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Implementing the Pancasila Student Profile Strengthening Project (P5) through IPAS (Natural and Social Sciences) Instruction: Fostering Responsibility among Elementary School Students

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ABSTRAK

Pelaksanaan Proyek Penguatan Profil Pelajar Pancasila (P5) di sekolah dasar sering kali masih bersifat seremonial dan belum terintegrasi secara optimal dalam penguatan karakter siswa. Penelitian ini bertujuan menganalisis implementasi P5 dalam pembelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) pada materi pencegahan kerusakan lingkungan serta kontribusinya terhadap penguatan karakter tanggung jawab siswa kelas V. Penelitian menggunakan pendekatan kualitatif deskriptif dengan melibatkan kepala sekolah, guru kelas V, dan lima peserta didik di SD Negeri 088 Panyabungan. Data dikumpulkan melalui observasi partisipatif, wawancara semi-terstruktur, dan dokumentasi, kemudian dianalisis menggunakan model interaktif Miles dan Huberman. Hasil penelitian menunjukkan bahwa P5 bertema Gaya Hidup Berkelanjutan dilaksanakan melalui empat tahap, yaitu pengenalan, perencanaan, pelaksanaan, dan evaluasi/refleksi. Kegiatan proyek meliputi daur ulang botol plastik menjadi pot tanaman, pemeliharaan kebun kelas, dan pemilahan sampah organik serta anorganik. Kegiatan tersebut menumbuhkan empat indikator tanggung jawab, yaitu menyelesaikan tugas, bertanggung jawab atas tindakan, melaksanakan piket sesuai jadwal, dan bekerja sama dalam kelompok. Faktor pendukung meliputi kepemimpinan sekolah, keterlibatan guru, ketersediaan sarana, dan partisipasi siswa. Adapun hambatannya adalah kesadaran tanggung jawab siswa yang belum merata dan keterbatasan waktu. Penelitian ini menunjukkan bahwa proyek lingkungan berbasis konteks nyata berpotensi memperkuat karakter tanggung jawab siswa sekolah dasar.

ABSTRACT

The implementation of the Pancasila Student Profile Strengthening Project (P5) in primary schools often remains ceremonial and is not fully integrated into students' character development. This study examines the implementation of P5 in Natural and Social Sciences (IPAS) learning on environmental protection and its contribution to fostering responsibility among fifth-grade students. A descriptive qualitative approach was employed, involving the principal, a fifth-grade teacher, and five students at SD Negeri 088 Panyabungan. Data were collected through participatory observation, semi-structured interviews, and documentation, then analyzed using the Miles and Huberman interactive model. The findings show that the Sustainable Lifestyle theme was implemented through four stages: introduction, planning, implementation, and evaluation/reflection. Project activities included recycling plastic bottles into plant pots, maintaining a classroom garden, and sorting organic and inorganic waste. These activities fostered four indicators of responsibility: completing assigned tasks, being accountable for actions, carrying out scheduled duties, and collaborating in groups. Supporting factors included school leadership, teacher involvement, available facilities, and student participation. However, uneven student awareness and limited implementation time remained challenges. This study highlights the potential of context-based environmental projects to strengthen responsibility among primary school students.

INTRODUCTION

The curriculum transformation in Indonesia through the Independent Curriculum places character building as one of the main objectives of national education, in line with the

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Regulation of the Minister of Education and Culture Number 22 of 2020 concerning the Strategic Plan of the Ministry of Education and Culture for 2020-2024. One of the main instruments to achieve this goal is the Pancasila Student Profile Strengthening Project (P5), a project-based co-curricular activity designed flexibly in terms of content, activities, and implementation time to strengthen the achievement of student competencies and character according to the Graduate Competency Standards (Tinggi and Sains 2026). As a new learning paradigm, P5 is designed separately from intracurricular activities, is interdisciplinary, contextual, and student-centered, thus providing space for schools to address real issues within their respective educational units (Satria et al. 2022) (Haris and Hikmah 2024).

One of the P5 themes relevant to environmental issues is Sustainable Lifestyle, which at the elementary school level can be integrated with Natural and Social Sciences (IPAS) learning, especially in the sub-material on preventing environmental damage on earth. The Splash IPAS Student Book for Elementary School/Islamic Elementary School Grade V contains material on reducing pollution from waste and preventing erosion which is conceptually aligned with efforts to strengthen students' character of responsibility towards their surrounding environment. This kind of integration provides opportunities for students to not only understand environmental concepts cognitively, but also practice the value of responsibility through real actions, such as sorting waste, caring for plants, and recycling used materials(Mulyono, Mardiyyaningsih, and Candramila 2026).

The character of responsibility is a crucial concern because it is directly related to the readiness of the younger generation to face future social and ecological challenges. Studies on project-based learning at the elementary school level in various regions of Indonesia show that authentic, problem-oriented project-based learning fosters positive character values, including discipline, independence, and responsibility, more meaningfully than conventional learning (Arrasyid, Herpratiwi, and Yulianti 2022) (Afriana, Permanasari, and Fitriani 2016). Similarly, a systematic review of environmental education articles in Scopus-indexed journals in Indonesia confirms that project-based approaches and hands-on experiences are the most effective strategies in fostering environmental awareness and responsibility in elementary school-aged students (Husamah et al. 2022) . These findings reinforce the argument that environmental-themed P5 has great potential as a vehicle for character building, as long as it is designed and implemented systematically, not merely ceremonially.

The implementation of the Project for Strengthening Pancasila Student Profiles (P5) serves as a vital context-based learning space aimed at fostering students' sense of responsibility through the exploration of environmental issues. However, field practice

reveals that P5 implementation in elementary schools remains suboptimal; many educational units encounter challenges in planning and executing projects systematically, leading to activities conducted superficially without deep alignment with targeted character values(Melati, Ardianti, and Fardani 2021). Furthermore, while previous literature has addressed P5 and project-based learning broadly, it has yet to provide an in-depth examination of the relationship between environmental project activities and the manifestation of student responsibility specifically within the context of Natural and Social Sciences (IPAS) education. This condition is mirrored in the domestic domain the foundational environment for character formation where research on fifth-grade students in Mandailing Natal demonstrates that practicing Pancasila values like responsibility relies heavily on consistent parental guidance and alignment between family and formal school education (Lubis and Hanida 2025). Addressing this gap, the present study moves beyond site-specific novelty by mapping environmental project activities directly against observed instances of responsible behavior, analyzing the intricate interplay among project dynamics, habituation processes, and the indicators of a responsible character within a structured school setting.

SD Negeri 088 Panyabungan, as one of the public elementary schools in Mandailing Natal Regency, has implemented the Independent Curriculum and implemented P5 with the theme of Sustainable Lifestyle which is integrated with science learning material on preventing environmental damage on earth. Initial observations show that some fifth grade students have not shown a consistent awareness of responsibility in maintaining the school environment, for example, they still need to be reminded to throw trash in the right place or carry out class duty according to schedule. This gap between the normative objectives of P5 and the real conditions in the field is the basis for the need for an in-depth study of how P5 is actually implemented and the extent to which these activities are able to strengthen the character of responsibility of students, as well as what factors support and hinder the process.

Based on the description, this article aims to: (1) describe the implementation of the Pancasila Student Profile Strengthening Project (P5) in science learning on the topic of preventing environmental damage on earth in grade V of SD Negeri 088 Panyabungan, and (2) identify the supporting and inhibiting factors faced by teachers in strengthening students' responsible character through P5. Different from previous P5 studies which were generally descriptive or meta-analytical (Laili 2024), this article provides a more detailed mapping between the types of project activities and the resulting indicators of responsible character, so that the findings of this study are expected to provide theoretical contributions to the

development of studies on the implementation of P5 in science learning, as well as practical contributions for teachers, schools, and educational policy makers in designing project activities that are more directed at strengthening the responsible character of elementary school students.

RESEARCH METHOD

This study employed a qualitative approach with a descriptive qualitative method, which aims to provide detailed explanations, descriptions, and descriptions of naturally occurring social phenomena without any manipulation or intervention by researchers (Murdiyanto 2020). This approach was chosen because the study aimed to deeply understand the implementation process of P5 and strengthen students' sense of responsibility based on real-world phenomena, as is common in naturalistic research conducted in natural settings (Abdussamad and Sik 2021).

The research was conducted at SD Negeri 088 Panyabungan, Panyabungan Kota District, Mandailing Natal Regency, North Sumatra. The research subjects consisted of primary data sources, namely the principal, fifth-grade teachers, and fifth-grade students. Of the 30 fifth-grade students who were the population, five people were selected as interview informants through purposive sampling techniques based on the homeroom teacher's considerations, taking into account variations in the level of awareness and character of responsibility shown during learning activities and P5, so that a more diverse picture was obtained. Secondary data sources included teacher learning device documents (teaching modules and P5-based lesson plans), fifth-grade science student books (Splash), photos and notes of project activities, and relevant school archives (Sugiyono 2022).

Data were collected through three complementary techniques. First, participatory observation was conducted with all 30 fifth-grade students during the implementation of science learning and P5 activities, focusing on student involvement in project activities, carrying out tasks and duties, group cooperation, and concern for the cleanliness of the school environment. Second, structured and unstructured interviews were conducted with the principal, class teachers, and five selected students to explore the planning process, implementation, and supporting and inhibiting factors for P5 implementation. Third, documentation was used to strengthen and verify the data from the observations and interviews through learning tools, activity photos, and school archives.

Data validity was tested through source triangulation and technical triangulation. Source triangulation was conducted by comparing information obtained from the principal, class teachers, and students regarding the same phenomenon, while technical triangulation was conducted by comparing the results of interviews, observations, and documentation on the same focus of the study, so that mutually reinforcing data can be accounted for in terms of validity (Murdiyanto 2020). Data were analyzed using the interactive model of (Miles, Huberman, and Saldana 2014)which consists of three stages: (1) data reduction, namely selecting, focusing, and simplifying data directly related to the implementation of P5 and indicators of responsible character; (2) data presentation, namely organizing selected data into narrative form and thematic matrices so that the pattern of relationships between categories appears more clearly; and (3) drawing conclusions and verification, which were carried out repeatedly until the data saturation point was reached. The responsibility character indicators used as an analytical framework in this study adapt four indicators developed by (Melati and Rini 2024), namely doing assignments and homework well, being responsible for every action, carrying out duties according to schedule, and working on group assignments together.

This study employed a qualitative case study approach to explore the implementation of environmental projects within Natural and Social Sciences (IPAS) instruction in depth. The research focused on a single fifth-grade class comprising 30 students, reflecting the natural and actual classroom dynamics in the field (real-life setting). To establish a clear methodological distinction, all 30 students served as observation subjects to monitor behavioral patterns and engagement throughout the project activities. From this group, 5 students were purposively selected as interview informants based on variations in their demonstrated responsibility behaviors (ranging from high, moderate, to needing guidance) to gain deeper insights into their individual experiences and perceptions.

Data analysis was conducted systematically using qualitative coding procedures. Transcripts from in-depth interviews and observational field notes were coded and categorized against the four primary indicators of responsibility: (1) completing tasks well, (2) taking responsibility for one's actions, (3) carrying out duty schedules consistently, and (4) collaborating effectively in groups. Subsequently, the coded qualitative data were correlated and validated against documentary evidence through source and technique triangulation. Cross-referencing these data streams ensured data trustworthiness and provided a rigorous, evidence-based synthesis of the findings.

Table 1. Characteristics of Research Informants

Informant	Role/Description	Data collection technique
Principal (FI)	Policy makers for implementing P5 at the educational unit level	Interviews, documentation
Grade V Teacher/Science Teacher (S)	The main designer and facilitator of P5 activities in science learning	Interviews, observations, documentation
YK students	Demonstrate consistent responsibility (plant care, duty)	Interviews, observations
SA students	Representing students who still need reminders	Interviews, observations
NU students	Active in creative activities recycling used materials	Interviews, observations
US students	Active in waste sorting and mutual cooperation activities	Interviews, observations
ZA students	Active in class garden/park maintenance activities	Interviews, observations

RESULT AND DISCUSSION

Context and Stages of Implementation of P5 in Science Learning

SD Negeri 088 Panyabungan is a public elementary school that has implemented the Independent Curriculum with an A accreditation (score 92), located in Panyabungan Kota District, Mandailing Natal Regency. This school has 872 students spread across six study groups, with 157 students in grade V divided into several parallel study groups, one of which is the location of this research. The availability of supporting facilities such as 33 trash bins, a school yard, and a garden area are important assets for the implementation of P5 with the theme of Sustainable Lifestyle which is integrated with science learning material on preventing environmental damage on earth.

The implementation of the Project for Strengthening Pancasila Student Profiles (P5) integrated within Natural and Social Sciences (IPAS) instruction was carried out through three main stages: planning, executing environment-based projects (class gardens and organic-inorganic waste sorting), and reflection and evaluation. During the planning stage, teachers developed structured task rubrics and role assignments to ensure that every activity carried clear accountability metrics. Throughout the execution phase, these environmental

activities consistently elicited four primary indicators of responsibility: completing tasks well, taking responsibility for one's actions, carrying out cleaning duties according to schedule, and working together in groups. Photographic documentation and observational field notes demonstrate that the classroom and garden areas served as an active social laboratory where these behavioral indicators were concretely expressed by students.

Nevertheless, field findings revealed significant behavioral variation among the 30 fifth-grade students observed. A subset of students demonstrated high autonomy and awareness in managing the class garden and sorting waste without requiring repeated instructions. Conversely, other students were at a developmental stage that still required verbal scaffolding, frequently neglecting their duty schedules or incorrectly sorting waste until the teacher stepped in with direct prompts and reminders. Interview evidence with student informants confirmed that teacher reminders do not indicate project failure, but rather represent a natural pedagogical function within the gradual habituation of student character.

This variation in student responses and reliance on teacher reminders constitutes a significant finding, emphasizing that the development of a responsible character does not occur instantaneously or uniformly. Character evolves as a dynamic, contextual process wherein external cues from educators progressively transform into internal self-regulation. In-depth interviews with five key informants selected based on their varying baseline levels of responsibility revealed that constructive feedback and consistent prompts helped them recognize the direct consequences of task neglect on group dynamics and the overall sustainability of their environmental project.

This character-strengthening process was further validated through data triangulation comparing interview transcripts, daily observational notes, and photographic documentation. Cross-referencing these data streams confirmed that habituation through structured IPAS projects effectively shifts student behavior from instructive reliance (dependency on teacher prompts) toward greater self-directed accountability. Consequently, the novelty of this research lies not merely in its specific geographical setting, but in its in-depth analysis of the complex interplay between environmental project activities, dynamic habituation processes, and the manifestation of responsibility character indicators in elementary education.

Observation and interview results indicate that the implementation of P5 in grade V takes place on a schedule for one week in a month and follows four sequential stages, as summarized in Table 2. In the introductory stage, the teacher explains the material on preventing environmental damage on earth accompanied by trigger questions so that students

can identify waste problems in the school environment independently. As stated by the principal, the P5 activity is designed so that students "produce creativity as a value of P5" at the end of the implementation week, which shows that this project is oriented towards real products, not just a one-way delivery of material.

Table 2. Stages of Implementation of P5 Sustainable Lifestyle Theme in Science Learning

Stage	Teacher Activities	Student Activities	External
Introduction	Delivering science material on preventing environmental damage; providing stimulating questions	Identifying waste problems and environmental damage around the school	Initial understanding of environmental issues
Planning	Form groups evenly; divide tasks and sub-themes of activities	Developing group activity plans, role assignments, and schedules	Project plan per group
Implementation	Provide tools and materials; accompany and direct; intersperse with games	Collecting plastic bottles, painting, planting, sorting waste, and cleaning duty	Recycled products, mini parks, sorted waste
Evaluation and Reflection	Assess the work of each group; give appreciation; utilize the work in the school environment	Presenting project results; reflecting experience and values of responsibility	Assessment of work, flower pots installed in the school yard

Table 2 shows that these four stages do not stand alone, but rather form a mutually reinforcing cycle: conceptual understanding at the introductory stage becomes the basis for action planning, concrete actions at the implementation stage become material for reflection, and reflection in turn strengthens conceptual understanding for the next project cycle. This cyclical pattern is consistent with the principles of project-based learning which emphasize authentic learning experiences based on real problems as the main driver of the formation of knowledge and attitudes of students (Retno et al. 2025)

In the implementation stage, three forms of core activities were found which became contextual vehicles for strengthening the character of responsibility, namely: (1) recycling used plastic bottles into plant pots which were then used to plant flowers in the school yard; (2) managing a mini garden or class garden which included activities of planting, watering, and monitoring plant growth in groups; and (3) sorting organic and inorganic waste using labeled trash bins provided by the school. These three activities were complemented by daily classroom cleaning duties which were carried out in turns outside the special P5 schedule, but

remained part of the habituation of students' responsibility towards their learning environment.

Manifestation of Responsible Character Indicators in P5 Activities

Th

ematic analysis of observation, interview, and documentation data shows that the four responsibility character indicators adapted from (Melati et al. 2021) emerged consistently, albeit with varying intensity across project activities. Table 3 presents a triangulation matrix that maps each indicator to the evidence found and its supporting data sources.

Table 3. Data Triangulation Matrix: Responsible Character Indicators in P5 Activities

Responsibility Indicator	Main Findings Evidence	Supporting Data Sources
Doing assignments and homework well	Students complete the tasks of processing plastic bottles, planting, and sorting waste according to the division of group tasks; try to complete the tasks before the deadline.	Observation of project activities; interviews with students and teachers
Responsible for every action	Students begin to understand the consequences of littering; remind each other when a friend has not completed their assignment.	Student interviews (YK, SA); observation of group interactions
Carry out the duty according to the set schedule	Students take turns watering and caring for the plants; carrying out class cleaning duties, although some still need to be reminded.	Observation of daily routines; interview of homeroom teachers
Doing group assignments together	Equal distribution of roles in the used bottle processing and garden maintenance groups; helping each other when there are difficulties	Group work observation; photo documentation of activities

To substantiate the empirical findings regarding the cultivation of responsible character through the Project for Strengthening Pancasila Student Profiles (P5), a triangulation matrix was developed to cross-reference project activities, observed behavioral manifestations, and core character indicators. The matrix maps data streams from daily observational field notes, in-depth student interviews, and photographic documentation. This qualitative mapping demonstrates how specific activities within the Natural and Social Sciences (IPAS) framework serve as a practical medium for character development, linking observable student actions directly to established theoretical indicators of responsibility.

The first focal activity examined in the matrix is class garden management, which encompasses collaborative tasks such as planting, watering, and plot maintenance. Observational logs revealed that while certain students independently executed their duties according to the assigned roster, others required teacher prompts before storing gardening tools properly. These behavioral dynamics directly reflect the indicators of completing tasks well and carrying out duties according to schedule. Triangulation with interview excerpts—such as statements from student informants acknowledging how neglected watering impacted plant growth combined with photographic evidence of student rosters, validated that accountability was gradually internalized through hands-on participation.

The second focal activity involves organic and inorganic waste sorting across classroom and schoolyard environments. Observation records captured instances where students actively collaborated to categorize waste into designated bins, alongside situations where waste items were mistakenly mixed until corrected through teacher scaffolding. These observations correspond to the indicators of taking responsibility for actions and working together in groups. Cross-referencing these actions with interview transcripts—where informants detailed how group discussions resolved sorting confusion—and visual records of labeled bins confirmed the consistency of peer cooperation and shared accountability during project execution.

This qualitative matrix provides a rigorous evidentiary foundation for the study's conclusions without relying on arbitrary quantitative frequencies. By synthesizing observational logs, interview narratives, and documentary artifacts, the matrix illustrates that character development is a multifaceted, observable process. It confirms that structured environmental projects effectively elicit key indicators of responsibility, while simultaneously accommodating the developmental variations and necessary pedagogical scaffolding observed among students in a real-world elementary classroom setting.

In the third indicator, the habit of being on duty and caring for plants becomes a routine mechanism that trains students' consistency in responsibility, although the research results also show that not all students are able to carry it out independently without reminders from teachers or peers. As for the fourth indicator, group cooperation is clearly visible in the activities of processing used bottles and garden care, which require students to share roles and help each other when a group member experiences difficulties. The class teacher emphasized that the results of students' work are used as flower pots in the school yard as a form of

appreciation and as a reinforcement of the meaning that "they already understand the meaning of cooperation and responsibility."

To clarify the relationship between the type of project activity and the scope of the responsibility character indicators that it manifests, an analysis of the frequency of occurrence of themes was carried out based on the results of qualitative data coding, as presented in Figure 1.

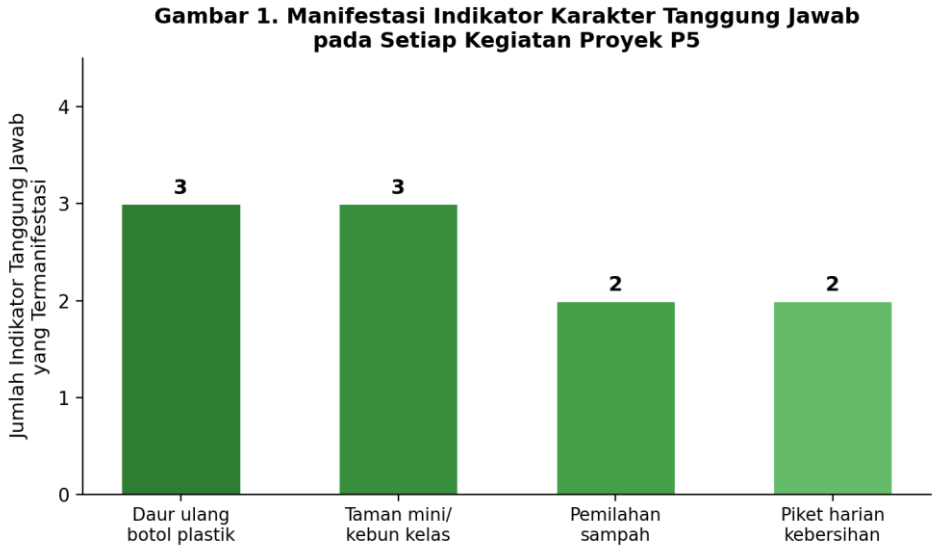


Figure 1. Manifestation of Responsible Character Indicators in Each P5 Project Activity

Figure 1 shows that plastic bottle recycling and classroom mini-garden/garden management exhibit the broadest range of responsibility indicators (three out of four indicators), as both activities require a continuous process from planning, execution, and maintenance of the work over a specific period. Conversely, waste sorting and daily cleaning duties are simpler and more repetitive, resulting in a relatively limited range of indicators (two out of four indicators), although they still play an important role as daily habituation mechanisms that reinforce consistent responsibility. This pattern indicates that longer-term projects involving the production process tend to provide a richer space for the development of various dimensions of responsibility than short-term routine activities, a pattern also confirmed by studies of project-based learning at the elementary school level that emphasize the importance of project duration and complexity as variables influencing the depth of internalization of character values (Arrasyid et al. 2022).

Supporting and Inhibiting Factors for P5 Implementation

The implementation of P5 in strengthening students' responsible character cannot be separated from the interaction of various supporting and inhibiting factors, as summarized in Table 4 and visualized in Figure 2.

Table 4. Supporting and Inhibiting Factors for the Implementation of P5 in Strengthening the Character of Responsibility

Category	Factor	Description
Supporters	Principal support	Providing freedom and direction for teachers to develop P5 activities according to school conditions; encouraging a culture of environmental care throughout the school community.
Supporters	The active role of teachers	Designing, mentoring, evaluating activities; providing examples of responsible behavior and ongoing motivation
Supporters	Facilities and infrastructure	School yards and gardens, labeled trash bins, and easily accessible used materials (plastic bottles)
Supporters	Student participation	Enthusiasm for working together in groups, planting, caring for plants, and carrying out duties without always being reminded.
Inhibitor	Awareness of responsibility is not yet evenly distributed	Some students still need to be reminded to throw away trash, water plants, or carry out their duties according to the schedule.
Inhibitor	Implementation time constraints	Project activities must be adjusted to other learning schedules so that some activities, such as plant care, are carried out in stages.

The principal's support is a fundamental supporting factor because it provides policy legitimacy and flexibility for teachers to design projects that are contextual to school conditions. This aligns with the principles of P5 implementation, which are flexible in terms of content, activities, and time (Haris and Hikmah 2024). The teacher's active role as a facilitator also determines the project's success, as teachers not only deliver science and science material but also serve as role models for responsible behavior that students internalize through imitation and habituation. The availability of facilities such as labeled trash bins and garden areas also facilitate students' direct practice of environmental

knowledge, while active student participation is an absolute prerequisite for project success, as without their direct involvement, the goal of character building cannot be achieved.

On the other hand, the unequal awareness of responsibility among some students reflects the psychosocial developmental characteristics of elementary school-aged children, who are still in the value-formation stage and require repeated practice, not just cognitive understanding. (Wibiyanto and Muhibbin 2021) classifies the factors inhibiting the formation of the Pancasila Student Profile into internal (innate characteristics and personality development stage) and external (family, teachers, and environment) dimensions, both of which are relevant to the findings of this study: differences in awareness of responsibility reflect more internal factors related to the child's developmental stage, while time constraints on project implementation represent external obstacles related to school schedule management. However, these time constraints did not halt the overall project implementation, as teachers continued to optimize the available time by integrating P5 activities into their daily routine of duty and rotating plant care.

Discussion

Comparative Discussion: Interpreting Findings in a Broader Literature Perspective

The mechanism by which environmental project activities foster student responsibility is anchored in experiential learning and social constructivist theories. Participating in class garden management and organic-inorganic waste sorting provides a concrete, contextual medium through which abstract ethical values are rendered tangible. According to Dewey's theory of experiential education, learning and character formation occur through reflective action within meaningful environments. In this study, daily contact with living ecosystems and waste management systems created a continuous feedback loop: when students neglected plant watering or incorrectly sorted waste, the visible consequences (e.g., wilting plants or cluttered sorting areas) triggered cognitive dissonance. This empirical observation aligns with Bandura's social learning theory, as character acquisition occurs not through passive indoctrination, but via active engagement, observation of peer actions, and immediate environmental outcomes that incentivize self-regulation and moral accountability.

Analyzing the relationship between project characteristics and student behavior reveals that distinct activity structures elicit varying dimensions of responsibility. Class garden

management requires sustained, long-term commitment and scheduled routines, primarily fostering task completion and adherence to duty rosters. In contrast, waste sorting involves immediate, decision-based actions that challenge students' moral integrity and peer accountability in real time. Empirical observations demonstrated significant variations in student execution: while high-autonomy students performed tasks independently, others relied on external scaffolding and teacher prompts. This behavioral spectrum corresponds to Vygotsky's Zone of Proximal Development (ZPD) and Kohlberg's stages of moral development. The necessity for teacher reminders does not represent a failure of character education; rather, it marks an essential transitional phase where external pedagogical guidance gradually internalizes into autonomous moral behavior.

The dynamic interplay between school support, pedagogical roles, and material resources serves as a critical catalyst for the habituation process. Consistent leadership from the school principal and proactive facilitation by teachers create an organizational culture that prioritizes value formation alongside academic goals. In accordance with ecological systems theory (Bronfenbrenner), the classroom micro-system functions effectively when supported by appropriate physical infrastructure, such as dedicated garden plots and clearly labeled sorting bins. However, empirical findings also highlight critical inhibiting factors—specifically uneven baseline student awareness and stringent instructional time constraints within the elementary curriculum. When time allocations are restricted, project activities risk being rushed, shifting student focus from reflective value internalisation to superficial task execution.

Ensuring the long-term sustainability of responsible practices requires a strategic alignment between structural school factors, family involvement, and local adaptability. While school-based habituation establishes foundational behaviors, research emphasizes that value retention degrades without home-school continuity and parental reinforcement. To prevent environmental project-based learning (P5) from deteriorating into isolated, one-off exercises, educational units must embed these initiatives within broader institutional routines and adapt project themes to local ecological context. By moving beyond site-specific descriptions to analyze the interplay between project dynamics, scaffolding, and habituation, this study demonstrates that project-based learning in IPAS serves as a viable, transferable model for character cultivation across diverse elementary education settings.

The finding that environmental-themed project activities can strengthen the character of responsibility in elementary school students is in line with a number of empirical studies in Scopus and Sinta indexed journals. (Afriana et al. 2016) in a quasi-experimental study on project-based STEM integrated science learning found that direct involvement of students in solving real problems in their case, the issue of air pollution significantly increased both students' scientific literacy and collaborative skills compared to a control group that received conventional learning. The parallelism of these findings with the results of research at SD Negeri 088 Panyabungan shows that the principle of learning through direct experience (experiential learning) works consistently across levels and across project themes, both on the issue of air pollution at the junior high school level and on the issue of waste management at the elementary school level.

Meanwhile, a study by (Arrasyid et al. 2022) of 95 third-grade students at a private elementary school in Lampung Province using a quasi-experimental method found that the implementation of project-based learning significantly improved students' character traits, including discipline and responsibility, as measured by an open-ended questionnaire. Although the study employed an experimental quantitative design, distinct from the descriptive qualitative design used in this study, the convergence of the two studies' conclusions that project-based learning effectively strengthens the character of responsibility strengthens the belief that the relationship between project-based learning and responsibility is robust and independent of a single research method. A fundamental difference worth emphasizing is that this study uncovers the mechanisms behind these improvements in greater detail by mapping project activity types against specific character indicators, as presented in Figure 1 a depth of analysis that is difficult to achieve through a purely questionnaire-based quantitative approach.

From an environmental education perspective, a systematic review by (Husamah et al. 2022) of twenty-six environmental education articles in the Indonesian Science Education Journal a Scopus-indexed journal in Indonesia identified that project-based learning and hands-on experience were the most dominant strategies used to foster environmentally conscious attitudes and behaviors in students. These findings are reinforced by Naila, Suwono, and Susilo's (2025) recent literature review of environmental literacy research trends in elementary schools, which emphasized that the most successful environmental education programs are those that simultaneously integrate cognitive (environmental knowledge), affective (caring attitudes), and psychomotor (real actions) aspects this pattern of integration

of the three domains is empirically evident in the implementation of P5 at SD Negeri 088 Panyabungan, where students acquire knowledge through the introductory stage (cognitive), build awareness through reflection (affective), and practice responsibility through recycling, planting, and waste sorting (psychomotor).

A study of the family dimension as a supporting factor for character building is also relevant to enrich this discussion. (Lubis and Hanida 2025) found that the practice of Pancasila values in fifth-grade elementary school students in Mandailing Natal was strongly influenced by the consistency of family education, and that values taught only at school without reinforcement at home tended to be short-lived. This finding provides additional explanation for the inhibiting factor of unequal awareness of responsibility among some students in this study: variations in family support backgrounds at home likely contribute to why some students internalized the value of responsibility more quickly than others, despite receiving the same P5 project treatment at school. The implication is that strengthening the character of responsibility through P5 ideally does not stop at school alone, but needs to be communicated to parents so that the values developed at school are consistently reinforced at home, in line with (Lubis and Hanida 2025) recommendation regarding the importance of synergy between family and school education.

In terms of implementation challenges, the finding of time constraints as a limiting factor aligns with global and national reviews of Project-Based Learning for environmental education at the elementary school level, which identified limited curricular time and teacher administrative burdens as recurring obstacles across contexts in both developed and developing countries. However, the study also found that schools that successfully addressed these obstacles generally integrated environmental projects into daily routines rather than treating them as separate, supplementary activities a strategy empirically implemented by fifth-grade teachers at SD Negeri 088 Panyabungan through the integration of daily shifts and rotating plant care into the regular schedule. This convergence of mitigation strategies across different contexts strengthens the argument that integrating projects into daily routines, rather than making them a periodic ceremonial activity, is key to the sustainability of character building through P5.

Overall, this comparative discussion confirms three things. First, the effectiveness of project-based learning in strengthening the character of responsibility is consistent across educational levels and across research designs, both qualitative and quantitative. Second, the

success of P5 as a vehicle for strengthening character depends heavily on the depth of integration of projects with daily learning routines, not just the frequency of implementation. Third, strengthening the character of responsibility through schools needs to be placed within a broader ecosystem that also involves families, so that the values developed through P5 do not remain a fleeting experience but are internalized into students' lifelong habits.

CONCLUSION

This study concludes that the implementation of the Project for Strengthening Pancasila Student Profiles (P5) under the theme of Sustainable Lifestyle in fifth-grade science instruction (IPAS) effectively provides a structured platform for fostering student responsibility. The core empirical finding reveals that the structural characteristics of sustained, long-term project activities such as managing class gardens and recycling initiatives offer students significantly broader, more continuous opportunities to practice and internalize responsibility indicators compared to short-term or routine tasks. Across the cyclic stages of introduction, planning, execution, and reflection, activities that integrate ongoing maintenance, task distribution, and peer collaboration consistently elicit four primary indicators of responsibility: completing tasks well, taking responsibility for actions, executing assigned duties punctually, and working cooperatively in groups.

The practical implications of these findings highlight the need for a shift in pedagogical design within elementary character education. Teachers and curriculum planners must design P5 initiatives that transcend mere product-oriented outcomes (such as producing physical crafts or isolated recycling outputs). Instead, project frameworks should deliberately incorporate structural processes, including equitable task allocation, transparent peer monitoring, continuous maintenance routines, and structured reflective sessions. Furthermore, sustaining character habituation requires overcoming inhibiting factors such as uneven student baseline awareness and strict time constraints by embedding project activities

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