation, interviews and documentation studies. The results of observations found that the steps for developing the project module to strengthen the profile of Pancasila students were carried out through three stages. The first stage identifies the characteristics of the school environment. There are two characteristics identified, the first is the natural environment and the second is the social environment. the natural environment in the observed school has a mountainous geographical area with a dominance of plantations. The second is social relations, the characteristics of the social environment of the school can be identified through the background of the students' parents who have jobs as farmers or daily laborers. The second step is to create a curriculum or project module with inter-school facilitation groups. This activity is carried out together in a community or teacher work group. The teachers' working

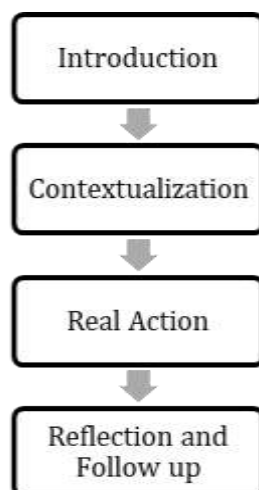
group formulates together the themes to the steps taken in carrying out the Pancasila students profile strengthening project. The third step is socialization. The socialization was carried out by the Project Facilitator for each school to parents and to the relevant agencies.



**Figure 1. The Flow of Compiling Project Activities**

The flow of project module activities was carried out with the theme of a sustainable lifestyle by compiling the topic "My waste is my responsibility" with a total of 57 hours of lessons. The dimensions of the Pancasila student profile taken are faith and piety to God Almighty, working together and thinking critically. The first directed supplements are to understand the connectedness of ecosystems, protect the natural environment, cooperate, have social coordination, ask questions, identify, clarify, and process information and ideas. Project activities are divided into four stages including introduction, contextualization, action and then ending with the reflection and follow-up stages.

The introduction stage is aimed at recognizing and building students' awareness of the waste management issues and their implications for climate change. The introduction phase includes several activities, the first is climate change and waste management issues, the second is exploration in the form of initial reflections and visits to landfills or waste care communities, and the third is discussing critical waste issues.



**Figure 2. The Stages of Project**

The second stage is the contextualization stage which aims to contextualize problems in the immediate environment, carried out through organizing and presenting data collection.

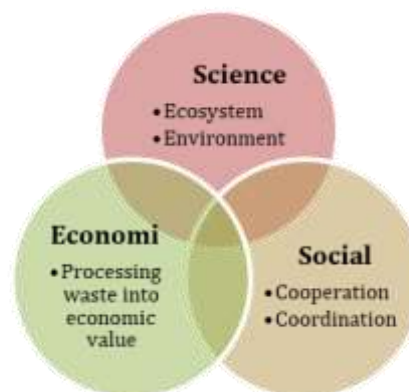
The third stage is the real action stage which includes four poster-making activities. Love My School real-action posters can be themed on my role and solutions in waste management at school, and do a self-assessment of the posters they make.

The fourth stage is reflection and follow-up which aims to respond to the process with various evaluation and reflection works and develop strategic steps in action to maintain the school environment with proper waste management.

Project-based learning (PjBL) has gained popularity as a teaching method in integrated science education because it has been shown to be effective in improving 21<sup>st</sup>-century skills (Cigdemoglu & Köseoğlu, 2019; Arifin et al., 2021; Domenici, 2022; Haatainen & Aksela, 2021) and promoting a connected worldview. It involves students actively participating in the process of planning, carrying out, and evaluating a project, which allows them to apply their knowledge and skills to solve real-world problems (Miller et al., 2021; Pranjol et al., 2022). PjBL can develop critical thinking and problem-solving skills, and foster creativity and innovation (Yaacob et al., 2020). PjBL has been widely researched and has been incorporated into many curriculum reforms as a promising approach to education (Haatainen & Aksela, 2021). Through the process of completing projects, students can develop a sense of belonging and a stronger sense of identity, as well as an understanding of the values that are important to preserve. For example, when students are faced with an ethical dilemma in reporting their findings, such as whether to include negative results or results that do not match their expectations, they can learn about the importance of honesty and transparency in their work. Through these experiences, students can learn to understand and recognize the ethical responsibilities that come with being a member of a community (Garzón-Díaz, 2021).

## **2. Integrating science content into the activities of the Pancasila Profile Strengthening Project in sustainable lifestyle theme.**

A sustainable lifestyle takes into account the needs of today's generation without compromising the needs of future generations. This can be achieved by managing resources wisely and minimizing negative environmental impact. Incorporating science helps students understand the core principles of a sustainable lifestyle, such as energy efficiency, reducing plastic use, and reducing waste. Through engaged and fun learning, students learn how to apply these principles to their daily lives such as saving energy, reducing plastic consumption, and disposing of waste properly at home.



**Figure 3. Integrating Science into The Sustainable Lifestyle Project**

Understanding ecosystems and environments plays an important role in mitigating climate change. These roles include: *First*, Understanding climate change mechanisms. By understanding ecosystems and the environment, we can understand the mechanisms of climate change. *B*. Factors affecting climate change, its impact on human livelihoods and ecosystems, and methods of measuring climate change. *Second*. Awareness of the impact of human behavior. Understanding ecosystems and the environment also helps us become more aware of the impact of human activity on climate change. For example, understanding the impact of uncontrolled wildfires and waste disposal can reduce actions that damage the environment and accelerate climate change. *Third*. Understanding climate change mitigation solutions. Understanding ecosystems and the environment also helps us comprehend the solutions we can take to mitigate climate change. Reducing greenhouse gas emissions, improving energy efficiency, or promoting green agricultural practices. *Fourth*. The real call to action. Understanding ecosystems and the environment can encourage real actions more conveniently to reduce climate change, including taking public transportation, buying eco-friendly products, and planting trees in your community. Therefore, understanding ecosystems and the environment is an important step in mitigating climate change and helps us figure out the best way to save the planet for future generations.

There are several ways to integrate science such as ecosystems and the environment into sustainable lifestyle education. *First*. Incorporating science concepts into lesson plans. Science concepts such as ecosystems and the environment can be incorporated into lesson plans for a variety of subjects such as biology, social studies, and geography. This can be done through hands-on activities, discussions, and projects that encourage students to think critically about the impact of their actions on the environment. *Second*. Using a real example, education for sustainable living can be enhanced using examples such as local or global environmental issues to become more meaningful and relevant to students. This helps students understand the importance of sustainable living and how they can make a difference in their own communities. *Third*. Promoting hands-on learning. Activities such as hands-on learning excursions and experiential learning are effective ways to engage students in sustainable living. This style of learning allows students to see the concepts they are learning in action and apply them in a hands-on setting. *Fourth*. Community Partner Involvement. Partnering with local organizations and businesses that focus on sustainability can provide valuable resources and perspectives for sustainable lifestyle education (Akiri & Dori, 2022; Martín-Sánchez et al., 2022). This may include inviting guest speakers, participating in service-learning projects, or visiting local green businesses. Incorporating these strategies effectively integrates scientific concepts such as ecosystems and the environment into sustainable living and helps students understand the importance of sustainable living.

The courses aligned with the goals of education for sustainable development (ESD) (UNESCO, 2017), but there were particular challenges in implementing real-life projects (Carrapatoso, 2021; Hofverberg & Westerlund, 2021). The students showed some understanding, abilities, and motivation related to sustainable living. With younger students, positive outcomes such as increased interest, enthusiasm for nature, and awareness of the possibilities for promoting sustainable development could be seen as progress improvement to become responsible citizens who can reflect on and contribute to sustainable development (Korsager & Scheie, 2019; Nguyen, 2018). It is important to understand sustainability more comprehensively and have a holistic view of sustainable development.

## Conclusion

In conclusion, the Infusion of Science into Sustainable Lifestyles Project was successful in promoting sustainable lifestyles among students in six schools in West Java, Indonesia. The project used a variety of activities, such as games, simulations, and discussions, to engage students and help them understand the principles of sustainable living. Integrating science content, such as information about ecosystems and the environment, was also found to be an effective way to enhance the sustainability theme of the project. Based on these findings, it is recommended that the project should be continued and evaluated in the future to assess its impact on students' understanding and adoption of sustainable lifestyles.

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