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Implementation of the Three R's in Solid Waste Management Practices in Identified Elementary Schools

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ABSTRACT

In school settings, solid waste management has emerged as a critical global and national issue due to the increasing volume of waste generated daily by students, teachers, and routine school activities. This prompted the researcher to determine the extent of implementation of the three Rs in solid waste management practices in the identified elementary schools in Carmen, Cebu, Philippines, for the school year 2025-2026, as a basis for a solid waste management plan. A descriptive-correlational research design was employed using an adopted standardized questionnaire administered to 100 teacher respondents from Carmen District. Using a number of methods to assess relationships between data, the researcher employed both the weighted mean, simple percent, standard deviation and also the Spearman's rho correlation approach to review the results found on the completed surveys by teachers. Teachers' responses indicate a good-to-high level of knowledge in regards solid waste management; therefore enabling good waste reductions in our schools. They showed strong adherence to reduce strategies, while the implementation of reuse and recycling practices was rated as "agree." Furthermore, respondents' profile characteristics, such as age, number of seminars attended, and teaching experience, did not significantly influence their implementation of the three Rs of solid waste management. Thus, promoting awareness to enhance effective waste management behaviors among respondents is important. Based on the findings, the researcher recommended the development and implementation of the Elementary School Solid Waste Continuity Plan.

KEYWORDS: *Administration and Supervision, Solid Waste Management, Descriptive-Correlational Design, Solid Waste Management Plan, Carmen, Cebu.*

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1. INTRODUCTION

Rationale of the Study

There has been substantial global and national concern regarding solid waste management in school systems due to the enormous volume of solid waste produced on a daily basis by students, faculty, staff, and the routine operations of school systems. Solid waste generation has increased globally as a result of urbanization, population growth, and consumption-related lifestyles; therefore, there is a great deal of pressure placed on institutional waste management systems and particularly on schools. Furthermore, according to the United Nations Environment Programme (UNEP, 2024), it has been projected that municipal solid waste will continue to increase globally, with schools continuing to be a growing segment of the population contributing to congestion associated with solid waste generation during the next few decades. Inefficiently managing solid waste within School-Based Environmental Education will cause significant damage to our environment, public health, and social welfare unless Effective School Water Management (SWM) is managed.

Schools are critical to the educational process by providing an institutional context to instill and reinforce environmental values, discipline, and sustainable behaviours as part of daily instruction and

overall school management systems. As such, Effective SWM is not only related to environmental concerns, but it is also the responsibility of school leaders, school governance, and school instructional supervision. Effective school leaders will assist in the development and implementation of policies, provide resources, and ensure compliance with all environmental programmes within their respective schools. (Araguas & Ilag).

At the national level schools in the Philippines are being increasingly encouraged to provide environmentally sustainable education through their curricula and operations. (Englis et al.)Some public school systems have begun to incorporate solid waste management (SWM) into classroom teaching and school-based initiatives (most notably urban areas, e.g., Mandaue City - Alburo, 2021), but research is lacking on the manner in which school administrators implement these policy changes to create aligned, sustainable planning at the school-based level (educational management/supervision perspective; Additionally, this gap illustrates the need to investigate the ways in which principals, teachers, and school stakeholders work collaboratively to implement guidelines and sustain environmental initiatives, in their schools. The degree of effectiveness with which SWM is implemented at schools is strongly correlated with school leadership practices; the availability of resources; teacher supervision; and commitments to the school. Therefore, all of these are central foci within the field of Masters of Arts in Educational Leadership (MAED) with a focus on Administration and Supervision.

In addition, the Department of Education continues to promote ENVIRONMENTAL initiatives at schools through implementation of the following: environmental initiatives; school-based solid waste management programs; campaigns are currently established in solid waste management; and ecological solid waste compliance monitoring activities; however, there remains little empirical evidence to support the impact of the aforementioned policies/incentives on internal school management decisions/operations; the level of teacher participation in managing solid waste; and the sustainability of such environmental initiatives at schools. Oftentimes, the lack of empirical data is readily apparent in smaller rural and/or semi-urban populated schools, where there may be significant fluctuations in school size, available resources, and administration/leadership capacity, which all greatly affect the successful outcomes of the implementation of solid waste management at schools. Through the consideration of the implementation of School-based SWM at the school level, this research will provide beneficial evidence to assist in developing successful evidence-based leadership practices within schools that will build and establish EDUCATIONAL institutions as model entities for environmentally responsible stewardship whilst establishing effective utilization of institutional resources within the scope of the MAED; Administration and Supervision Program.

This research project is unique in that it is designed to sustain School-Based SWM practices through an in-depth examination of the successful implementation of the three R's (Reduce, Reuse, Recycle); specifically, within elementary schools located in Carmen District, Cebu, Philippines for the 2025-2026 academic school years. While past studies emphasize students' awareness, attitudes towards solid waste, or general compliance with solid waste management practices, and provide little empirical evidence of how the three R's is operationalized through the daily school management practices of the schools in Carmen District, the findings of the current research project move beyond a descriptive level of understanding to include an analysis of the actual implementation of these processes, including the extent of administrative/leadership support, the level of teacher involvement, the availability of resources for operationalization, as well as monitoring systems used to evaluate SWM activity and processes at the school level - which are key educational administration and supervision concerns.

Thus, through the provision of practical evidence-based findings, the research will assist the development of specific and contextually relevant solid waste management improvement plans as a vehicle to assist school principals, supervisors, and teachers, in improving their implementation of solid waste management programs, creating stronger collaboration between stakeholders involved in the school-based solid waste management process, and institutionalizing long-term sustainable environmental practices within their schools.

By linking empirical evidence to school-based leadership actions, the research will support the establishment of a more organized, accountable, and sustainable school-based SWM system, and will contribute to the larger vision of transforming our school-based institutions into environmentally responsible model schools, while simultaneously providing the necessary support for the development of effective, evidence-based school administration and effective, evidence-based instructional supervision and sustainable educational leadership

within the MAED - Administration and Supervision program.

Theoretical Background

Different legal and theoretical frameworks are used in this research. More specifically, the Theory of Planned Behavior (TPB) (Amir, F. 2025), School Based Management Theory, and Ecological Systems Theory (Saldana & Domanog 2024) along with the legal resources used with the Ecological Solid Waste Management Act of 2000 (RA 9003, 2000), Guidelines for Environmental Education (DO 44, 2005) to Ensure Support of the Local Government Unit-LGU for the Implementation of Solid Waste Management (RA 7160, 1991), and Implementing Guidelines for the Integration of Gulayan sa Paaralan, Solid Waste Management, and Tree Planting Under the National Greening Program-NGP (DO 5, 2014).

The Theory of Planned Behavior (TPB), which was used by Amir, provides an excellent structure for predicting behaviors related to the managing of solid waste created by schools. According to TPB, the primary driver of a person's behavior is their intention toward that behavior. Intentions to behave a certain way are determined by the individual's attitude about carrying out (the) behavior; the subjective norms influencing their decision to behave a certain way; and their perception of how much control they possess for being able to carry out the behavior. In schools, the teachers' and school's intention to engage in environmentally sustainable waste management practices such as segregation; recycling; and composting will be dependent upon teachers' perceived ability to effectively manage and enforce their respective waste programs and these will all impact whether or not those intentions are ultimately carried out as behavior.

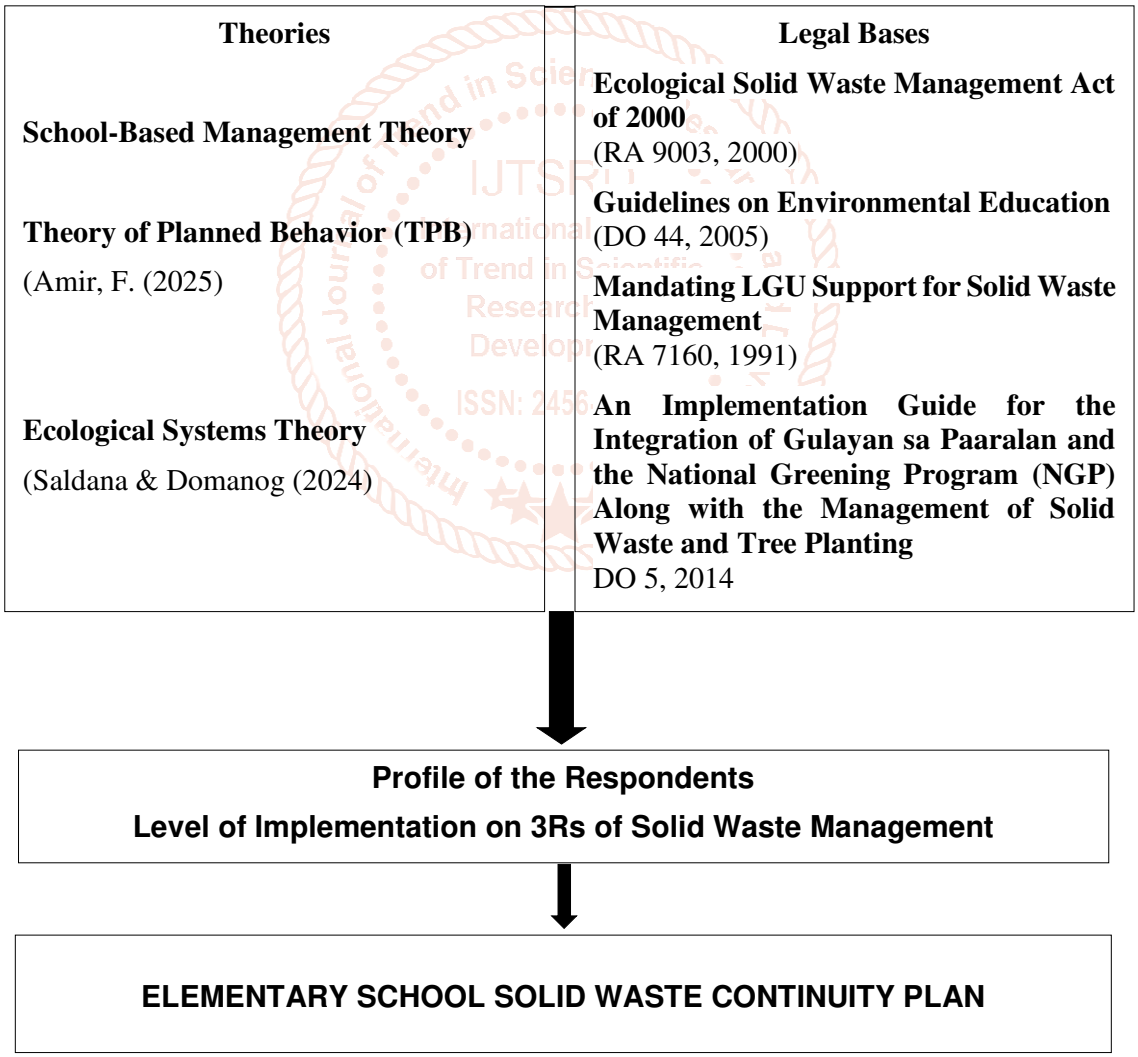

Figure 1. Conceptual Framework

The study by Amir strongly illustrates that the best way to promote successful school-based waste management initiatives is to ensure that the attitudes of educational professionals (teachers and administrators) are strengthened; social norms are utilized; and educational professionals have a greater sense of perceived control, which will lead to

consistent and effective implementation of environmentally sustainable programs.

School Based Management (SBM) is an educational system in which individual school committees have greater discretion than they do in traditional educational systems. To that end, SBM allows for a greater degree of decentralization (e.g., authority for decision making is transferred from the central office to the individual school) through a focus on the levels of involvement from relevant stakeholders (e.g., principals, teachers, parents, and community members) as it pertains to the planning, implementation and evaluation of school programs. Furthermore, schools will also have more authority to control their own resources (e.g., funding, staff, supplies), create localised interventions (e.g., those that are relative to their local communities), and address school-specific problems (i.e., those that are unique to their individual environments). The participative and decentralised nature of SBM helps to foster greater levels of accountability, transparency and shared responsibility among schools; therefore, contributing directly to the enhancement of school performance and learner outcomes.

In relation to this research project, the SBM theoretical framework will be used to investigate the implementation of the three "Rs" (Reduce, Reuse and Recycle) as they relate to student solid waste management programmes in elementary schools in Carmen/Cebu for the 2025-2026 school year. Given that SBM promotes localised decision-making, and encourages the active involvement of stakeholders, it provides a strong foundation for the development of school-based waste management programmes. The results of this project will provide schools with the necessary information to develop a contextualised solid waste management plan that is appropriate for their unique needs, is suitable to their available resources, and is consistent with the degree of commitment shown by teachers within their schools to outside environmental initiatives. Ultimately, strict adherence to SBM will help ensure that the implementation of the three "Rs" is not only being established by teacher participation but will also be sustained through motivation and accountability to the school staff and the school community. Like Ecological Systems Theory (EST), which was first proposed by Urie Bronfenbrenner, Ecological Systems Theory maintains that a person's behaviour and development are influenced by the myriad experiences available to them in their environment. This would include both their immediate environment (such as the classroom) and their larger environment (such as the surrounding community and societal norms) (Ecological Systems Theory Overview).

EST takes this idea further by helping us to understand how the practices of teachers and school principals regarding solid waste management are impacted not only by their own personal beliefs and understanding but also through the relationships between these educators and the many overlapping and nested systems of education such as school culture, co-curricular organisations, local educational policy, and community expectations. For example, many of the YES-O programs include clean-ups, ecological solid waste management, and environmental education within a school's microsystem and mesosystem; reaching students and staff directly, but also linking these activities back to the larger community and policy environment (Saldana & Domanog, 2024).

Therefore, while individual changes made by schools in the community - through individual effort - are necessary for sustainable behaviours, the development and sustainability of these behaviours can only be accomplished through ongoing interaction and change among the various levels of the Ecological System (from the teacher-student to the institution to the community). Therefore, by providing a holistic view of the multi-level factors that promote or inhibit effective school waste management practices, the Ecological Systems Theory provides an understanding of how to effectively incorporate and sustain SWM practices, including RA 9003, or the Ecological Solid Waste Management Act of 2000.Under this new law, society will be required to safely segregate, collect & recycle solid waste from households, educational institutions and communities (e.g. schools). This new law also requires that schools establish Materials Recovery Facilities (MRFs) and educate staff and students on how to handle waste responsibly. There is a great deal of responsibility for teachers and school administrators as implementers and monitors of solid waste management programs at schools. They will be required to integrate environmental awareness into their lesson plans, monitor adherence to segregation policies and encourage participation in waste-reduction programs and recycling programs. By including these responsibilities into school operations, RA 9003 reinforces and solidifies the concept of environmental stewardship along with the operation of the school, and allows schools to help achieve larger national waste management goals.

The Guidelines for Environmental Education (DepEd Order No. 44, s. 2005) provide guidelines specifically for the education sector; they outline how education systems can embed environmental sustainability in their operations. This policy stipulates that teachers will act as facilitators of environmental education

and, therefore, must inform their students about ecological responsibility and how to reduce waste & recycle. Additionally, school administrators are also required to support these efforts by providing appropriate administrative & logistical support for effective implementation of environmental programs. The order emphasizes the need to include environmental education in the formal curriculum as well as the co-curricular program, ensuring that all members of the school community are equally responsible for reducing waste and recycling.

The Local Government Code of 1991 (R.A. 7160) complements federal policies by mandating that local government units (LGUs) be a part of enforcing solid waste management programs. LGUs are responsible for the implementation of the provisions of Republic Act No. 9003 which includes their coordination with schools in relation to the compliance of waste segregation, collection and disposal laws as well as the important role of teachers and school administrators in reporting violations and cooperating with municipal governments on compliance issues. They serve as a link between schools and local government and also participate in community-based solid waste management programs. The provisions of Republic Act No. 9003, Department of Education (DepEd) Order No. 44, and Republic Act No. 7160 create an overarching legal framework that allows educators to mentor, lead by example and practice sustainability with regards to the environment in their schools.

Department Order No. 5, s. 2014 governs the Integrating the Gulayan sa Paaralan Program (GPP), Solid Waste Management (SWM) and Tree Planting Initiatives under The National Greening Program (NGP) in public schools. This Department Order promotes environmental sustainability through the establishment of vegetable gardens, the proper segregation of waste, proper disposal of waste and the planting of trees (i.e., Tree Planting). Additionally, this Department Order emphasizes experiential learning, whereby pupils actively participate in ecological activities such as composting biodegradable wastes and reuse and reduction of waste.

This Department Order solidifies and reiterates the objectives of the study titled “Implementation of the Three R’s (Reduce, Reuse, Recycle) in Solid Waste Management Practices in Identified Elementary Schools" through the institutionalization of waste management as part of the school curriculum and administrative operation of schools. The Solid Waste Management (SWM) law specifically outlines the different aspects of waste management in schools, including waste segregation, composting and recycling, that follow the principles of the Three R's. As such, it provides a real policy framework to evaluate how schools are implementing each of these three waste management practices. By integrating SWM with environmental programs, such as Gulayan sa Paaralan and tree planting, SWM enhances the practical application of the Three R's by students and teachers. Thus, it is a foundational basis for measuring the extent, effectiveness, and challenges encountered by schools in implementing solid waste management principles, and thus it has direct relevance as a theoretical and policy anchor for the research.

There is a focus in the study of municipal solid waste management on technological interventions to improve the processes for collection, transportation and sorting (Masanga et al, 2024). The applications of machine learning and deep learning for improved efficiency and accuracy of waste classification will all contribute to the development of smarter waste management systems. The other major area of SWM research is the behavioural drivers and community practices associated with waste reduction, reuse and recycling. Previous studies of urban households demonstrate that the environmental knowledge, the attitudinal disposition of individuals and their perceived behavioural controls directly affect waste reduction, reuse and recycling (Amir et al, 2025).

With regard to policy implementation and institutional challenges, this is a primary focus of current research literature. The 2025 study of the Ecological Solid Waste Management Act of the Philippines continues to demonstrate the persistent gaps between legislative frameworks and actual practice at the barangay level, particularly with respect to MRFs and functional enforcement (Yazawa et al, 2025).These gaps highlight the need for strong institutional support, infrastructure, and building local capacities pointing to broader initiatives calling to enhance monitoring systems and community partnerships between local government and the community for the pursuit of sustainable solid waste management. Other studies conducted at the household level suggest that having knowledge of waste segregation guidelines leads to higher rates of compliance with waste segregation principles, while demographic factors such as age, education and income can act as moderators of this relationship (Salud et al., 2025). The findings of this study support the findings of many other global behaviour based frameworks, (i.e., Theory of Reasoned Action and Theory of Planned Behaviour) which assert that knowledge and awareness have a direct effect on

behaviour intentions and actual behaviours (Amir et al., 2025). However, translating knowledge and awareness into consistent behavioural practice does not always occur automatically; some literature suggests that although individuals may have knowledge of SWM principles, actual SWM practices can be affected by contextual factors such as infrastructure availability, socioeconomic conditions, and levels of positive or negative reinforcement.

The study also found a positive correlation between preventive behaviours (segregation, reduction, recycling and reuse) and overall implementation; indicating that participation by the teachers in these preventive behaviours may foster teacher compliance with school-based SWM practices (Hermosa & Seduco, 2025).

In addition, the study conducted by Bagacay National High School investigated teacher and student awareness and actual implementation of SWM practices at the Bagacay National High School and found that teachers exhibited a significantly higher level of awareness than their students and that teacher awareness was significantly related to teacher implementation of SWM (Margate & Padilla, 2025). Teacher and student awareness of solid waste practices (segregation, reduction, reuse, recycling and disposal) was significantly and positively related to actual implementation of these solid waste practices; indicating that as teachers have knowledge and awareness of solid waste principles, they are more likely to promote and model proper solid waste management practices (Lalamonan & Comighud, 2019).The results of school SWM Programs show that teachers show some level of awareness when it comes to SWM however there is still much need for improvement regarding community participation and resources provided to schools as part of the program. For example, evaluations of SWM in schools indicated that while teachers were aware of the SWM practices, many times they did not practice effective implementation due to a lack of training and institutional support (Monserrate & Sarmiento, 2025).

Innovative teaching practices through classroom-based projects and lessons that address SWM concepts have resulted in improved behaviours and attitudes of students regarding waste management. For example, the TRASH (Transformation and Resilience towards Advancing Sustainable Habits) project was an action research project that had classroom teachers conduct structured classroom intervention and had resulted in a decrease in waste generated by the students as well as developing a more responsible disposal behaviour in students, which demonstrates that innovation led by teachers can create long term behavioural change (Piedad & Rubin, 2025).

An effective plan will include community education, stakeholder involvement, and enforcement mechanisms in order to help ensure that the intended practices of segregation at source and recycling are understood and adopted by residential and institutional users. Integrating these components into the plan will build relationships and create a strong performance of municipal and institutional waste systems. The major barrier that schools continue to struggle with in the management of solid wastes is a lack of sufficient resources and infrastructure. Schools in developing countries are typically under-resourced for waste management activities, such as they may not have appropriate tools (bins, separation containers) or people (trained staff) to effectively manage waste in schools. Teachers have to improvise to find ways of managing waste, such as use of a cardboard box, which leads to poor separation of school wastes (Debrah et al., 2015; Mzobea et al., 2024).

The lack of staff or trained personnel qualified to teach students or to carry out waste management activities has made it difficult for schools to incorporate waste management (WM) practices into their daily routines and school curricula. In many cases, school principals and teachers do not have the expertise or confidence to implement sustainability initiatives and they delay or undermine the establishment of WM in schools (Debrah et al., 2021; Mzobea et al., 2024).

Another significant barrier is the lack of supervision and monitoring of WM in schools, which leads to varying levels of enforcement of WM policies in schools. Due to their instructional workloads and administrative duties, teachers often do not have sufficient time to provide supervision to ensure that proper waste handling practices are being implemented or to follow-up with students who are not complying with WM policies, such as proper separation of waste from recyclables (Nerida & Dela Cruz, 2025).

In addition, teachers are often having difficulties integrating WM education into their curricula on a consistent basis, leading to issues related to the awareness of WM and the application of WM principles without the use of reinforcements. Lastly, policies that are intended to encourage or require WM in schools may also be barriers to schools that are attempting to implement and enforce WM policies. Schools encounter difficulties in implementing Solid Waste Management (SWM) strategies as mandated nationally in legislation such as the Ecological Solid

Waste Management Act (RA 9003), largely because schools lack the required infrastructure to enforce regulatory provisions. Research conducted at Narvacan National Central High School identified several challenges preventing compliance with national SWM mandates, including (1) lack of knowledge regarding SWM; (2) poor coordination; and (3) lack of funding (Nerida and Dela Cruz, 2025).

Research examining relationships between teachers' demographic characteristics and SWM practices using multiple demographic characteristics indicates demographic characteristics can significantly affect the implementation of sustainability-oriented behaviours (e.g., the Three Rs) (i.e., reduce, reuse, recycle). For example, in a recent study examining science teachers' SWM practices in Leon, Iloilo, evidence of differences between demographic characteristics (particularly age) among teachers' implementation of SWM was found; specifically, teachers aged 36 years and older evidence greater implementation of SWM activities (both segregation and reduction) than do younger teachers; thus, there may be a relationship between age and level of experience/education and level of pro-environmental behaviours (Hermosa & Seduco, 2025).

The research regarding the role of seminars in implementing SWM found no statistically significant relationship between how many seminars were attended and level of implementation; however, the results of this study suggest that participation alone does not increase the level of implementation within the classroom; rather, increased levels of implementation occur with sustained, relevant professional development, which aligns with school policies(Hermosa & Seduco, 2025). Desimone (2009) also emphasised this finding when discussing criteria that must be met to positively impact teacher practice; namely: professional development must be continuous, focus on content, and be active/involving. Similarly, Guskey (2002) indicated improvement in practice is contingent upon training, application opportunities, feedback and observable changes in practice due to those applications.

This study is based on a research-based questionnaire that will be used to collect data from elementary schools in Carmen District, Cebu Province. The previous discussions provide a theoretical framework for the solid waste management program's implementation and its awareness.

THE PROBLEM

Statement of the Problem

This research determined the implementation of the three Rs in solid waste management practices in the identified elementary schools in Carmen, Cebu, Philippines for the school year 2025-2026 as basis for a solid waste management plan.

Specifically, this sought to answer the following questions.

1. What are the respondents' profiles as to:
1.1. age;
1.2. sex;
1.3. highest educational attainment;
1.4. seminars attended relevant to solid waste management; and
1.5. length of teaching experience?
2. What is the level of awareness of the respondents on the three Rs of solid waste management?
3. What is the level of implementation of the respondents on the three Rs of solid waste management practices, as to:
3.1. reduce;
3.2. reuse; and
3.3. recycle?
4. Is there a significant relationship between the respondents' profiles (age, seminars attended relevant to solid waste management, length of teaching experience) and their implementation of the respondents on the three Rs of solid waste management practices?
5. Is there a significant relationship between the respondents' level of implementation on the three Rs of solid waste management and their level of awareness on the three Rs of solid waste management?
6. What are the challenges encountered by the respondents in the implementation of the respondents on the three Rs of solid waste management practices?
7. Based on the findings of the study, what solid waste management plan could be proposed?

Null Hypothesis

The null hypotheses were tested at the alpha level of 0.05 (five percent) as stated below;

HO1: There was no significant relationship between the respondents' level of implementation of the three Rs of solid waste management (reduction, reuse, and recycling) and their levels of awareness of the three Rs of solid waste management.

HO2: There was no significant relationship between the demographic profile of the respondents (such as age, attendance to training workshops related to solid waste management, and years of experience as a teacher) and their implementation of the three Rs of solid waste management practices.

Significance of the Study

The results of this study were beneficial to the following sectors and entities:

Department of Education, informal waste management groups, school administrators, teachers, learners, community, researcher, future researchers.

Department of Education. This study could give essential information to help the Department of Education understand how well the Three Rs are implemented in schools. The information generated from this study may also help to build upon current environmental policy, improve waste management and waste recovery through collaboration between informal waste management groups and schools, and develop initiatives that are both sustainable and environmentally responsible.

Informal Waste Management Groups. Informal waste management groups may benefit from this study as it establishes the important role that these groups have in recycling and recovering waste products. The findings of this study could encourage a larger collaboration between these informal groups and the schools, resulting in more efficient waste segregation, larger opportunities for recycling, and greater support for improved livelihoods.

School Administrators. School administrators will benefit from this study because they will learn how effective their former waste management practices were. This knowledge will allow them to create more informed school policies, use resources more effectively, and develop a cleaner, healthier, and more sustainable school environment.

Teachers. Teachers will benefit from this study, as it will provide them with a reference point for using the Three Rs and integrating environmental education into their curriculum. Additionally, this study will increase teachers' awareness of the need to model environmentally responsible behavior to their students.

Learners. Learners will benefit from this study through the increased awareness, knowledge, and positive attitudes they will develop regarding waste reduction, reuse, and recycling. Furthermore, this study will motivate learners to practice proper waste management in both the school environment and their homes and will create a lifetime commitment to being environmental stewards.

Community. The community will benefit by gaining access to an improved waste management system at the school. Increased awareness and participation in the Three Rs will lead to a cleaner community; decreased waste production; and increased community participation in efforts to develop environmental sustainability.

Researcher. This study will allow the researcher to continue developing their understanding of, skills in, and experience with conducting research focused on the environment and education. As a result, this study will contribute to the researcher's continued advancement both academically and professionally in the areas of solid waste management and sustainability.

Future Researchers. Future researchers interested in studying related topics (i.e., waste management, environmental education, and/or sustainability practices) can use this study to identify where research efforts have been made and the types of research activities that remain unexplored. The findings of this study will also provide a baseline for future research efforts relating to implementation of the Three Rs in schools.

RESEARCH METHODOLOGY

The research study is described in detail, including the materials and procedures employed to conduct the study as well as the flow of the study from beginning to end, the research design employed, how to conduct data collection, the source of the collected data, the instrument(s) used during data collection, and how data will be analysed and scored.

Design

Researchers used the descriptive-correlational method in this study because this research design needed to be descriptive, as all data gathered would be displayed in tables. Additionally, these methods provide data collection via an already adopted questionnaire that collected demographic data from the participants as well as their level of implementation and their level of awareness of the 3 R's (Reduce, Reuse, and Recycle) regarding solid waste management. Subsequently, the researchers were able to test for any relationships between these two variables (level of implementation and level of awareness) using correlation analysis. The researchers were also able to test for relationships between the demographic data (age, seminars attended related to solid waste management, length of experience as a teacher) and the 3 R's of solid waste management practices using correlation analysis.

Flow of the Study

This research involved the system models employing the input, process, and output approaches.

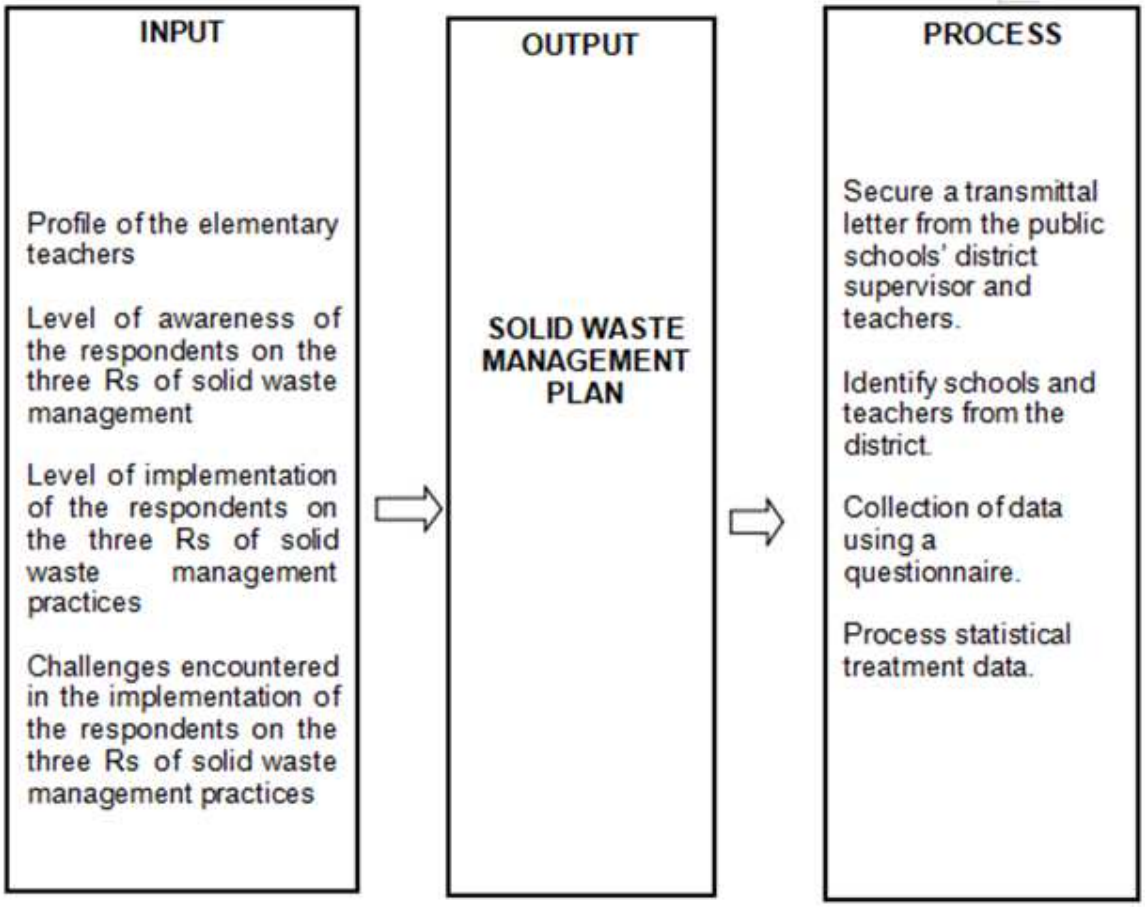

Figure 2. Flow of the Study

Input. The data presented here describes the profiles of the elementary school teachers, (the levels of implementation on the three Rs of solid waste management by each respondent); (levels of awareness on the three Rs of solid waste management); (significant relationships between the levels of awareness and implementation of the three Rs); as well as (age, number of seminars attended regarding solid waste management, and years of teaching experience were examined in relation to the implementation of the three Rs by respondents).

Process. An analysis was conducted that examined two major aspects: profiles of the elementary school teachers and their levels of and degree of awareness about three R's of solid waste management practices. The study also aimed to find any significant relationships between respondents' profile characteristics (age, number of seminars attended relevant to solid waste management, length of teaching employed), and their corresponding levels of implementation and awareness of three R's of solid waste management practices. All data was collected, organized, analyzed, and evaluated to calculate group results.

Output. The output of this research provided the researcher an empirical data to create an solid waste management plan that helped teachers develop and implement an effective, sustainable, and environmentally responsible solid waste management system within the school by promoting proper waste segregation, reduction, reuse, and recycling, in order to maintain a clean and healthy learning environment, protect the health of students and staff, and foster environmental awareness and responsibility among learners and the school community.

Environment

The study of elementary schools in Carmen District, Baring, Carmen, Cebu (which is located in the northeast corner of Cebu Province) provided some insight into how well they are implementing the three R's of solid waste management (which are reduce, reuse and recycle). Respondents' perceptions and experiences with waste reduction between schools varied, but generally respondents stated that schools promote waste reduction practices, such as encouraging students to bring reusable water bottles and lunch containers, limiting the use of disposable plastics for school activities and placing notices about how to dispose of waste properly.

However, the degree to which these waste reduction practices were consistently followed was mainly determined by each school's operational policies and the level of active monitoring by teachers and administrators. There was a fair degree of agreement among respondents that many elementary schools engage in re-use practices in their classrooms and throughout the school, including making drafts from reused paper, using recycled materials for art projects, and making use of containers for multiple purposes, which have introduced the concept of resourcefulness amongst students.

The recycling process is occurring at many elementary schools in the Carmen District through the use of waste segregation by way of labelled bins and ancillary collection of recyclable materials, frequently in collaboration with current barangay initiatives.

Figure 3. Location Map of the Study

Respondents

The teacher respondents from Carmen district were all elementary teachers. Using purposive-convenient sampling as a sampling technique allowed for a quicker and easier way for the researcher to complete this project.

Table 1 ***Distribution of Respondents***

n=100

Respondents	n	%
School A	4	4.00
School B	18	18.00
School C	10	10.00
School D	17	17.00
School E	19	19.00
School F	12	12.00
School G	20	20.00
TOTAL	**100**	**100.00**

Another component of the research was the area of expertise of the sample population. The sample used in this study was constituted from a combination of purposive samples and convenience samples that provided relevant and current contextual data about the most suitable sample group under the practical constraints of accessibility and time. This method used was also in keeping with the exploratory nature of this study which was carried out to gain a full understanding of the actual experiences of the teaching professionals in regard to the implementation of the three Rs of solid waste management practices, and their application in a local context.

Instrument

Dela Peña and his colleagues (2024) have created both a study and an instrument to assess how schools are implementing solid waste management; both of these works can be used by others who want to evaluate whether or not their local schools are implementing solid waste management programs. The instrument provides a solid framework for evaluating school-based activities associated with solid waste management, which can help identify whether and how established environmental policy aligns with the current state of solid waste management in schools. The instrument also covers all components of solid waste management, including: waste reduction; waste separation; reuse of materials; recycling; and community stakeholder engagement. These elements make up the functional aspect of solid waste management within educational institutions.

As a result of a review of solid waste management implementation at school level, we will gain a better appreciation of how educational practice and administrative duties intersect to create sustainable, well-maintained, environmentally responsible school communities.

As such, adopting the instrument of Dela Peña et al. (2024) ensured methodological rigor while providing contextually appropriate and meaningful data for assessing schools' solid waste management implementation, particularly in the first, second, and third part of the questionnaire.

The first part of the questionnaire answered the demographic profile of the respondents, particularly as to age, sex, highest educational attainment, number of seminars attended relevant to solid waste management, and length of teaching experience.

Likewise, the second part answered the level of awareness of the respondents on the three Rs of solid waste management. It had a total 10 statements to be answered among the respondents.

The third part answered the level of implementation of the respondents on the three Rs of solid waste management practices. It was adopted from the study of Dela Peña et al., (2024). It had a total 30 statements with 10 statements each for reuse, reduce, and recycle to be answered among the respondents with strongly agree, agree, neutral, disagree, or strongly disagree.

Furthermore, the fourth part of the questionnaire answered the challenges encountered by the respondents in the implementation on the three Rs of solid waste management practices.

Data-gathering Procedures

The researcher sought permission from the public schools' district supervisor of Carmen District, Baring, Carmen, Cebu and with the recommendation approval of the research adviser. After permission was given, the preliminary data gathering (research questionnaire) was administered to the identified teachers respectively, on hand.

Ethical Considerations

The study emphasized respondents' voluntary participation, ensuring that teacher respondents were fully informed about the research purpose, objectives, and their rights before giving consent. Participation was

entirely optional, with no obligation to take part. It also guaranteed confidentiality by protecting respondents' identities and keeping all profiles, responses, and collected data private and secure throughout the study.

Statistical Treatment of Data

In this study, a descriptive approach will be employed to analyze the data by providing an overview of the data being analyzed. This approach will include the overall data presentation, specifically with regard to participant demographics, participant implementation levels of the Three Rs (reduce, reuse, recycle) of solid-waste management; participant awareness of the Three Rs of solid-waste management; relationship between the participant's Three R implementation and Three R awareness; and relationship between the participant demographics and participation in the Three Rs of solid-waste management.

Statistical treatments include: simple percentage computation to profile the participants and provide frequency; weighted mean to calculate the percentage of participants that implemented the Three Rs of solid-waste management; percentage of the participants that had awareness of the Three Rs of solid-waste management; and Spearman's rho correlation was used to determine correlation between participant-level implementation and participant-level awareness of the Three Rs of solid-waste management; and correlation between participant demographics and participant implementation of the Three Rs of solid-waste management.

Scoring Procedures

To determine the levels of implementation and awareness of the three Rs of solid waste management, a researcher utilized a five-point Likert scale, which allowed participants to express the degree to which they agreed or disagreed with statements about their implementation of the three Rs and their awareness of them.

Response Category	Range	Verbal Description	Interpretation for level of implementation	Interpretation for Level of Awareness
5	4.21-5.00	Strongly Agree	Exemplary Implementation	Extremely
4	3.41-4.20	Agree	Fully Implemented	Moderately
3	2.61-3.40	Neutral	Moderately Implemented	Somewhat
2	1.81-2.60	Disagree	Poorly Implemented	Slightly
1	1.00-1.80	Strongly Disagree	Not Implemented	Not at All

DEFINITION OF TERMS

In order to prevent ambiguities in the study, we have established operational definitions of the terms used in this document.

Challenges Encountered. In this study, challenges encountered refer to the difficulties, limitations, and obstacles experienced by teachers and school administrators in implementing the Three Rs in solid waste management practices, as identified through survey responses.

Implementation. In this study, implementation refers to the extent to which the policies, activities, and procedures related to the Three Rs are carried out in the school as measured through teachers' responses and observed waste management practices.

Recycle. In this study, recycle refers to the process of segregating and processing recyclable materials such as paper, plastic, metal, and glass for collection or conversion into new products, as practiced in the school and reported by teachers.

Reduce. In this study, reduce refers to the practices aimed at minimizing the amount of waste generated in the school, such as limiting the use of single-use materials and promoting waste prevention, as reported by teachers.

Reuse. In this research, the term reuse includes reusing materials at least two different times for at least one or more uses within the school (i.e., containers, paper, education), as indicated by teacher observations/reports.

Solid Waste Management Plan. In this study, solid waste management plan refers to the written school-based program or set of guidelines that outlines strategies, responsibilities, and activities for implementing the Three Rs and proper waste handling within the school.

Solid Waste Management Practices. In this study, solid waste management practices refer to the actual methods and activities performed in the school for waste segregation, collection, reduction, reuse, recycling, and disposal, as assessed through survey questionnaires and observations.

Teachers. In this study, teachers refer to the licensed classroom instructors employed in the school who are directly involved in implementing, supervising, and modeling the Three Rs in solid waste management practices and who serve as respondents of the study.

2. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

The present chapter cover; both the compiled statistics, provide descriptive statistics and summary of these to describe the sample population (i.e. respondent profile), provide the levels of knowledge/understanding (awareness) regarding the Three Rs as defined above, provide the level of implementation of the Three Rs as defined above, provide an interpretation (i.e. correlation) between respondents profile (age, the number of solid waste related training conducted attended/participated, years of instructional experience) and level of implementation of the Three Rs and provide an interpretation (i.e. correlation) between level of implementation and level of awareness regarding the Three Rs. A summary of common barriers that were experienced by respondents regarding the implementation of the Three Rs was also included.

PROFILE OF THE RESPONDENTS

The results of the survey regarding the demographic characteristics of the participants will include information about the age, sex, highest degree achieved, number of seminars attended that relate to solid waste management, and how long each participant has been teaching in various capacities. This information is presented in a table and is followed by discussions.

Age

This section presents how the respondents' ages are distributed from 21 - 60 years of age based on their own identification of their ages. The below table displays the results of the survey of the respondents' ages based on each of the above identified age ranges. The results are displayed in Table 2.

Table 2 Age

Age	F	%
51-60 years old	14	14.00
41-50 years old	29	29.00
31-40 years old	45	45.00
21-30 years old	12	12.00
TOTAL	**100**	**100.00**

Table 2 depicts the respondents' distribution by age. The majority of the total number of respondents was between 31 and 40 years of age (45 respondents- 45%). Therefore, the largest cohort of respondents was comprised of "early middle-age working individuals (31–40 years old)" and represented the largest grouping of respondents to this study. Out of 29 respondents (29%) represented the next largest grouping, which was ages 41 to 50. Nearly 1/3 of the total population was respondents between 41 and 50 years of age. 14 respondents were within the 51 to 60 years of age (14%) category, representing a smaller percentage of respondents that could be regarded as older. The 21 to 30 years of age (12%) category had the smallest number of respondents (12). This suggests that most respondents are at or near their peak professional years (ages 31 to 50) and most likely have developed previous job experience and professionalism within their current job roles.

Research into the areas of organizational behaviour and human resource development indicate that mid-career age employees typically possess greater levels of job competence, job efficacy and job engagement (Ng & Feldman, 2019) than employees who are younger or older than mid-career age (37 to 50 years of age). Additionally, mid-career adults have the best opportunity to apply their prior experience/knowledge to their current job, and to adapt and perform according to evolving institutional expectations, creating greater consistency in performance and decision making within each individual's current job (De Lange et al., 2020). Teacher respondents who are classified in the 31-50 years of age category frequently utilize their teaching expertise with continuous professional development/learning opportunities, which often create for the administrators and district a more consistent implementation of district based programmes (Klassen & Tze, 2019).

Sex

The sex of the respondents will be indended through the following section depicting a count of male vs female for the sample of respondents documenting sex identification. The results of the Survey in this sub-section will contain data about respondents according to their sex. This data will be presented in Table 3.

Table 3 Sex

Sex	f	%
Male	13	13.00
Female	87	87.00
TOTAL	**100**	**100**

Figure 3 shows how respondents are divided by sex, the majority of people surveyed (87 people) are female (87%) compared with 13 male (13%), there is a grossly unbalanced sex distribution indicating that this survey sample consists primarily of females, which might be indicative of the breakdown of sex in the surveyed institution or designated area/value/field etc. Staff who work in areas such as teaching, counselling and administrative support have been found to comprise more females than males due in part to historical, social and cultural factors that impact both their occupational choice and long-term commitment to their positions (Berry & Grunwald, 2021). For example, trends within the labour force indicate that in education there are more women working as teachers than men across all areas of education, and this is generally reflective of gendered occupational supply and occupational segregation (Santiago et al., 2019).

Furthermore, organisation structure and demographic breakdown can influence how people perceive their work environment, engage with each other and create a culture within the workplace; in many cases these cultures formed in female majority dummy workplace will have an impact on how people communicate with each other, engage in collaborative behaviour and in what order people fulfil their obligations, which may affect the level of satisfaction of an employee (Eagly & Carli, 2022). With most employees being female in a workplace it is likely that the survey respondents will exhibit behaviour relevant to the majority demographic, thus there is a need to examine the study conclusions within the parameters of the gender mix and the potential impact that has on responses and attitudes (Holmes & Smith, 2020).

Highest Educational Attainment

The subsequent section presents data from this study's sample regarding respondents highest level of education achieved (formerly referred to as "typical highest level of education achieved"), based on the number of respondents who provided an indication of their highest level of education attained and number of people who did not provide any information concerning their highest level of education attained. The results of the survey regarding highest level of education attained can be seen as Table 4 below.

Table 4 Highest Educational Attainment

Highest Educational Attainment	f	%
Doctorate Degree	2	2.00
With Units in Doctorate	3	3.00
Masters Degree	13	13.00
With Units in Masters	59	59.00
Bachelor's Degree	23	23.00
TOTAL	**100**	**100**

Respondents were grouped based on their highest level of education (Table 4). Almost 60% of respondents had earned their master's degree or part of it; indicating they are working toward the next level of education. The next largest group consisted of 23% with a BA and 13% that hold an MA and the remaining individuals were represented by three individuals at the doctorate level or two individuals that had completed their doctorate degree. Therefore, the highest educated respondents in this workforce seem to be very highly educated, with a majority of respondents (59%) presently enrolled in obtaining their master's degree, demonstrating the commitment to continuing professional growth and academic advancement; albeit their current status regarding the degree is incomplete. Continued academic engagement may ultimately improve the overall ability, critical thinking, and instructional skills of the workforce and subsequently the quality of the instruction and implementation of institution's programs.

Higher levels of education and ongoing academic engagement are linked to enhanced professional skills which include; critical thinking, reflective teaching and instructional effectiveness (Mizell, 2019). Teachers who earn advanced degrees are typically more inclined towards learning and improving instruction, which may result in better strategies for the classroom and greater success in the delivery of institution programs (Darling-Hammond et al., 2020).

Seminars Attended Relevant to Solid Waste Management

Table 5 presents the results of this study's respondents, who had either completed zero, one, two, three, four, five or six of the total possible number of seminars relevant to solid waste management; thus showing that respondents to this study were exposed to a low degree of training/capacity building with regard to solid waste management (i.e., through seminar attendance).

The percentage of respondents who have attended either 0 – 5 or 6 – 10 seminars relevant to solid waste management is 99 percent for the group who attended 0-5 seminars and one percent for group that attended 6-10 seminars. Therefore, it can be concluded that the vast majority (get 99 percent) of the respondents have attended between zero to five (0 – 5) seminars; thus they are likely to have had very limited formal training through their participation in a total number of vertical (10) solid waste management related seminars.

Table 5 Number of Seminars Attended Relevant to Solid Waste Management

Number of Seminars Attended Relevant to Solid Waste Management	f	%
6-10	1	1.00
0-5	99	99.00
TOTAL	**100**	**100**

The data presented indicates that most individuals surveyed have little professional level training regarding solid waste management, indicating that there are inadequate opportunities for training on these topics (and, thus, increased education on methods for reducing waste) available to them.

Strongly "female-dominated" occupational fields include many helping and educational professions; this gender related distribution of labor and participation in the work force reflects trends present throughout modern society's desire to develop female professionals in the workforce (Eagly & Carli (2022); Santiago et al. (2019)).

Generally, when professionals are working in an area where there is no documented training program available (such as solid waste management), there is an increased chance that the professional has not had prior experience in effectively implementing or utilizing solid waste management systems, nor experienced a lack confidence, as well as reduced ability to be successful at implementing or pursuing new practices and innovations in their practice (Avalos, 2019).

Length of Teaching Experience

Table 6 contains the data for the length of the survey participants' teaching experience. The table shows how the survey participants reported their teaching experience broken down into 1–30 years or more from their respective teaching experience records.

Table 6 Length of Teaching Experience

Length of Teaching Experience	f	%
26-30	7	7.00
21-25	7	7.00
16-20	18	18.00
11-15	21	21.00
6-10	29	29.00
1-5	18	18.00
TOTAL	**100**	**100**

According to Table 6, the largest respondent group has between 6 and 10 years of experience (29 of 100 respondents or 29%) indicating that this level of experience represents a significant sector of the teacher workforce in early to midcareer. The next two groups are teachers from 11 to 15 years (21 of 100 or 21%) and those from 16 to 20 years (18 of 100 or 18%) providing a significant opportunity for midcareer teachers to be represented in the data collected. An additional 18 participants (18 of 100) have between 1 and 5 years of experience as a teacher which represents a large number of newly hired or novice teachers in the data sorted into these groups. The smallest two groups of respondents include teachers who have between 21 and 25 years and between 26 and 30 years (7 of 100 or 7%), representing the limited number of teachers who have extensive teaching experience or are considered veterans.

The table demonstrates that there is considerable diversity in the teacher population based on years of experience, with a significant concentration of teachers falling into the service of between 6 to 15 years, indicating that both novice teachers and mentor and veteran educators are represented within the developmental continuum of teachers' careers.

The career stages of teachers illustrate that midcareer teachers frequently combine enthusiasm with a growing depth of pedagogical knowledge, which positions them to be influential contributors to school improvement initiatives while remaining receptive to continued professional development (Beltman et al., 2020). Novice teachers (1–5 years) typically present new and innovative ideas and are motivated to develop their skills through

continuing education; while many veteran teachers (21 years and beyond) use their extensive classroom experience to inform both their decision-making as well as mentor novice teachers through their own learning (Ingersoll & Strong, 2019).

LEVEL OF AWARENESS OF THE RESPONDENTS ON THE THREE RS OF SOLID WASTE MANAGEMENT

This portion shows the level of awareness of the respondents on the three Rs of solid waste management. The data are presented in table 7.

Table 7 Level of Awareness of the Respondents on the Three Rs of Solid Waste Management

Indicators	Mean	SD	Verbal Description
1. I have knowledge about Republic Act 9003 or the Ecological Solid Waste Management Act of 2000.	4.11	0.94	A
2. I am aware of the Solid Waste Management (SWM) Program of the school.	4.32	0.94	SA
3. I am familiar on the policies of the school's solid waste management program.	4.30	0.78	SA
4. I know the Corresponding sanctions of any violations of the Solid Waste management (SWM) program.	4.35	0.78	SA
5. I am properly informed on the purpose of implementing the Solid Waste Management (SWM) program.	4.19	1.03	A
6. I am knowledgeable on possible illnesses that one can get whenever trashes are not properly of disposed.	4.33	0.8	SA
7. I am aware that before throwing garbage, it is a must to read those trash-can labels for segregation.	4.18	0.97	A
8. I can distinguish and identify biodegradable from non- biodegradable.	4.17	1.04	A
9. I am well informed on the importance of recycling.	4.23	0.99	SA
10. I practice waste minimization practices like reuse, recycle and reduce.	4.19	1.03	A
GENERAL WEIGHTED MEAN	4.23	**0.93**	**SA**

Note: 1.0-1.8=strongly disagree; 1.81-2.6=disagree; 2.61-3.4= neutral; 3.41-4.2=agree; 4.21-5.0=strongly agree

Table 7 presents the level of awareness of the respondents on the three Rs of solid waste management. Statement 4 "I know the Corresponding sanctions of any violations of the Solid Waste management (SWM) program." is the highest response with a mean of 4.35 and a verbal description of strongly agree.

This implies that while respondents may vary in their awareness of specific practices, they are particularly knowledgeable about the regulatory and accountability aspects of the SWM program, which may enhance compliance and support the effective implementation of waste-reduction initiatives within the institution.

Awareness of regulatory structures has been shown to contribute to more consistent engagement in environmentally responsible behaviors because individuals who understand both the "what" and the "why" behind guidelines are more likely to adhere to them (Gifford & Nilsson, 2019). In organizational and educational settings, knowledge of policies and associated accountability mechanisms has also been linked to greater participation in compliance-oriented behaviors, including waste reduction and recycling initiatives (Kollmuss & Agyeman, 2020).

In addition to the level of awareness of the respondents on the three Rs of solid waste management, statement 6 "I am knowledgeable on possible illnesses that one can get whenever trashes are not properly of disposed." is the second highest response with a mean of 4.33 and verbal description of strongly agree.

This implies that such knowledge may motivate more responsible waste-handling behaviors, reinforce the importance of proper disposal practices and support the successful implementation of Reduce, Reuse, and Recycle initiatives within the institution. The importance of health education in solid waste management programs can help people be more compliant and actively participate in the program. By tying environmental behavior to health-related outcomes, educational interventions will not only allow individuals to see how and why proper disposal is important, but they will also create a sense of ownership and personal and collective responsibility which aids in program participation. Therefore, using health-centered messaging in programs

related to solid waste management may be effective in keeping individuals engaged in the program and compliant throughout the school community (Zhang et al, 2021).

Likewise, regarding the level of awareness of the respondents towards the three Rs (Reduce, Reuse, and Recycle) of solid waste management, the second statement "I am aware of my school's Solid Waste Management (SWM) Program" was the third highest response with a mean of 4.32 and verbal description of strongly agree. This indicates that the majority of respondents understand that there is an institutional structure that supports proper management of solid waste, and that they have been made aware of the policies, procedures, and objectives outlined in their SWM program. This level of familiarity with their school's SWM program will likely result in individuals being compliant and willing to actively participate in the three Rs (Reduce, Reuse, and Recycle), as individuals who are familiar with organizational programs are more likely to modify their behaviors accordingly.

In educational and workplace environments, individuals who are familiar with environmental initiatives will be more likely to engage in waste reduction strategies and practices such as the three Rs (Reduce, Reuse, and Recycle), because they can better understand the expectations and consistently incorporate recommended practices into their daily lives as informed stakeholders (Zhang et al, 2021). Moreover, clear communication of institutional frameworks will improve compliance with environmental policies and help build a sense of collective responsibility and ownership within organizations, thereby enhancing the effectiveness of sustainability programs as a whole (Bamberg et al, 2021).

Therefore, the overall average response of the level of awareness of the respondents toward the three Rs (Reduce, Reuse, and Recycle) is 4.23 with a verbal description of strongly agree. This indicates that those with high awareness levels toward the three Rs of solid waste management can provide the basis for implementing effective waste reduction initiatives because they will be more likely to demonstrate responsible behavior, comply with institutional policies for responsible solid waste management, and build upon their knowledge of sustainability and positively influence their peers to participate in sustainable practices.

In summary, environmental education demonstrates that both knowledge and awareness are two of the best predictors of pro-environmental behavior, and that informed individuals are more likely to participate in things such as waste segregation, recycling, and reduction (Moser & Kleinhückelkotten, 2019). Moreover, institutional studies suggest that awareness of environmental policy and procedures enhances compliance, fosters intrinsic motivation for sustainable action, and encourages individuals to model and promote positive behaviors within their social networks (Steg & Vlek, 2019).

THE LEVEL OF IMPLEMENTATION OF THE RESPONDENTS ON THE THREE RS OF SOLID WASTE MANAGEMENT PRACTICES, AS TO: REDUCE, REUSE, AND RECYCLE

This portion shows the level of implementation of the respondents on the three Rs of solid waste management practices, as to: reduce, reuse, and recycle. The data are presented in tabular forms.

Level of Implementation of the Respondents on the Three Rs of Solid Waste Management Practices as to Reduce

This sub-section presents the level of implementation of the respondents on the three Rs of solid waste management practices as to reduce. Data is presented in table 8.

Table 8 presents the level of implementation of the respondents on the three Rs of solid waste management practices as to reduce. Statement 9 "I practice proper waste segregation in school like the way we are practicing at home." is the highest response with a mean of 4.36 and a verbal description of strongly agree.

Therefore, enhancing the overall success of a Solid Waste Management program increases by transferring individual responsibility from home to school. This also means there is an ability to use existing home practices for promoting more sustainable behavioural choices, which is part of reinforcing the school's culture/daily routines with Reduce approach. Furthermore, this suggests that strengthening consistency between home and school practices can significantly improve long-term environmental responsibility among learners and staff.

Table 8 Reduce

Indicators	Mean	SD	Verbal Description
1. I separate biodegradable (paper, banana peels, cardboard, and vegetables) and non-biodegradable (plastic toys, glass, steel, rubber) wastes at school.	4.28	1	SA
2. I separate recyclable wastes (paper, cardboard, plastic bottles) from non-recyclable (food wastes, leaves, twigs) wastes at school.	4.27	0.9	SA
3. I separate non-harmful wastes from toxic and hazardous wastes such as pentel pens, laboratory chemicals, ink, cell batteries and others.	4.21	0.98	SA
4. I mix all the garbage in one garbage container.	4.19	0.87	A
5. I segregate recyclable items for collection.	4.33	0.8	SA
6. I read the waste bin label before throwing garbage.	4.16	1.06	A
7. I observe the proper waste segregation.	4.10	1.05	A
8. I only practice proper segregation if someone remind me or ask me to do it.	4.20	0.95	A
9. I practice proper waste segregation in school like the way we are practicing at home.	4.36	0.92	SA
10. I practice proper waste segregation to serve as a model for others and to influence.	4.08	1.02	A
GENERAL WEIGHTED MEAN	**4.21**	**0.96**	**SA**

Note: 1.0-1.8=strongly disagree; 1.81-2.6=disagree;
2.61-3.4= neutral; 3.41-4.2=agree; 4.21-5.0=strongly agree

Furthermore, studies show that aligning personal sustainability routines with organizational expectations strengthens the integration of environmental practices into everyday routines and helps cultivate a culture of sustainability within institutions (Barr, 2019). In schools, developing existing home behaviours through education/awareness and reinforcement can help students to adopt Reduce practices at school thereby helping to establish sustainable behaviours within the school's daily operational practices (Rickinson, 2020).

The three Rs of waste reduction show that the second highest mean from the respondents indicates that 4.33 (strongly agree) of them separate their recyclables for collection (as per statement 5).

By recycling on an ongoing basis through separating recyclables, individuals will enable recycling programs, allow for timely collection of recyclables and help to reduce the ecological footprint. The results further illustrate the ability of the participants to use the knowledge obtained from the three Rs, resulting in participants supporting sustainable initiatives and further promoting the successful integration of the school's Solid Waste Management program.

Recycling behaviours that are developed over time will help to improve the waste management system's efficiencies and create a broader culture of environmental stewardship and consciousness within organisations/educational institutions (Kinnaman, 2019). Schools especially show that when students/staff have demonstrated their knowledge and use of the three Rs of Waste Reduction (i.e., Reduce, Reuse, and Recycle) on a regular basis, it will create/establish sustainable practices and improve the effectiveness of the programs. The more often these types of behaviours are exhibited visibly, consistently provide peer support and compel institutions to comply with them (Hines et al., 2020;The respondents' level of practice of the three Rs of solid waste management, in terms of reduce as represented by Statement 1, "I separate biodegradable (paper, banana peels, cardboard and/or vegetable) versus non-biodegradable (plastic toys, glass, steel, and/or rubber) at school." The score is the 3rd highest level of response from respondents, with a mean of 4.28 and a description of strongly agree; thus the implementation by respondents of appropriate waste segregation practices demonstrates an effective and systematic method for applying their knowledge to ensure maximum efficiency of waste processing and recycling at the school. In addition, respondents demonstrate their environmental responsibility by continually implementing appropriate strategies for waste segregation and in creating an environment where Reduce strategies become an integral and ongoing part of the daily practices of the school community, enhancing the school's overall Solid Waste Management program.

Systematic waste segregation at source increases the efficiency of waste processing and recycling through the reduction of contamination and by enhancing the fluidity of processes for handling and recycling waste

downstream (Singh et al., 2020). In addition, behaviours associated with waste recycling and segregation have also displayed an improved impact on larger environmental concerns such as reduced landfill usage, reduced consumption of resources, and decreased ecological footprint (Zeng et al., 2019).

The continued practise of systematic waste separation contributes to a culture of responsibility and sustainability amongst all members of the organisation, as the habitual execution of waste separation behaviours become part of the day-to-day activities and intrinsic behaviours of all individuals who comprise the institution, further strengthening the school's commitment to environmental stewardship (Tilbury, 2020).

In conclusion, the overall mean of the respondents' level of adherence to the three Rs of solid waste management practices in the area of reduce is 4.21 and a descriptor of strongly agree. This reflects the respondents' knowledge and commitment to implementing Reduce strategies in their waste management practices, thus improving the operational efficiency of the waste management system, minimising environmental effect, and fostering a culture of sustainability within the institution. Continued implementation of Reduce practices — including minimising waste generated at the source, practising source segregation of waste, and reusing materials — improves the efficiency of solid waste management systems, while reducing the overall impact on the environment (Kinnaman, 2019).

Moreover, studies in educational and organizational settings show that when individuals translate their knowledge of sustainability into habitual behaviors, it fosters a culture of environmental responsibility, encouraging peers to adopt similar practices and reinforcing institutional sustainability initiatives (Hines et al., 2020; Poškus, 2021).

Level of Implementation of the Respondents on the Three Rs of Solid Waste Management Practices as to Reuse

This sub-section presents the level of implementation of the respondents on the three Rs of solid waste management practices as to reuse. Data is presented in table 9.

Table 9 presents the level of implementation of the respondents on the three Rs of solid waste management practices as to reuse. Statement 4 "I bring water in reusable water containers." is the highest response with a mean of 4.48 and a verbal description of strongly agree.

Table 9 Reuse

Indicators	Mean	SD	Verbal Description
1. I borrow, share, and/or rent things that are needed occasionally.	4.18	0.97	A
2. I buy only what I need so that I will not end up throwing away extra food.	4.14	1.05	A
3. I always bring packed lunch in reusable lunchbox.	4.20	1.02	A
4. I bring water in reusable water containers.	4.48	0.86	SA
5. I am cautious and responsible to every waste I produced.	4.17	1.08	A
6. I bring containers for food and bought.	4.33	0.8	SA
7. I bring reusable bags and basket whenever I go to market.	4.28	0.93	SA
8. It is more comfortable for me to use available plastics from the vendor.	3.99	1.05	A
9. It's awkward to bring container when buying cooked food for takeout.	4.03	1.02	A
10. I practice zero-waste initiative to help reduce waste production.	4.16	0.94	A
GENERAL WEIGHTED MEAN	**4.19**	**0.97**	**A**

Note: 1.0-1.8=strongly disagree; 1.81-2.6=disagree;
2.61-3.4= neutral; 3.41-4.2=agree; 4.21-5.0=strongly agree

The results suggest that promoting reuse containers can help create environmentally conscious behaviors, aid in resource conservation, and contribute to the goals of the school Solid Waste Management program. This also helps translate awareness into tangible behaviours that support the development of a culture of sustainability in the school community.

The use of reusable containers has been effective at creating environmentally responsible behaviours and supporting resource conservation. When people often replace disposable products with reusable products, less waste is generated, and resources are managed sustainably. This also reinforces the reduce and reuse principles of the three Rs (Verma et al., 2020).

The level of implementation of respondents concerning the three Rs of solid waste management practices, regarding the reuse of items, statement 6, "I bring my containers for food and purchase food with containers that I bring," received a mean response of 4.33 and a verbal description of strongly agree.

This indicates that the use of reusable items reinforces environmentally responsible behaviours and integrates the use of reusable items into daily practices. In addition, the successful integration of environmental awareness into daily behaviour supports the sustainability initiatives of the school.

Additionally, using reusable containers and reducing waste through sustainable behaviours plays a key role in developing an environmentally responsible school culture. By incorporating environmentally responsible practices into their everyday lives, individuals create habits that reinforce both personal responsibility and shared participation (Verplanken & Roy, 2019).

Similarly, the level of implementation of the respondents regarding the three Rs, solid waste management practices, and reuse, statement 7, "I take reusable bags or baskets with me to the market," received a mean response of 4.28 and a verbal description of strongly agree.

This indicates that using reusable containers and bags encourages individuals to reduce waste and develop environmentally responsible behaviours in further support of the school Solid Waste Management program. The consistency of Reuse behaviours may demonstrate that sustainability initiatives and awareness campaigns are being translated into tangible actions.

Repeatedly practising Reuse behaviours, such as taking reusable containers and bags, will not only reduce the use of disposable products, but will also help to establish pro-environmental behaviours in the everyday lives of individuals by making environmental sustainability a standard within the community (Klockner, 2019).

In summary, the mean level of implementation of the respondents on the three Rs of solid waste management practices, concerning reuse, is 4.19 with a verbal description of agree.

This means that while respondents have good participation in Reuse practices, additional work is needed to integrate these behaviours into everyday life. Doing so through continued awareness campaigns, practical examples, and institutional support will increase the school's capability to promote sustainability.

In addition to promoting resource conservation, integrating Reuse behaviours into daily practices will help enhance the efficiency of solid waste management programs through establishing a culture of shared environmental responsibility and commitment (Barr, 2019).

Level of Implementation of the Respondents on the Three Rs of Solid Waste Management Practices as to Recycle

The level of implementation by respondents regarding the recycling aspect of the three Rs (reduce, reuse and recycle) of solid waste management is presented in this subsection, with data shown in Table 10.

Table 10 Recycle

Indicators	Mean	SD	Verbal Description
1. I convert or redesign waste materials into new product.	4.17	0.97	A
2. I make decors out of plastic wrappers and other colorful waste materials	4.08	1.05	A
3. I ignore the importance of recycling	4.07	0.99	A
4. I initiate generating income out of waste materials	3.97	1.11	A
5. I re-use plastic bottle container as long as it is still reusable	4.24	0.99	SA
6. I reuse my old materials than buying a new one	4.16	1.06	A
7. I keep those unfilled papers and use it as scratch.	4.16	1.06	A
8. I reuse grocery bags.	4.32	0.97	SA
9. I reuse washable food containers.	4.12	1.03	A
10. I reuse scrap paper into memo pads.	4.18	1.07	A
GENERAL WEIGHTED MEAN	**4.14**	**1.03**	**A**

Note: 1.0-1.8=strongly disagree; 1.81-2.6=disagree;
2.61-3.4= neutral; 3.41-4.2=agree; 4.21-5.0=strongly agree

Table 10 illustrates the implementation levels of respondents regarding solid waste management practices through the reuse aspect of the three Rs. The highest recorded response is based on statement 8 "I reuse grocery bags.", which produced a mean score of 4.32 with a verbal descriptor of "Strongly Agree".

Based on these findings, it can be inferred that consistent behaviours of reusing grocery bags will assist in protecting the environment, promote responsible waste management behaviours, and help to further develop the school's overall Solid Waste Management Program. Additionally, this type of behaviour indicates that sustainability principles are being internalized by the respondents and ultimately will create an environment of environmental responsibility within both the school and the broader community.

Through habitual reuse behaviours like using reusable grocery bags it will help reduce plastic usage, reduce the amount of waste going to landfills, and also support the institutions' efforts to develop effective Solid Waste Management programs (Kollmuss & Agyeman, 2020). Additionally, when individuals begin incorporating environmentally positive behaviours within their daily routine, then these behaviours will become normalised, thus developing a culture of sustainability and encouraging the development of group environmental responsibility within both schools and communities (Steg & Vlek, 2019; Klockner, 2019).

Additionally, Table 10 also provides the implementation levels of respondents regarding solid waste management activities regarding recycling. Again, as indicated in statement 5 "I re-use plastic bottle containers as long as they are still reusable.", this is the second highest response from respondents, producing a mean score of 4.24 with a verbal descriptor of "Strongly Agree". The results indicate that responsible recycling behaviour significantly contributes to the success of the school's Solid Waste Management program.

In an educational environment, the continued use of reusable materials not only makes Solid Waste Management programs more effective, but also reinforces pro-environmental behaviours by demonstrating sustainable behaviours to fellow students, and embedding these behaviours into daily routines (Tilbury, 2020; Poškus, 2021).

Likewise, the respondents also rated their level of implementation of the three Rs of Solid Waste Management as follows; statement 10 “I reuse scrap paper into memo pads.” was the third highest rated statement with a mean of 4.18 and a verbal description of Agree.

These findings suggest that even small, everyday recycling behaviours such as reusing scrap paper contribute to reducing the environmental impact of Solid Waste Management, and therefore to the overall success of the school's Solid Waste Management program. Additionally, they suggest that developing these behaviours can help foster:a culture of resourcefulness and environmental responsibility among students and staff.

The consistent practice of recycling on a regular basis reduces consumption of resources, decreases the generation of waste, and reinforces the wider goals of sustainability in both organisations and educational institutions (Verplanken & Roy, 2019).

In summary, the overall mean score of the respondents rated the level of implementation of the three Rs of Solid Waste Management by recycling as 4.14 with a verbal description of Agree.

These results indicate that continuing education, awareness campaigns and support from the institution can help to further develop consistent recycling behaviours; thus helping to reduce waste; conserve resources; and enhance the overall effectiveness of the school's Solid Waste Management program.

Environmental education and structured awareness campaign initiatives will increase knowledge and motivation, encouraging individuals to adopt recycling and other environmentally responsible behaviours (Moser & Kleinhuckelkotten, 2019; Gifford & Nilsson, 2019).

SIGNIFICANT RELATIONSHIP BETWEEN THE RESPONDENTS’ PROFILES (AGE, SEMINARS ATTENDED RELEVANT TO SOLID WASTE MANAGEMENT, LENGTH OF TEACHING EXPERIENCE) AND THEIR IMPLEMENTATION OF THE RESPONDENTS ON THE THREE RS OF SOLID WASTE MANAGEMENT PRACTICES

This portion shows the significant relationship between the respondents’ profiles (age, seminars attended relevant to solid waste management, length of teaching experience) and their implementation of the respondents on the three Rs of solid waste management practices. Data are shown in table 11.

Table 11 Significant Relationship Between the Respondents' Profiles (Age, Seminars Attended Relevant to Solid Waste Management, Length of Teaching Experience) and Their Implementation of the Respondents on the Three Rs of Solid Waste Management Practices

Profile	Level of Implementation					
	Reduce		Reuse		Recycle	
	r value	p value	r value	p value	r value	p value
Age	.0976	.3340	.0811	.4225	.0595	.5565
No. of Seminars attended relevant to solid waste management	-.0914	.3658	-.0666	.5103	-.0068	.9465
Length of Teaching Experience	.0199	.8442	-.0757	.4541	-.0371	.7140

Note:

(p) Spearman's rho correlation
(q) Probability value
* Significant when $p < .05$

Table 11 examines the relationship between respondents' profile characteristics age, number of seminars attended relevant to solid waste management, and length of teaching experience and their perceived level of implementation of the three Rs: Reduce, Reuse, and Recycle. In terms of age, the Spearman's rho correlation with Reduce ($r = 0.0976$, $p = 0.3340$), Reuse ($r = 0.0811$, $p = 0.4225$), and Recycle ($r = 0.0595$, $p = 0.5565$) are positive but very weak, indicating a negligible relationship between age and the implementation of the three Rs. The number of seminars shows very slight negative correlations with Reduce ($r = -0.0914$, $p = 0.3658$), Reuse ($r = -0.0666$, $p = 0.5103$), and Recycle ($r = -0.0068$, $p = 0.9465$). Teaching experience is essentially uncorrelated with Reduce ($r = 0.0199$, $p = 0.8442$) and shows tiny negative associations with Reuse ($r = -0.0757$, $p = 0.4541$) and Recycle ($r = -0.0371$, $p = 0.7140$). Based on the figures, p-values are above .05 for all profiles and all three outcomes. Thus, the dataset shows no relevant relationships between these profile factors and how the respondents viewed the implementation of Reduce, Reuse, or Recycle.

Moreover, the combination of very low correlation coefficients with non-significant p-values for all comparisons means age, seminar attendance and experience in teaching cannot reliably predict how respondents perceive the implementation of Reduce, Reuse, and Recycle. Additionally, the very low magnitudes mean that if there are any differences in perceptions of implementation across these profile factors, they are too minor to be meaningful.

These findings are congruous with past environmental education literature stressing that organizational/structural attributes play a greater role than individual demographic attributes in the pro-environmental behaviour of institutions. For example, research has shown that accessible waste-segregation bins, well-communicated policy regarding the environment, and consistent institutional support have a large positive impact on individuals exhibiting sustainable behaviour in educational institutions and organizations (Bamberg et al., 2021; Vicente-Molina et al., 2020).

Similarly, if educational institutions establish good environmental management systems and provide adequate recycling infrastructure as well as establish a collective sense of environmental responsibility, they will support the adoption of waste-reduction practices regardless of the demographics of the staff (Zhang et al., 2021). Finally, sustainability in education will be better influenced by a school-wide environmental culture, as opposed to the individual level of training and experience, where there are common beliefs and values, support from leaders in the organisation, and visible acts of sustainability (Leal Filho et al., 2019; Wamsler, 2020).

Therefore, an organisation's environment that fosters positive attitudes towards the environment is likely to have implemented the three Rs effectively and creates supportive norms and resources. Social Cognitive Theory (SCT) emphasizes that behavior results from the reciprocal interaction among personal factors, environmental influences, and behavioral patterns (Bandura, 2025). Within school settings, this suggests that visible environmental practices, availability of waste-management resources, and consistent modeling by the institution play a greater role in shaping recycling behaviors than individual profile factors. Furthermore, Ecological Systems Theory highlights how individuals' behaviors are influenced by multiple environmental systems, including organizational structures, policies, and social interactions within institutions (Saldana & Domanog, 2024).

SIGNIFICANT RELATIONSHIP BETWEEN THE RESPONDENTS' LEVEL OF IMPLEMENTATION ON THE THREE RS OF SOLID WASTE MANAGEMENT AND THEIR LEVEL OF AWARENESS ON THE THREE RS OF SOLID WASTE MANAGEMENT

This portion shows the significant relationship between the respondents' level of implementation on the three Rs of solid waste management and their level of awareness on the three Rs of solid waste management. Data are shown in table 12.

Table 12 Significant Relationship Between the Respondents' Level of Implementation on the Three Rs of Solid Waste Management and Their Level of Awareness on the Three Rs of Solid Waste Management

	Level of Implementation					
	Reduce		Reuse		Recycle	
	r value	p value	r value	p value	r value	p value
Level of Awareness	.9879	**< .0001***	.9271	**< .0001***	.9076	**< .0001***

Note:

(p) Spearman's rho correlation
(q) Probability value
* Significant when $p < .05$

Table 12 summarizes the relationship between respondents perceived level of awareness and their perceived level of implementation of the three Rs of solid waste management Reduce, Reuse, and Recycle using the Spearman's rho correlation. The correlation between awareness and Reduce is $r = 0.9879$ with $p < .0001$, indicating an extremely strong positive association. For Reuse, awareness correlates at $r = 0.9271$ with $p < .0001$, also reflecting a very strong positive link. The relationship with Recycle is similarly robust, $r = 0.9076$ with $p < .0001$. All three results are statistically significant at $\alpha = .05$, showing a consistent pattern in which higher reported awareness goes together with higher reported implementation across the three behaviors.

Strong relationships exist between perceived awareness of the practice and the implementation of the practice evidenced by the large magnitudes of the coefficients of the two variables. Based on the r^2 interpreted as effect size as the variance explained of the outcome variable, awareness accounts for approximately 97.6% of the variance in Reduce, 86.0% in Reuse, and 82.4% in Recycle. Based on these results, it is advisable to invest in awareness-building strategies that involve targeted information campaigns, classroom demonstrations, and clear, simple messaging because there is a good likelihood that increased awareness will coincide with increased self-reported implementation of the practice.

Individuals who are more informed about environmental issues tend to demonstrate higher engagement in sustainable practices such as waste reduction and recycling (Vicente-Molina et al., 2020; Bamberg et al., 2021). In educational settings, awareness campaigns, environmental education programs, and sustainability-focused instruction have been found to positively influence students' and teachers' participation in recycling and waste-management activities (Zhang et al., 2021).

This finding can be supported by the Theory of Planned Behavior (TPB), which explains that individuals' behaviors are influenced by their attitudes, subjective norms, and perceived behavioral control; when individuals are more aware and knowledgeable about environmental issues, they tend to develop more positive attitudes and stronger intentions to perform environmentally responsible actions such as practicing the three Rs (Amir, 2025).

CHALLENGES ENCOUNTERED BY THE RESPONDENTS IN THE IMPLEMENTATION ON THE THREE RS OF SOLID WASTE MANAGEMENT PRACTICES

This portion shows the challenges encountered by the respondents in the implementation on the three Rs of solid waste management practices. Data are shown below.

Table 13 Challenges Encountered by the Respondents in the Implementation on the Three Rs of Solid Waste Management Practices

Challenges	Frequency	%
Lack of resources and facilities	30	30
Limited awareness and training	25	25
Institutional and behavioral barriers	22	22
Time constraints and workload pressures	23	23
Total	**100**	**100**

Table 13 presents the challenges encountered by the respondents in the implementation of the Three R's (Reduce, Reuse, Recycle) in solid waste management practices. The findings show that the most prevalent challenge is lack of resources and facilities, with a frequency of 30 or 30%, indicating that many schools are constrained by insufficient materials such as waste bins and segregation areas. The second most common challenge is time constraints and workload pressures (23%), followed closely by limited awareness and training (25%), and institutional and behavioral barriers (22%).

3. SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

The research presents the outcomes and gives both a concluding statement and recommendations based upon what has been discovered from those results about investigating The 3 Rs' Implementing Solid Waste Management Practices in Selected Elementary Schools Within Carmen, Cebu, Philippines Through Existing Solid Waste Management Plans.

Specifically, this study defined the following: respondents' profile (age, how many seminars they attended about solid waste management, long-term teaching experience); respondents' awareness of the 3 Rs; the extent to which each respondent is currently implementating the 3Rs; the degree of significance between the different aspects of respondent's profiles relative to their 3 Rs Implementing Solid Waste Management Practices; how the respondents' level of implementation relates to their level of awareness; and difficulties that the respondents faced while implementing 3 Rs Implementation of Solid Waste Management Practices.

The study was conducted in the elementary schools of Carmen District, with over 100 respondents. The research design developed by Dela Peña et al., (2024) included a study instrument that contained information about descriptive correlation studies. Their study used a wide range of statistical techniques during both collection and analysis of the data, such as weighted means, simple percentiles, and Spearman's rho correlation.

Summary of Findings

The data about teacher demographics collected from different groups of people illustrated that there were more females than males in the teaching profession; most teachers have been in teaching for 0-20 years; teachers have received little formal training related to solid waste management but have completed various levels of higher education than those not engaged in waste-related works. These results indicate the potential for improved professional development regarding the knowledge and practice of sustainable methods related to solid waste management, which may further support their successful implementation at schools.

All respondents expressed a high level of understanding and awareness of the three Rs associated with solid waste management, with details including an understanding of program regulations, the consequences for failing to comply with regulations, and the potential health hazards created by improperly disposed of solid waste. Thus, these respondents clearly demonstrated an existing knowledge base to help them to effectively implement waste-reduction initiatives at their schools.

In addition, each respondent indicated that they possessed a high level of implementable Reduce-related knowledge around solid waste management and practiced proper waste separation between biodegradable (compostable) and non-biodegradable materials. Overall, their strong adherence to Reduce strategies indicates a commitment to applying sustainable waste management practices within the school environment.

Moreover, the study revealed that respondents strongly practice the "reuse" aspect of the three Rs of solid waste management. The most common behavior was bringing water in reusable containers, followed by bringing containers for purchased food and using reusable bags and baskets when going to the market. Overall, respondents showed a high level of implementation of reuse practices, described as agree.

Likewise, the most common behaviors included reusing grocery bags, repurposing plastic bottles, and converting scrap paper into memo pads. Overall, respondents demonstrated a high level of implementation of recycling practices, described as agree.

Consequently, based on the results, all p-values exceed the significance level of 0.05, indicating that there are no statistically significant relationships between respondents' profile characteristics age, number of seminars attended, and teaching experience and their perceived level of implementation of the three Rs. Therefore, the null hypothesis is accepted, meaning that respondents' profile characteristics do not significantly influence their waste management practices.

Finally, all correlations between respondents perceived level of awareness and their implementation of the three Rs are very strong and statistically significant. Therefore, the null hypothesis is rejected, indicating that respondents' level of awareness has a significant positive relationship with

their implementation of Reduce, Reuse, and Recycle practices.

Conclusion

In conclusion, the study concluded that respondents' profile characteristic, such as age, number of seminars attended, and teaching experience, do not significantly affect their implementation of the three Rs of solid waste management. In contrast, respondents' level of awareness plays a crucial role, as higher awareness is strongly associated with greater implementation of Reduce, Reuse, and Recycle practices. Thus, promoting awareness to enhance effective waste management behaviors among respondents is important.

Recommendations

Based on the findings of the study, the following brief recommendations are proposed:

1. A consideration of the respondent's age, sex, level of education (highest level); number of Seminars attended; and teaching experience in years should be considered when designing Professional Development initiatives.
2. Schools are encouraged to create/offer targeted, differentiated training of solid waste management, taking into account the difference among the demographics of the teachers participating. Emphasis could especially be placed on increasing participation in relevant seminars and capacity-building activities because the findings indicate a lack of formal training in solid waste management. Through these differentiated/targeted interventions; All teachers (regardless of their demographics/professional experience) will be better able to improve their overall; technical knowledge and practical competent of Solid Waste Management.
3. Sustain & enhance awareness campaigns. Since there is a strong correlation between awareness and implementation; on the three Rs (Reduce, Reuse, Recycle) have to be intensified through ongoing information drives, workshops, and school-based campaigns.
4. Institutionalize School-Based Waste Management Programs. Schools should develop or strengthen policies and structured programs, to ensure that there is a systematic method of waste separation, recycling efforts, and reduction efforts are being completed in the school.
5. Encourage role modeling among teachers. Teachers should regularly model Sustainable Practices (e.g. Using reusable materials). The behavior of the teacher can cause a ripple effect that will impact the student body and the school community as a whole.
6. Encourage collaboration and community-based initiatives. Schools should establish partnerships with local governments and/or environmental organizations to support the work of waste management and expand the use of waste management practices outside of the school.
7. Conduct Additional Research. Future research should explore other influences such as institutional support, availability of materials and/or support of students that may affect the success or failure of the implementation of solid waste management practices.

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