Sorting It Out: Solid Waste Segregation Practices Among Grade 4 Learners in School

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Abstract

This study examined the solid waste segregation practices of Grade 4 learners at Obrero Central Elementary School. Using a descriptive research design, 187 respondents were selected through stratified random sampling with proportional allocation, ensuring fair representation from both morning and afternoon sessions. Data were gathered using an adapted and validated questionnaire based on previous studies and the Department of Education's WinS (Wash in Schools) Monitoring Form. The instrument measured learners' attitudes and waste segregation practices through close-ended and open-ended questions. Expert validation and a pilot test ensured the reliability and clarity of the tool. Findings revealed a weighted mean of 4.25, interpreted as "Agree" and described as "Appropriate," indicating generally positive waste segregation practices among the learners. The highest adherence was observed in using separate bins for biodegradable, non-biodegradable, and recyclable waste, reflecting learners' understanding of proper segregation practices. However, compost bins received the lowest mean score, suggesting limited familiarity and access to composting and highlighting an area for improvement. The results imply the effectiveness of integrating environmental education into classroom instruction and routines. They also suggest that consistent practice and teacher reinforcement play a vital role in shaping positive environmental behaviors among young learners. However, the gap in composting awareness implies a need for more comprehensive and accessible instruction in this area. School is encouraged to enhance composting education through hands-on activities and provide accessible composting facilities. Continued collaboration with parents and community stakeholders may reinforce waste management practices at home. Ongoing environmental programs and follow-up studies are suggested to strengthen sustainable behaviors and evaluate the long-term impact of school-based waste management initiatives.

Index Terms: Composting Facilities, Environmental Education, Solid Waste Segregation

I.INTRODUCTION

Effective waste management is a critical component of environmental sustainability and public health. The environment encompasses all factors that influence the development and well-being of individuals and communities. Efficient waste management techniques help reduce pollution, conserve resources, and minimize health risks. According to LeBlanc (2020), solid waste management involves controlling the generation, storage, collection, transport, processing, and disposal of solid waste to address public health, environmental conservation, economic, aesthetic, and engineering concerns.

Solid waste management remains a significant challenge despite growing global awareness, especially in developing countries. Many communities struggle with improper waste disposal and segregation due to ineffective practices and low participation rates (Ferronato & Torretta, 2019). Understanding the factors influencing community involvement—such as knowledge, attitudes, and behaviors—is essential to developing effective strategies for promoting sustainable waste management. Globally, zero-waste initiatives, including composting organic waste and recycling reusable materials, have gained prominence for reducing landfill volumes and providing livelihood opportunities for waste workers.

Organic waste accounts for approximately 52% of solid waste in the Philippines, with recyclables making up another 28% (Nabor & Dela Cruz, 2022). These materials, however, are often improperly discarded due to weak waste segregation practices. In response, the government enacted Republic Act 9003, the Ecological Solid Waste Management Act of 2000, which mandates a comprehensive, ecological approach to waste management. The law highlights the crucial role of the national government, the Department of Education (DepEd), and schools in continuously educating learners and raising awareness about proper waste management. Embedding environmental education into school curricula is vital for fostering early responsibility and sustainable habits.

Schools play a foundational role in shaping socially responsible citizens by instilling respect, empathy, and responsibility in supportive learning environments (Gökçe, 2021). Teachers act as facilitators and role models, guiding learners toward environmentally conscious behaviors through strong relationships and consistent practice. Promoting adequate waste segregation among Grade 4 learners remains challenging at Obrero Central Elementary School. Although waste management lessons are included in the curriculum, learners' consistent application of proper segregation practices varies, revealing a gap between attitude and actual behavior. This study investigates the attitudes and practices of Grade 4 learners regarding waste segregation and identifies factors influencing their participation. The findings aim to inform the development of responsive school policies that enhance waste segregation management and promote sustainable environmental habits among students

II. RESEARCH ELABORATIONS

This study was anchored on the Behavior Modification Theory rooted in the behaviorism principles of B. F. Skinner (1953) and the Theory of Planned Behavior (TPB) by Icek Ajzen (1985). Behavior modification theory focuses on the idea that behavior can be learned and unlearned through conditioning, reinforcement, and punishment. It emphasizes that positive behaviors can be encouraged through rewards or acknowledgment and provides valuable insights into shaping desirable behavior, making it highly relevant to promoting positive behavior. Reinforcing the theoretical statement above, learners were more likely to develop long-term positive output when they received consistent reinforcement. Positive reinforcement, such as praise, rewards, or recognition, fortifies motivation to continue the behavior. As suggested by Skinner, positive and negative reinforcements could influence a child's behavior. In addition, it contributed to the behavioral theory of personality by explicating how to respond based on the acquired experiences.

This study is also anchored on The Theory of Planned Behavior (TPB), proposed by Icek Ajzen in 1985, which explains that behavior is influenced by personal attitudes, subjective norms, and perceived behavioral control, which shape an individual's intention to act. This was supported by highlighting how positive attitudes and social influence could encourage positive behavior. The theory of Planned Behavior helps identify barriers like lack of awareness or resources, enabling the development of targeted interventions. It explains that human actions are determined by a person's intention, which is influenced by attitude, subjective norms, and perceived behavioral control.Accordingly, this study is guided by Behavior Modification Theory and the Theory of Planned Behavior (TPB) to understand how attitudes and practices in waste segregation develop among Grade Four Learners. Behavior Modification Theory, introduced by Skinner (1953), emphasized that behavior is shaped through reinforcement, conditioning, and habit formation. Learners could have developed proper waste disposal habits in waste segregation when positive behaviors were rewarded and reinforced. Teachers and peers played a crucial role by modeling and encouraging correct waste segregation. When learners experienced consistent reinforcement, such as praise or incentives, they were likelier to adopt segregation as a habit. Over time, repeated exposure to these behaviors strengthened waste management practices, leading to long-term environmental responsibility.

On the other hand, the Theory of Planned Behavior (TPB), proposed by Ajzen (1985), explains that attitudes, subjective norms, and perceived behavioral control influence a person's intention to act. In waste segregation, learners' attitudes, whether seen as important, affected their willingness to participate. Subjective norms, including influence from teachers, parents, and peers, played a role in reinforcing proper practices. Additionally, perceived behavioral control determined how easy or difficult learners found segregation based on knowledge and access to proper waste bins. When learners believed to had resources and support to segregate waste correctly, learners were more likely to do so. TPB highlighted the importance of social and environmental factors in shaping a learner's waste management behavior.The Behavior Modification Theory and TPB highlighted the significance of reinforcement, social influence, and perceived control in shaping waste segregation practices. These theories provided a structured basis for understanding and improving learners' waste segregation behaviors. By integrating these approaches, this study aimed to identify effective strategies for fostering sustainable waste management habits among young learners.

III.RESEARCH METHODOLOGY

The study assessed the practices of Grade 4 learners in implementing solid waste segregation at Obrero Central Elementary School, serving as a basis for future waste management policies. Researchers used a descriptive research design to describe current

behaviors and determine the relationship between learners' attitudes and segregation practices. This quantitative approach enabled the analysis of numerical data to understand patterns without influencing variables. The study was conducted at Obrero Central Elementary School, located in a residential area of Butuan City, Agusan del Norte, which provided a suitable environment for school-based research.

The target population included 352 Grade 4 learners across 10 sections during the 2024–2025 school year. Using Slovin's formula with a 5% margin of error, the researcher determined a sample size of 187 respondents. The study employed stratified random sampling with proportional allocation, dividing learners into morning and afternoon strata. Each section received a proportional number of respondents, ensuring fair representation. Learners were randomly selected, and the survey was administered after explaining its purpose and providing clear instructions to promote honest and accurate responses.

The researcher used an adopted questionnaire based on the work of Nabor Jr. and Dela Cruz (2022) and the Department of Education's WinS Monitoring Form. The tool was divided into two sections: one measuring learners' attitudes with five questions and two open-ended items, and another measuring practices with seven questions and one open-ended item. Experts validated the instrument, including two Master Teachers in Science and a City Environment and Natural Resources Office (CENRO) representative. A try-out was conducted at Bading Elementary School with 30 learners. After revising low-performing items, reliability improved, with Cronbach's Alpha scores reaching acceptable levels (0.694 for attitudes and 0.657 for practices). After securing the necessary approvals, the researcher distributed the final questionnaire to the 187 selected learners. Responses were encoded and analyzed using descriptive and inferential statistics. Weighted mean was used to measure the level of agreement, while standard deviation assessed the consistency of responses. Frequency and percentage summarized response distribution

III. RESULTS AND DISCUSSION

Extent Of the Common Solid Waste Segregation Practices of Grade 4 Learners

This section presents the extent to which Grade 4 Learners engage in solid waste segregation practices within school environment. It included indicators that reflected the learners' involvement in proper waste disposal practices, such as using designated trash bins, following waste segregation rules, and contributing to waste recycling efforts. The results provided insight into how well these learners applied waste segregation methods based on attitudes and actions.

Table 1

Extent of the Common Solid Waste Segregation Practices of Grade 4 Learners

Indicators	Weighted Mean	Standard Deviation	Verbal Description	Descriptive Level
1. I see trash bins in the hallways, classrooms, and playground, and I use them to throw my trash properly.	4.37	1.035	Agree	Appropriate
2. I follow my school's waste segregation rules by using separate bins for biodegradable, non-biodegradable, and recyclable waste.	4.44	0.820	Agree	Appropriate
3. I properly use the compost bin for food scraps and dried leaves when available.	4.08	1.127	Agree	Appropriate
4. I put plastic wrappers, bottles, and other non-biodegradable waste in the correct trash bin.	4.26	1.137	Agree	Appropriate
5. I bring recyclable materials like plastic bottles to the Materials Recovery Facility (MRF) instead of throwing them away.	4.24	1.016	Agree	Appropriate
6. I avoid using too much plastic by bringing a reusable water bottle.	4.26	1.067	Agree	Appropriate
7. I actively participate in keeping my surroundings clean and free from trash.	4.39	1.212	Agree	Appropriate
Overall Weighted Mean	**4.25**	**0.770**	**Agree**	**Appropriate**

Legend: 1.00-1.49-Strongly Disagree/Most Inappropriate; 1.50-2.49-Disagree/Inappropriate; 2.50-3.49-Uncertain/Slightly Inappropriate; 3.50-4.49-Agree/Appropriate; 4.50-5.00Strongly Agree/Absolutely Appropriate

The study recorded the highest mean score of 4.44 for the statement: “I follow my school’s waste segregation rules by using separate bins for biodegradable, non-biodegradable, and recyclable waste.” This result reflects the learners’ consistent adherence to the school’s waste segregation guidelines and their clear understanding of the importance of waste separation. This finding aligns with the study by Taypin et al. (2024), which emphasized that learners’ attitudes and behaviors toward waste management improved through continuous environmental education and integration of these practices into the school curriculum. The current study supports this, showing that learners at Obrero Central Elementary School actively participated in categorizing waste—particularly in classrooms were teachers regularly integrated waste segregation into daily routines. The alignment of curriculum-based instruction with hands-on practice significantly reinforced positive waste management behavior among the students.

Salain (2020) emphasized that hands-on learning activities, such as actual waste segregation tasks, promoted positive behaviors in waste management. The study suggested that pairing awareness with practical application encouraged learners to consistently follow proper waste disposal methods. This is evident in the current study, where classrooms that implemented daily sorting routines observed more consistent and engaged behavior among learners. Like Abdurahim-Salain’s findings, this study underscores the value of experiential learning in shaping responsible environmental practices. The lowest mean score, 4.08, was recorded for the statement: “I properly use the compost bin for food scraps and dried leaves when available.” Although this still falls under the “Agree” category, it suggests that learners may not consistently use compost bins. This could be due to limited access, a lack of awareness, or unfamiliarity with composting practices. Most environmental education efforts tend to emphasize general waste segregation into labeled bins, rather than specific composting methods, indicating a gap in students’ comprehensive understanding of waste management. Similarly, Dela Cruz and Nabor Jr. (2022) found that learners had limited awareness, knowledge, attitudes, and practices regarding composting, despite the presence of school policies promoting waste management. The low usage of compost pits was attributed to unclear guidelines and insufficient educational support. The study also highlighted that composting was rarely practiced at home, which contributed to learners’ limited engagement. The present study confirms this pattern: without exposure or reinforcement at home, learners struggled to fully grasp and apply composting as part of their waste segregation habits. Both studies suggest that school-based instruction alone is insufficient without strong support from the home environment.

The overall weighted mean of 4.25, categorized as “Agree” with a verbal interpretation of “Appropriate,” indicates that Grade 4 learners generally demonstrated positive waste segregation practices. They properly used separate bins for various types of waste and contributed to recycling efforts by bringing materials to the Materials Recovery Facility (MRF). Moreover, learners actively worked to keep their surroundings clean. However, areas such as composting require further attention and improvement. In response to an open-ended question about other waste management practices, learners shared various activities that reflected their growing awareness of environmental responsibility and sustainability. These findings highlight the importance of combining knowledge, practice, and community involvement to build lasting habits in young learners. Some learners mentioned donating old clothes to those in need, such as

"*Ibibigay ko yong mga damit yong goot sa akin*"
(I will give my clothes that won’t fit me anymore).

Others expressed commitment to recycling by saying,
"*I will recycle my things so there is no trash*," and
"*I will recycle bottle to make a Christmas decoration.*"

Additionally, some learners emphasized the importance of not throwing away items, with one stating,
"*Hindi ko itatapon ang aking mga damit dahil ipamimigay ko*"
(I will not throw away my clothes because I will give them away).

These responses reflected a strong understanding of waste reduction and a desire to make environmentally responsible choices.

IV. CONCLUSIONS AND RECOMMENDATIONS

The study concludes that integrating environmental education into classroom instruction and daily routines significantly shapes responsible behaviors among young learners. The consistent involvement of teachers and structured school activities has supported this development. However, the observed gap in composting awareness highlights the need for more targeted instruction and improved accessibility to composting facilities. The school strengthens its composting education by incorporating more hands-on activities and ensuring that compost bins are readily available and easy to use. Teachers should continue reinforcing waste segregation practices and integrating environmental topics into various learning areas. Collaboration with parents and community stakeholders is also essential to reinforce these practices beyond the school setting. Furthermore, the school should sustain and expand environmental programs to promote long-term behavioral change and environmental responsibility. Conducting follow-up studies is encouraged to monitor progress and assess the long-term impact of these initiatives on learners’ waste management behaviors.

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