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Integrating Waste Management and Character Education through a School Waste Bank for Elementary Students' Environmental Responsibility

Sri Mulyani^{1a*}, Try Riduwan Santoso^{2b}, Isye Ai Febriani^{3c}, Cia Livia Ferra⁴
^{1,2,3,4} IAILM Suryalaya, Tasikmalaya, Indonesia

asrimulyaniqurotuainy@gmail.com, btryriduwan165@gmail.com × isye.ai27@admin.sd.belajar.id,

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*Correspondence Address:

tryriduwan165@gmail.com

Abstract:

This study aims to describe the implementation of a school waste bank program in developing environmental responsibility among elementary school students. A qualitative descriptive approach was employed at SDN 3 Cikaso, Banjarnegara District, Ciamis Regency, where the waste bank program is implemented as a strategy for school environmental management and character education. Participants included the principal, teachers, students, and school committee members involved in the program. Data were collected through in-depth interviews and observations of waste bank activities and analyzed through data reduction, data display, and conclusion drawing. The findings show that the waste bank program contributes to the development of students' environmental responsibility through habituation in waste sorting and management, maintaining school cleanliness, and cultivating responsibility and discipline. The program also enhances students' understanding of the functional and economic value of waste. These findings indicate that a school waste bank can function not merely as a waste-management mechanism but also as a practice-based medium for character education. Its educational value emerges through the integration of school policy, teacher guidance, active student participation, repeated environmental practices, and collective responsibility. Thus, the waste bank program provides a contextual learning environment in which environmental knowledge is transformed into sustainable pro-environmental behavior among elementary school students.

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Introduction (مقدمة)

Environmental problems have become increasingly complex social issues, particularly in relation to the growing volume of waste and the low level of public awareness regarding waste management. Elementary schools are not exempt from these challenges, as waste is often not managed systematically or sustainably. At the same time, schools play a strategic role in shaping students' character from an early age. The independent implementation of a school waste bank program represents a concrete form of waste-management practice that is oriented not only toward maintaining environmental cleanliness but also toward cultivating environmentally responsible attitudes and behaviors through students' active involvement in all program activities.

Theoretically, character education is a process of instilling values continuously through habituation and direct experience (Lickona, 2013). Environmental responsibility is one of the core values of character education that needs to be developed from the elementary level (Kemendiknas, 2010). Previous studies have shown that school waste bank programs can improve students' environmental awareness, sense of responsibility, and pro-environmental behavior (Suryani, 2014; Wibowo & Gunawan, 2015). In an educational context, a waste bank can be viewed as a contextual learning model that integrates students' cognitive, affective, and psychomotor dimensions through activities such as sorting, saving, and recycling waste (Saputro, 2019).

Based on this background, this study aims to describe the implementation of a waste bank program in developing environmental responsibility among elementary school students. Specifically, the study seeks to: (1) examine school policies concerning the independent implementation of the waste bank program; (2) describe students' actions and participation in implementing the program; and (3) analyze the program's impact on strengthening students' environmental responsibility.

This study argues that the implementation of a waste bank program, when supported by clear school policies, carried out consistently, and accompanied by active student participation, can make a significant contribution to the development of environmental responsibility. The waste bank program functions not only as a waste-management facility but also as an effective medium for character education because it instills values of environmental care, responsibility, discipline, and cooperation through authentic practices in students' everyday school lives.

Although previous studies have shown that school waste bank programs can increase environmental awareness, waste-sorting practices, and students' sense of responsibility, much of the existing discussion continues to position waste banks primarily as environmental-management instruments or practical programs for reducing school waste. This emphasis leaves an important pedagogical question relatively underexplored: how can students' involvement in routine waste bank activities develop into a process of character formation? Several studies indicate that environmental education is more likely to influence students' pro-environmental behavior when learning is connected to direct experience, repeated practice, and meaningful participation rather than merely to the transmission of environmental knowledge. From this perspective, a school waste bank can be understood not simply as a waste-management facility but as an informal learning environment in which students connect environmental values with everyday practices (Humaira et al., 2026; Aji & Anggraini, 2025). International research also indicates that school-based environmental education can influence children's pro-environmental behavior, although its effects depend on the intensity and design of the intervention (International Journal of Educational Development, 2024).

The research gap addressed in this study lies in connecting the implementation of a school waste bank with the pedagogical process of developing environmental responsibility. This study examines not only whether students participate in waste-sorting activities or whether the volume of school waste decreases, but also how school policies, student participation, habituation, and environmental practices interact directly in shaping responsibility toward the environment. This perspective is important because character education involves not only moral knowledge but also the internalization of values through repeated actions and consistent behavioral practices (Lickona, 2013). Therefore, this study views the school waste bank as a contextual pedagogical mechanism that connects environmental knowledge with responsibility, discipline, cooperation, and pro-environmental behavior. Accordingly, the contribution of this study lies in shifting the focus from waste management as a technical activity toward waste management as a character-education practice integrated into everyday school culture.



Method (منهج)

This study was conducted at SDN 3 Cikaso, located in Sukapura Hamlet, Cikaso Village, Banjarnayar District, Ciamis Regency, West Java Province, Indonesia. The site was selected because the school has independently implemented a waste bank program as part of its efforts to strengthen students' environmental responsibility within the school environment.

This study employed a qualitative approach to obtain an in-depth understanding of the implementation of the waste bank program in developing environmental responsibility among elementary school students. A qualitative approach was selected because the study focuses on revealing the processes, meanings, and dynamics of the waste bank program within the school's natural setting, without manipulating or intervening in the research variables.

The participants included students, teachers, the school committee, and members of the surrounding community who were involved in or knowledgeable about the implementation of the waste bank program. Participants were selected purposively by identifying individuals who were considered relevant, knowledgeable, and directly or indirectly involved in planning, implementing, and evaluating the school waste bank program.

Data were collected through interviews and observations. In-depth, semi-structured interviews were conducted with students, teachers, school committee members, and residents living around the school to obtain information about school policies, the role of the school committee in supporting the waste bank program, forms of student participation, and the program's impact on the development of environmental responsibility. Direct observations were conducted during waste bank activities at the school, including waste sorting, weighing, recording, and students' behaviors related to maintaining cleanliness and demonstrating environmental concern.

The data were analyzed through data reduction, data display, and conclusion drawing. The analysis focused on four main categories: school policy, student participation, habituation, and environmental responsibility. Data credibility was strengthened through source and technique triangulation by comparing information obtained from school leaders, teachers, students, observations, and documents. The analysis was directed toward identifying how students' routine involvement in the waste bank program transformed environmental knowledge into concrete practices of responsibility, discipline, cooperation, and environmental care. Ethical considerations included obtaining permission from the school and maintaining the confidentiality of all research informants' identities.

Result (نتائج)

1. The Implementation of Independent School Waste Bank Policy

Based on observations and documentation, the implementation of the waste bank program at SDN 3 Cikaso emerged from an urgent need for waste management at the school. The school, with a relatively large number of students, generates waste every day, particularly plastic waste from food packaging, which can accumulate and adversely affect health and the learning environment if not properly managed. This urgency is compounded by the absence of dedicated cleaning staff, meaning that responsibility for maintaining cleanliness rests largely with teachers and students. To address this problem, the school provides supporting facilities, including separate waste bins in each classroom, weighing scales for measuring students' waste deposits, and a designated area for collecting and managing accumulated waste. The availability of these facilities indicates that waste management has been systematically planned as part of school policy.

Figure 1.



Figure 2.



Figures 1 and 2. Meeting for Developing the Waste Bank Program at SDN 3 Cikaso

Source: SDN 3 Cikaso Documentation

The two photographs documenting the meeting for developing the waste bank program show the active and collaborative involvement of various school stakeholders in planning its implementation. The meeting was conducted participatively in a conducive discussion atmosphere and involved the principal, teachers, and educational staff, both in a formal classroom forum and in a more informal discussion setting. These activities demonstrate a shared commitment to formulating the objectives, strategies, and mechanisms for implementing the school waste bank program. The involvement of school stakeholders from the planning stage reflects strong institutional support for the waste bank as an effort to strengthen environmental responsibility, as well as evidence of systematic and sustainable planning. Documents such as the School Work Program, the Decree establishing the Waste Bank Management Team, and the routine weighing schedule were discussed in meetings between the principal and teachers. These documents demonstrate that the waste bank policy is not temporary but has been established as a sustainable program oriented toward strengthening character education and controlling the amount of waste. Each class is responsible for maintaining the cleanliness of a designated area, making the involvement of the entire school community part of the solution to the absence of cleaning personnel.

An interview with Mulyani (43), the principal, revealed the fundamental reason for implementing the program:

“Because SDN 3 Cikaso does not yet have dedicated cleaning staff, we have to develop a strategy to ensure that waste is properly managed. The waste bank is a solution that not only reduces waste but also teaches students to become independent and care about the environment.” (Interview, December 12, 2025)

The interview findings indicate that the implementation of the waste bank program at SDN 3 Cikaso was driven by the school’s practical need to address limited resources, particularly the absence of dedicated cleaning personnel. This condition encouraged the school to formulate a waste-management strategy that was not merely a solution to cleanliness problems but also had educational value. The waste bank program was considered a relevant alternative because it could address two objectives simultaneously: maintaining the cleanliness of the school environment and instilling values of independence and environmental responsibility among students. The principal’s statement confirms that the waste bank was not designed merely as a technical waste-management program but as a character-learning medium integrated into students’ everyday school lives.

The same point was emphasized by Abdul Aziz (51), the teacher responsible for managing the Waste Bank program:

“Waste is generated every day, especially from students’ snacks. If students do not manage it themselves, the school environment will quickly become dirty. Through the waste bank, students learn to sort waste and take responsibility for the waste they produce.” (Interview, December 12, 2025)

The statement from the program coordinator emphasizes that waste in the school environment is a routine and continuing problem, particularly waste generated by students’ daily consumption activities. This condition requires a waste-management system that actively involves students so that the cleanliness of the school environment can be maintained. Through the waste bank program, students are not merely instructed to dispose of waste properly; they are also trained to sort and manage the waste they generate responsibly. This demonstrates that the waste bank functions as a practical learning medium that cultivates students’ awareness, responsibility, and concern for the school environment while strengthening environmental character through direct experience.

The school committee chair, Wahidin (47), also highlighted the health and collaboration aspects:

“This waste bank program is very important and provides a good solution. Because there are no cleaning staff, the students’ role becomes very important. We fully support this policy so that waste does not become a source of disease and the school remains comfortable.” (Interview, December 13, 2025)

The interview with the school committee chair demonstrates strong support from members of the school community for implementing the waste bank program. His statement emphasizes that limited resources, particularly the absence of cleaning staff, are viewed as a challenge that must be addressed through collaboration between the school and students. The committee’s support is based not only on cleanliness but also on considerations of health and the comfort of the school environment. This indicates that the waste bank is understood as a preventive effort to reduce the risk of disease resulting from inadequate waste management, as well as a form of synergy between the school and the school committee in creating a healthy, safe, and conducive learning environment.

Overall, the data indicate that the waste bank policy at SDN 3 Cikaso is a strategic response arising from the school’s practical need to manage waste in the absence of dedicated cleaning personnel. The program operates independently and sustainably, serving both as a means of

strengthening students' discipline and environmental responsibility and as a mechanism for maintaining the quality of the learning environment.

2. The Student Participation in Implementing the Waste Bank Program

Based on observations, students at SDN 3 Cikaso play an active role in the routine implementation of the waste bank program. Students sort waste according to type in their respective classrooms and then deposit it at the school waste bank to be weighed and recorded. All activities are conducted under teacher supervision so that students understand the procedures for properly sorting and managing waste. Photographic documentation from the observations shows students' involvement at every stage of the activity, including sorting, weighing, recording, and working cooperatively in groups with enthusiasm.

Figures 4 and 5. Student involvement in sorting waste for deposit at the waste bank

Source: SDN 3 Cikaso Documentation

This student involvement also demonstrates the development of positive habits in maintaining the cleanliness of the school environment. Each class is responsible for a particular area, so student participation extends beyond waste bank activities and contributes to the development of disciplined cleanliness practices. Through consistent implementation, the program effectively encourages students not only to avoid littering but also to manage waste in productive and beneficial ways.

The interview findings support these observations. One student, Alya Dwi Putri (12), a sixth-grade student, stated:

"I enjoy participating in the waste bank because I have learned that waste can still be reused and has monetary value. This helps keep the school clean, and we also benefit from it. Sometimes my friends and I recycle plastic bottles into flower decorations with guidance from the teacher." (Interview, July 12, 2025)

The student's statement indicates that the waste bank program provides a meaningful learning experience. Through direct involvement in waste bank activities, students not only gain an understanding of waste management but also recognize that waste has functional and economic value. This awareness fosters positive attitudes toward waste-management activities because students experience tangible benefits, both for the cleanliness of the school environment and for themselves. The finding suggests that the waste bank program functions effectively as a contextual learning medium that can enhance students' awareness, motivation, and environmental concern while strengthening environmental responsibility through direct experience.

The teacher responsible for the waste bank program, Abdul Aziz (52), also emphasized the positive change in students' attitudes:

"Students have become more concerned about the waste they produce because they see that waste can be processed, reused, and have economic value. They are more enthusiastic about participating in the activities." (Interview, July 12, 2025)

The program coordinator's statement indicates a significant change in students' attitudes following their involvement in the waste bank program. Students no longer view waste merely as something to be discarded, but as a resource that can be processed, reused, and given economic

value. This understanding encourages a stronger sense of responsibility for the waste they produce and increases their motivation and enthusiasm for participating in waste-management activities at school. The finding indicates that the waste bank program contributes positively to the development of environmental concern and students' sense of responsibility through experiential learning.

Thus, students can be considered the primary actors who actively contribute to the success of the waste bank program at SDN 3 Cikaso. Their participation not only helps maintain school cleanliness but also develops students' understanding of recycling and the economic value of waste while fostering environmental responsibility, cooperation, and a sense of responsibility.

3. The Impact of the Waste Bank Program on Strengthening Students' Environmental Responsibility

Based on observations, the waste bank program at SDN 3 Cikaso has had a tangible impact on the development of students' environmentally responsible behavior. Behavioral changes are evident in students' reduced tendency to litter and their consistent practice of placing waste in the appropriate bins according to type. Students also appear increasingly active in maintaining the cleanliness of classrooms and school grounds without waiting for instructions from teachers. They remind one another when peers do not follow cleanliness rules. The school environment, which previously often contained piles of waste, now appears cleaner, more orderly, and more comfortable for learning activities. School records, including activity evaluation reports and classroom cleanliness journals, indicate a significant increase in student participation in school-cleanliness activities. The principal noted that students' positive habits have become increasingly established through collective responsibility and the division of waste-management tasks among classes. This has contributed to strengthening character values, including responsibility, cooperation, discipline, and sustained environmental concern. The program has also become part of the internalization of values within character education at school.

Interviews with members of the school community reinforce these findings. Nurdolam (45), the coordinator responsible for waste-bank deposits, stated that students are now more aware of and concerned about the environment. They take the initiative to maintain cleanliness without being instructed. This indicates a positive change in character. (Interview, May 13, 2026)

The statement from the waste-bank deposit coordinator reinforces the finding that students' character has changed as a result of implementing the school waste bank program. Students' initiative in maintaining cleanliness without direct instructions indicates that environmental values have become internalized in their everyday behavior. This change represents a shift from instruction-dependent behavior toward behavior driven by personal awareness. The finding suggests that the waste bank program functions not only as a waste-management activity but also as an effective means of developing students' environmental responsibility and character sustainably through habituation and direct experience.

A fifth-grade student, Fikri Haikal (11), also described his positive experience:

"I have become more accustomed to putting waste in the proper place and reminding my friends when they litter. The school looks cleaner now. I also feel more comfortable studying because the classroom looks clean and tidy."
(Interview, July 13, 2026)

The student's statement indicates that participation in the waste bank program has encouraged positive habits in students' everyday behavior. Students not only become accustomed to disposing of waste properly but also begin to play an active role in reminding their

peers to maintain the cleanliness of the school environment. This indicates the internalization of environmental values as reflected in concrete actions and social interactions among students. The finding further confirms that the waste bank program contributes to developing environmental responsibility, a sense of accountability, and students' collective awareness in creating a clean and comfortable school environment.

Wahidin (47), the chair of the School Committee, also assessed the program as effective for character education:

"This waste bank program is not only about cleanliness; it also teaches children to take responsibility and care for the environment through concrete actions. We also feel responsible for supporting the school program that has been established, both through ideas and material support according to our capacity. We are sometimes invited by the principal to participate in cleaning up waste." (Interview, School Committee Chair, December 13, 2025)

The school committee chair's statement emphasizes that the waste bank program is viewed not only as an effort to maintain school cleanliness but also as an effective means of character education. Through direct involvement in waste management, students are trained to take responsibility for their actions and to develop concern for their surrounding environment. This assessment indicates that the school committee recognizes the strong educational value of the waste bank because it integrates character learning with authentic practices in students' everyday lives. The finding reinforces that implementing the waste bank program contributes significantly to developing students' environmental responsibility and social accountability at school.

Overall, the data indicate that the waste bank program at SDN 3 Cikaso has not only succeeded in managing school waste but has also made a substantial contribution to strengthening students' environmental responsibility. Sustained behavioral change serves as an indicator of the program's success as an effective and meaningful medium for character education.



Discussion (مناقشة)

The independent implementation of the waste bank program at SDN 3 Cikaso demonstrates that school policy emerged from the practical need to manage waste in the absence of cleaning personnel. This condition is consistent with the view that effective educational policies should be contextual and grounded in the real problems faced by educational institutions (Mulyasa, 2007). Sagala (2009) emphasizes that school policies based on local contexts tend to be more readily accepted and consistently implemented by school members because they correspond to actual needs and conditions. This situation explains why the school adopted a waste-management strategy based on the participation of the school community and how the policy was implemented consistently through the provision of supporting facilities, the establishment of a management team, and the distribution of cleanliness responsibilities among classes. Tilaar (2004) argues that active participation by the entire school community is an important prerequisite for the success of sustainable educational innovation. This adaptive policy demonstrates the school's capacity to respond to environmental problems by turning resource limitations into a stimulus for educational innovation (Daryanto, 2007). Suharsaputra (2010) further emphasizes that responsive school leadership and governance can transform limitations into opportunities for developing a positive school culture. Thus, the waste bank program is not positioned as an additional activity but is integrated into the school management system and the

everyday culture of the school community, giving it strong potential for sustainability in supporting environmental character education.

This finding is consistent with the view that character education is effective when it is systematically integrated into school policies, governance, and lived school culture rather than merely delivered through verbal instruction in the classroom (Mulyasa, 2007; Lickona, 2004). Koesoema (2007) argues that sustainable character education must be embodied in a living school culture experienced collectively by all members of the school community. In this context, the waste bank policy at SDN 3 Cikaso functions not only as a technical regulation for waste management but also as a structural instrument supporting the internalization of environmental values. This is consistent with Tilaar's (2004) view that educational policies oriented toward value formation must be implemented through concrete practices in everyday school life. Policies supported by school leadership commitment and collective participation strengthen the process of habituating values, so that environmental responsibility is not merely taught but directly experienced and practiced by students in their daily activities at school (Zubaedi, 2011). This view is reinforced by Suparno (2002), who emphasizes that value internalization is more effective when learners are directly involved in meaningful and repeated social experiences.

Furthermore, students' actions and participation in implementing the waste bank program demonstrate that learners are actively involved as the main implementers through routine activities of sorting, weighing, and recording waste. This active participation reflects an experiential learning process that positions students as subjects of learning, so that environmental responsibility develops through direct experience and repeated habituation (Lickona, 2004). Students' involvement in every stage of the activity not only improves their technical skills in waste management but also fosters a sense of ownership, responsibility, and awareness that the waste they generate is a consequence of consumption behavior that must be managed responsibly. This condition is consistent with the view that character education is more effective when students are actively involved in authentic practices in everyday life (Zubaedi, 2011).

The interpretation of students' actions and participation demonstrates strong alignment with theories of character education and contextual learning. Lickona (2004) emphasizes that character formation occurs through the integration of moral knowing, moral feeling, and moral action. In this study, these three components are manifested simultaneously through students' sustained waste-management practices in the school environment. This finding is consistent with Zubaedi (2011) and Koesoema (2015), who argue that active student involvement in authentic activities is essential to effective character education, particularly in cultivating responsibility and environmental concern. In addition, learning integrated into school routines supports the principles of contextual learning, as proposed by Johnson (2002), whereby learning becomes meaningful when students directly experience and practice the values they learn in everyday life. Thus, this study strengthens previous research by demonstrating that the sustainability of student participation in a waste bank program is strongly influenced by the integration of the program into school culture and routines rather than its treatment as an incidental activity or short-term project.

Based on the empirical evidence, this study found sustained changes in students' behavior as a consequence of implementing the waste bank program. Students became accustomed to disposing of and sorting waste according to type, maintaining the cleanliness of the school environment without waiting for teachers' instructions, and demonstrating social concern by reminding one another. This finding reinforces Lickona's (2004) view that character develops through consistent moral habituation in real-life contexts. Zubaedi (2011) likewise argues that character education is effective when values are cultivated through routine and repeated collective practices that form students' habits and internal awareness. The finding is also consistent with Berkowitz and Bier (2005), who emphasize that character education is effective

when moral values are integrated into students' daily activities through authentic and repeated experiences. In this context, the waste bank program functions as a contextual learning environment, as proposed by Johnson (2002), in which students learn environmental responsibility through direct experience in everyday school activities. Thus, the effectiveness of the waste bank as a medium for character education lies in its ability to integrate values, actions, and habituation into school culture on a sustainable basis.

This perspective is consistent with Tilbury (2004), who argues that effective environmental education should not stop at increasing cognitive knowledge but should encourage tangible changes in students' attitudes and behavior in everyday life. Similarly, Lickona (2004) states that the internalization of character values becomes meaningful when students directly experience those values through repeated actions in authentic social contexts. Therefore, the behavioral changes observed among students at SDN 3 Cikaso indicate that the waste bank program has functioned as an effective and contextual means of internalizing environmental responsibility. The finding also strengthens the position of the waste bank as a practice-based character education model for elementary schools, particularly those with limited resources, because it emphasizes habituation, active participation, and collective responsibility among school community members (Zubaedi, 2011).



Conclusion (خاتمة)

This study demonstrates that the educational significance of a school waste bank extends beyond its function as a technical mechanism for collecting and managing waste. When supported by clear school policies, teacher guidance, student participation, and repeated environmental practices, a waste bank can become a contextual learning environment for developing students' responsibility toward the environment. The program provides students with opportunities to transform environmental knowledge into concrete action through sorting, collecting, recycling, and sharing responsibility for maintaining the cleanliness of the school environment.

The main contribution of this study lies in conceptualizing the school waste bank as pedagogical infrastructure for developing environmental responsibility. Environmental responsibility is not viewed as a direct outcome of environmental knowledge alone, but as the result of a process involving institutional practices and habituation. Responsibility toward the environment develops as students repeatedly engage in meaningful environmental activities and receive social reinforcement from teachers and peers. This finding extends previous research on school waste banks by connecting waste management, environmental education, and character formation within a single educational framework.

Nevertheless, this study has limitations because its findings are situated within a particular school context and therefore cannot automatically be generalized to all elementary schools. Future research could employ comparative or mixed-methods designs involving multiple schools to identify differences in program implementation and measure changes in students' pro-environmental behavior over a specified period. Future studies could also examine how digital technologies, environmental learning platforms, and student-led sustainability projects can strengthen the function of school waste banks as future-oriented environmental education models.

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