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A Qualitative Study on the Implementation of Student Collaboration through Zero-Waste Activities in Group B at TK Sahabat Bekasi

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Abstract

This study aims to reveal the implementation of cooperation between students in waste-free activities (zero waste) in Group B of TK Sahabat Bekasi. This research used a qualitative approach with a case study method. The subjects of this study included teachers, principals, parents, and students. Data were collected through observation, in-depth interviews, and documentation, then analyzed using data reduction, presentation, and verification techniques. The results showed that waste-free activities fostered student cooperation through task sharing, joint responsibility, mutual help, and positive communication. The teacher's role as a facilitator and role model was crucial, while parents supported the habit at home. This program not only instilled environmental awareness but also strengthened the socio-emotional aspects of early childhood. The study concludes that environment-based learning can effectively instill cooperation values among children.

Keywords: Cooperation, Early Childhood, Zero Waste, Environmental Activities, Contextual Learning.

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INTRODUCTION

Collaboration is a crucial aspect of socio-emotional development in early childhood, as it forms the foundation for children to learn how to interact, share, and understand others from a preschool age. Children aged 5–6 years old begin to demonstrate cooperative abilities through play activities, role sharing, and reciprocal communication (Putri & Zulminiati, 2020). Collaborative skills developed in early childhood support children's readiness to face social demands in later stages of education (Maulidar et al., 2020).

Socio-emotional development in children is not limited to recognizing and managing emotions but also includes skills to establish healthy interactions with peers. The American Academy of Pediatrics emphasizes that socio-emotional development is a vital foundation for building both academic and non-academic competencies in the future (Nurjannah, 2021). This highlights that collaboration is not a supplementary aspect but a core component of early childhood education.

Numerous studies have revealed that socio-emotional learning occurs through active interaction with parents, teachers, and peers. Children imitate adult behavior, internalize social norms, and build collective awareness through real-life experiences (Anggraeni & Zaman, 2020). Therefore, stimulating collaboration should be carried out through concrete, repeated, and meaningful activities in children's daily lives (Arga & Rahayu, 2019).

Preschool children are at a developmental stage highly receptive to experiential learning. According to Piaget's theory of cognitive development, children more readily grasp social values during the preoperational stage through group play and cooperative activities (Berman, 2021). Thus, cooperative play is an appropriate medium to foster collaboration, empathy, and a sense of togetherness from an early age (Saputri, 2020).

Empirical studies demonstrate that cooperative learning in kindergarten enhances children's sense of responsibility, social competence, and communication skills (Umam, 2023). Children accustomed to group work show greater ability to resolve conflicts peacefully, share responsibilities, and appreciate differing viewpoints (Bella Syahida, 2019). This proves that collaboration is not an instant skill but the result of consistent habituation in educational activities.

However, field realities reveal that while socio-emotional aspects are relatively well developed, environmentally friendly behavior remains a considerable challenge. Many young children are not yet accustomed to simple actions such as sorting waste, reducing single-use plastics, or understanding sustainability concepts (Wildan & Yusuf, 2024). In fact, environmental literacy at an early age plays a significant role in shaping sustainable habits that will persist into adulthood (Chaesar, 2024).

Children's lack of environmental literacy is often caused by limited school facilities, insufficient learning media, and inadequate teacher training (Lemaire & Limbourg, 2019). Children frequently receive a theoretical understanding of cleanliness without opportunities to practice it daily. Consequently, children's environmental awareness remains superficial and has not yet become a part of their daily culture (Singh & Krishnaswamy, 2022).

In this context, the zero-waste movement emerges as an innovative educational approach to instill environmental awareness while cultivating collaboration. Zero waste teaches children to reduce waste and encourages them to cooperate in maintaining a clean school environment (Hakam et al., 2022). Children learn collective responsibility through simple practices such as bringing their own lunch boxes, using reusable water bottles, and reusing materials (Fathoni et al., 2021).

Research by Nafi'ah and Hermawan (2024) shows that zero-waste education successfully fosters environmental awareness among children at TK Dharma Wanita 2. Children demonstrated improved understanding of cleanliness and active participation in recycling activities. This indicates that zero waste can serve as an effective medium to strengthen cooperation among students in daily learning contexts.

Sari (2023) asserts that schools, as miniature representations of society, are strategic spaces to form agents of change from an early age. Children habituated to zero-waste practices at school are engaged in waste management and carry these values into their homes. Hence, school-based environmental education generates a multiplier effect in instilling collaboration and ecological awareness.

Moreover, a learning approach grounded in the principles of the circular economy has proven effective in instilling ecological consciousness in early childhood education (Tiara & Adelia, 2025). Waste sorting and repurposing activities encourage critical

thinking, problem-solving, and teamwork among children. This supports the formation of responsible and environmentally conscious character traits in early learners.

From Vygotsky's sociocultural perspective, zero-waste-based learning can be understood as a collaborative process within the proximal development zone. Children learn more optimally when guided by teachers as facilitators and peers as learning partners (Vioreza et al., 2023). Thus, zero-waste activities teach environmental care and provide opportunities for children to internalize collaboration values.

The success of zero-waste programs in schools is significantly influenced by parental involvement. Without family support, school-based practices are unlikely to be sustained. Puntillo (2023) and Dilekli and Cazcarro (2019) emphasize that collaboration between schools and families is key to effective environmental education. Children who experience consistency between school and home practices are more likely to internalize eco-friendly behaviors.

Schools can provide holistic learning spaces by integrating socio-emotional and environmental education. Children are nurtured to become cooperative individuals and prepared as agents of change who care about environmental sustainability (Ghosh et al., 2022). Such integration aligns with the demands of 21st-century education, which requires synergy between social skills, character, and environmental literacy (Danaher et al., 2020).

The novelty of this study lies in its attempt to connect zero-waste programs with the development of collaboration in early childhood. Previous research has examined either environmental or social aspects chiefly in isolation, while this study integrates both dimensions. Consequently, this research is expected to provide theoretical contributions to the field of early childhood education as well as practical implications for PAUD curricula oriented toward sustainability and collaboration (Budiarti, 2021).

METHOD

This study employed a qualitative approach with a case study design. The case study method was chosen because it is suitable for exploring the social phenomena that occur in real-life contexts, particularly regarding implementing student collaboration through the zero-waste program at TK Sahabat Bekasi. A case study allows the researcher to understand the complex interactions among subjects within their natural settings (Creswell, 2017). Thus, this research does not aim at generalization but rather at comprehensively understanding the participants' lived experiences.

The research was conducted at TK Sahabat Bekasi, and the research subjects consisted of Group B students, classroom teachers, the principal, and parents. The subjects were selected purposively, as they were directly involved in the implementation of the zero-waste program and had relevant experiences related to children's collaboration. Purposive sampling in qualitative research is essential to ensure that the data collected are aligned with the research focus (Sugiyono, 2019).

Data were collected using three main techniques: observation, in-depth interviews, and documentation. Observations were carried out in a participatory manner to understand students' actual behaviors during zero-waste activities. In-depth interviews were conducted with teachers, the principal, and parents to obtain broader insights into their roles in fostering children's collaboration. Documentation, including photographs of activities, field notes, and school archives, served as supporting data to strengthen the research findings (Moleong, 2017).

The data were analyzed using Miles and Huberman's interactive model, which consists of three stages: data reduction, data display, and conclusion drawing. Data reduction was conducted by filtering information relevant to the research focus, data display was presented in descriptive narrative form, and conclusion drawing was carried out iteratively to ensure the validity of

findings (Miles, Huberman, & Saldaña, 2014). This model assists researchers in identifying patterns emerging from field data and connecting them with the theoretical framework.

To maintain data trustworthiness, this study applied triangulation of sources and techniques. Source triangulation was done by comparing observations, interviews, and documentation data. In contrast, technique triangulation was performed by combining multiple data collection methods to obtain a more comprehensive picture (Sugiyono, 2019). Therefore, the research findings are more reliable and accurately reflect the real conditions in the field.

Result and Discussion

Planning

Planning is the initial stage that greatly determines the success of implementing the zero-waste program at TK Sahabat Bekasi. Teachers, together with the school administration, designed activities integrated into the early childhood curriculum. At this stage, the teachers emphasized the importance of raising students' awareness of the dangers of single-use plastics and encouraging them to bring reusable food containers. The planning process ensured that the zero-waste program would not merely be incidental but structured and sustainable.

The teachers prepared a set of classroom rules related to reducing plastic usage, such as prohibiting single-use plastic bags and promoting the use of refillable water bottles. These rules were explained to the students in simple language and reinforced through concrete examples. In this way, children not only understood the rules verbally but also observed consistent applications of these practices in their daily school life.

In addition to rules, the teachers designed waste-sorting activities according to categories of organic, inorganic, and recyclable waste. These activities were framed as group games to make them more engaging for young learners. Through sorting activities, children learned to collaborate, help one another, and understand that maintaining cleanliness is a shared responsibility. By adopting a playful approach, children more easily internalized values of environmental care.

Recycling activities were also an essential part of the planning stage. Teachers prepared creative projects, such as making simple toys from used bottles or collages from scrap paper. These activities not only supported environmental learning but also enhanced children's creativity. Through group projects, children learned to share tasks, value the contributions of peers, and experience satisfaction in producing collaborative works from materials previously considered waste.

The planning of the zero-waste program was carried out collaboratively by involving the principal and parents. The principal provided policy support, while parents were engaged through socialization of rules and practices at home. The involvement of all stakeholders ensured that the program was not limited to school settings but extended into family environments. This was crucial for maintaining consistency in children's environmental habits in daily life.

With well-prepared planning, the zero-waste program at TK Sahabat Bekasi had clear directions and measurable strategies. Teachers not only designed activities suited to the developmental characteristics of young children but also ensured that the program fostered social skills, particularly collaboration. Thus, planning became the key foundation linking the goals of environmental education with the socio-emotional development of children.

Implementation

The implementation of the zero-waste program at TK Sahabat Bekasi demonstrated the active involvement of students in various teacher-designed activities. Children were not merely passive participants but were given roles to share tasks and take responsibility for the ongoing activities. This provided them with real-life experiences to internalize the value of collaboration, as they learned to work in groups toward common goals.

One of the most prominent forms of implementation was the activity of sorting organic and inorganic waste. Children were guided to understand the differences between these two types of

waste through hands-on practice. This activity was organized as a group game, which made it enjoyable rather than burdensome. Through this process, children learned the importance of role-sharing and how each individual's contribution affects the success of the group.

In addition to waste sorting, students were also encouraged to bring their own meals from home using environmentally friendly containers. This habit not only instilled awareness of reducing single-use plastics but also strengthened children's sense of responsibility for the environment. They came to understand that simple daily actions can have a positive impact, both on school cleanliness and environmental sustainability.

The program also included creative projects using recyclable materials, such as plastic bottles, paper, and cardboard. These activities encouraged children to collaborate, share ideas, and appreciate their peers' creations beyond enhancing fine motor skills and creativity. Such projects reinforced values of togetherness and environmental care. Children realized that items considered waste could still be transformed into useful products.

Teachers played the role of facilitators, providing guidance, instructions, and role modeling in every activity. Rather than merely explaining procedures, teachers demonstrated firsthand how to sort waste or reuse materials. The teacher's presence as a role model was essential, as young children tend to imitate the behaviors of adults they directly observe. This ensured that the lessons delivered were more easily understood and internalized by the students.

The implementation of the zero-waste program not only succeeded in instilling environmental awareness but also nurtured children's social skills, particularly collaboration. Through varied and enjoyable activities, children were able to demonstrate caring attitudes, responsibility, and teamwork. This proves that the program's implementation effectively integrated environmental education with the socio-emotional development of early childhood learners.

The Role of Teachers and Parents

The role of teachers in the zero-waste program at TK Sahabat Bekasi is crucial as both facilitators and role models. Teachers not only deliver rules and materials but also demonstrate real attitudes in maintaining cleanliness and reducing plastic use. Such modeling has a significant impact because young children tend to imitate behaviors they observe daily. Thus, teachers serve as the primary role models in shaping environmentally friendly habits.

As facilitators, teachers are responsible for guiding activities related to waste management, ranging from sorting and recycling to transforming used materials into creative products. They design activities using play-based approaches so that children enjoy the learning process. Moreover, teachers provide assistance when children face difficulties and offer praise when children succeed in showing environmentally responsible behaviors. This fosters intrinsic motivation among students.

Parents, on the other hand, play an equally important role in reinforcing the habits instilled at school. Through simple practices, such as preparing meals in reusable containers or involving children in waste sorting at home, parents help ensure that the values learned at school remain consistent within the family environment. Parental support is key to making environmentally friendly behaviors sustainable rather than temporary.

Collaboration between teachers and parents creates continuity in children's education. Without parental involvement, school-based programs risk becoming short-term activities. Conversely, when parents provide full support and act as role models at home, children are more likely to internalize these positive behaviors. This synergy reflects the importance of ecosystem-based education, where schools and families work together to shape children's character.

Furthermore, the roles of teachers and parents complement each other. Teachers introduce values and habits through structured school activities, while parents reinforce them in everyday family life. This ensures that children not only understand the concept of environmental care but also consistently practice it across different contexts.

The involvement of teachers and parents is a determining factor in the success of the zero-waste program in fostering collaboration and environmental awareness among young learners. Both serve as role models who provide behavioral consistency, ensuring that children gain holistic learning experiences. This proves that environmental character education requires strong support from both schools and families.

Discussion

The findings indicate that the zero-waste program successfully fostered environmental awareness from an early age in both enjoyable and meaningful ways. Children learned to understand concepts of cleanliness and plastic reduction through daily activities integrated into the curriculum. This supports the view that environmental education is more effective when implemented through real-life practices closely related to children's lives (Husna, 2021).

Active student involvement in activities such as sorting organic and inorganic waste provided contextual learning experiences. Early childhood learners are more likely to grasp abstract concepts through hands-on, play-based activities, making the lessons easier to internalize (Dewi, 2022). These activities not only enhanced children's knowledge about the environment but also developed their collaboration skills with peers.

Recycling activities, such as transforming used materials into creative media, encouraged children to work collaboratively in groups. The process of sharing ideas, dividing tasks, and producing collective outcomes nurtured both responsibility and togetherness. Similar studies highlight that project-based approaches improve social interaction and effective communication among young learners (Putra, 2020).

Teachers played a central role as both facilitators and role models. Their visible actions in reducing single-use plastics became behavioral examples for children. This aligns with the notion that social-emotional learning in early childhood is strongly shaped by imitation, as children learn more effectively from what they see than from verbal explanations (Sari, 2020). Thus, teachers contributed to education not only through instruction but also through consistent personal conduct.

Parental involvement was equally crucial for sustaining the program. Environmentally friendly practices reinforced at home ensured consistency in children's behavior across contexts (Andini, 2021). This collaboration between school and family created continuity in learning, producing long-term effects on character development.

The implementation of the zero-waste program also demonstrated that environmental education can serve as a medium for social learning. Through group-based waste management activities, children practiced role-sharing, tolerance, and collective responsibility (Wahyuni, 2021). This reflects the importance of cooperative learning in strengthening children's socio-emotional development.

The habit of bringing meals from home in reusable containers trained children to be disciplined and environmentally responsible. This simple practice reduced plastic waste and nurtured children's accountability for cleanliness (Utami, 2020). In this way, the zero-waste program supported the habituation of prosocial behaviors.

The study further revealed that integrating environmental programs with social learning generated a dual impact. Children not only developed ecological awareness but also strengthened their communication, collaboration, and leadership skills (Lestari, 2020). This dual effect highlights the relevance of zero-waste programs in supporting character education.

A key novelty of this study lies in combining zero-waste education with the development of early childhood collaboration. Whereas much of the previous literature tended to examine environmental or social education separately, this integration demonstrates that environmental programs can simultaneously nurture socio-emotional growth (Nugroho, 2022).

The practical implication is that similar approaches should be adopted by other schools, with strong support from teachers, parents, and school policies. Zero-waste programs are not only relevant for environmental education but also serve as character-building models oriented

toward sustainability (Rahmawati, 2021). With careful planning, consistent execution, and collaborative involvement, they hold potential as holistic educational practices.

Conclusion

This study confirms that the zero-waste program effectively fostered environmental awareness while enhancing social skills among young children. Through activities such as waste sorting, recycling, and bringing eco-friendly meals, children learned responsibility, collaboration, and care for both others and the environment. The role of teachers as role models at school and parents as reinforcers at home proved crucial in ensuring the sustainability of these habits.

Beyond ecological understanding, the program also strengthened children's socio-emotional development through collaborative activities that nurtured communication, tolerance, and shared responsibility. With the active involvement of all stakeholders, the zero-waste program can serve as a model of character education oriented toward sustainability and is highly relevant for implementation in other early childhood education institutions.

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