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Level of Awareness and Attitude of Teachers and Learners on Implementation and Practice of Ecological Solid Waste Management

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A B S T R A C T

This study will determine the level of awareness and attitude of teachers and learners on the implementation and practice of Ecological Solid Waste Management (ESWM) of Junior High Schools in San Rafael, Bulacan Year 2023-2024. With a mixed-methods as research design and 367 learners and 276 teachers as the respondents of the study. Findings revealed awareness of reduce, reuse, recycle, and repair were rated as “extremely aware” by the teachers and “very aware” by the students. Meanwhile, the teachers' and learners' attitudes towards ESWM in terms of personal responsibility, emotional response, perceived importance, and perceived effectiveness were described as “highly positive”. Meanwhile, practices of ecological solid waste management in terms of segregation, storage, transfer, and disposal were expressed as “often practice”. Based on the findings of the study, the following conclusions were drawn: There is a significant relationship between the level of awareness and practices of respondents regarding the implementation of (ESWM). Students have a lower level of awareness, while teachers' attitudes and practices are more consistent than the students. There is also a significant relationship between the attitude and awareness of respondents regarding ESWM practices. Furthermore, the teachers and students have identified common challenges in ecological solid waste management, such as a lack of discipline among students, insufficient resources, limited time, and the need for constant awareness programs

Keywords*: Ecological Solid Waste Management, Emotional Response, Perceived Effectiveness, Personal Responsibility*

Introduction

The Philippines is making efforts to deal with the growing amount of solid waste it generates even though there are enormous waste management problems in place. It is estimated that about 40,000 tons of solid waste are produced each day by the country and more than a half of it comes from households (EMB, 2022). Waste generation rate has been in sharp focus but waste management facilities and practices have been improved upon. Environmental challenges such as air and water pollution, land contamination will be minimized, while ensuring public health (World Bank, 2018).

Recognizing the urgency of the situation, the Philippine government enacted Republic Act 9003, also known as the Ecological Solid Waste Management Act of 2000 (ESWMA). This landmark legislation aims to promote sustainable solid waste management practices through the 3Rs: Reduce, Reuse, and Recycle (DENR, 2023). The ESWMA mandates the implementation of various programs, including waste segregation at source, composting, recycling, and proper disposal of residual waste.

However, the Commission on Audit (COA) recently highlighted persistent challenges in waste management in the Philippines, more than two decades after the enactment of Republic Act No. 9003, also known as the Ecological Solid Waste Management Act of 2000. According to COA's audit report, the country faces a significant waste management issue, with a notable increase in waste generation over the years. The report revealed that municipal waste production surged from 9.07 million metric tons in 2006 to 16.63 million metric tons in 2020. Projections indicate a continuous rise, reaching 19.76 million metric tons in 2030 and potentially escalating to 24.5 million metric tons in 2045. Despite the goals set by RA 9003 to reduce waste through prevention, reduction, and recycling, COA identified root causes contributing to the law's faltering implementation. These include population growth, the impact of Covid-19, insufficient public awareness on recycling procedures, a scarcity of solid waste facilities, urban dependence on single-use items, and the country's acceptance of waste imports from developed nations. The report emphasizes the urgency of addressing these challenges to avert the projected annual waste generation of 19,764,384.95 metric tons in 2030 to 24,499,946.53 metric tons in 2045 (COA, 2023).

Furthermore, schools play a crucial role in promoting environmental awareness and responsible behavior among young Filipinos. Recognizing this crucial role, the Department of Education (DepEd) issued DepEd Order No. 52, s. 2011, which reiterates the importance of integrating ESWM in the school curriculum and daily operations (DepEd, 2011). This order encourages schools to establish waste management committees, conduct waste segregation activities, and promote the use of environment-friendly materials.

Despite the positive policies and efforts made by DepEd, the implementation of ESWM in high schools still faces several challenges. Some of the key issues include limited resources, as many schools lack the necessary funding and infrastructure to implement ESWM programs effectively. This often leads to inadequate waste segregation facilities, insufficient personnel training, and limited access to composting and recycling technologies. Additionally,

aside from solid waste, food waste in school is one of the big contributors to ecological solid waste ranging from an average of 35 kg of food waste per day (Pancino et al., 2021).

Another challenge is the lack of awareness and participation. Some students and teachers may not fully understand the importance of ESWM and how their actions impact the environment. This lack of understanding can lead to complacency and hinder the effectiveness of waste management programs (Benosa, 2021).

Moreover, social and cultural barriers can also impede the adoption of new waste management behaviors. Long-held practices and traditions can make it challenging to introduce and promote new approaches. Addressing these social and cultural barriers requires targeted interventions and community engagement. Furthermore, the consumption behaviors of people as well as the advancement of technology contributed to the development of rapid changes in the technology in managing ecological solid waste (Abdel, 2018).

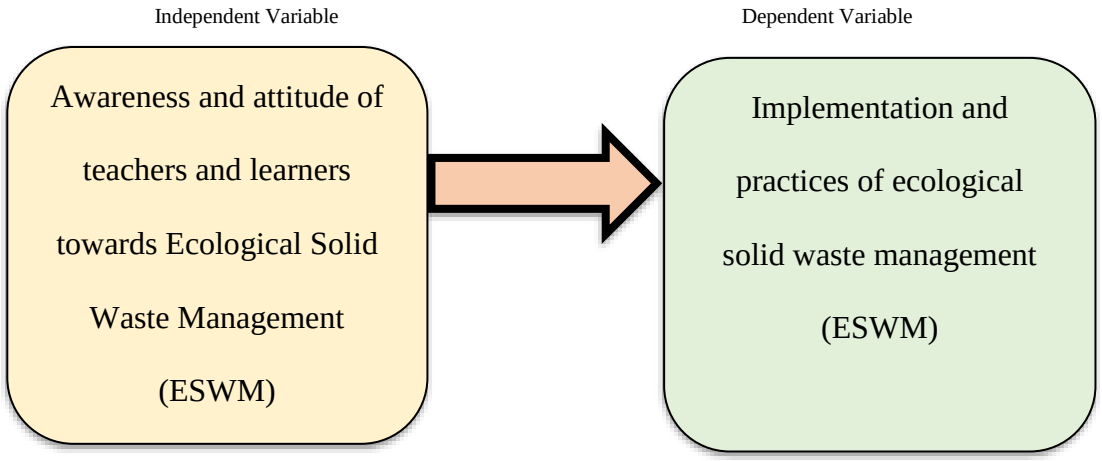
While previous research has explored the challenges and opportunities surrounding ESWM in the Philippines, there is still a dearth of studies specifically focused on the level of awareness and attitude of teachers and learners in high schools. Understanding the perspectives and knowledge base of these stakeholders is critical to designing effective ESWM programs and fostering a culture of environmental responsibility within school communities.

This research aims to address this gap by investigating the level of awareness and attitude of teachers and learners on the implementation and practice of ESWM in Junior High Schools in San Rafael, Bulacan. By analyzing the level of awareness, attitudes, and practices related to the implementation of waste management, this study aims to provide valuable insights that can inform future policy initiatives, educational programs, and community interventions to promote ESWM in schools more effectively.

Conceptual Framework

Based on the related studies, and literature cited, presented, and explained above, the researcher came up with a paradigm that will serve as a guide in the conduct of the study. This paradigm is illustrated in Figure 1.

Figure 1. Paradigm of the Study



Statement of the Problem

This study determined the level of awareness and attitude of teachers and learners on the implementation and practice of Ecological Solid Waste Management of Junior High Schools in San Rafael, Bulacan Year 2023-2024.

Specifically, it will seek answers to the following questions:

1. How may the level of respondents' awareness on implementation of Ecological Solid Waste Management be described in terms of:
    1.1 reduce;
    1.2 reuse;
    1.3 recycle; and
    1.4 repair?
2. How may the attitude of the respondents towards Ecological Solid Waste Management be described in terms of:
    2.1 Personal Responsibility;
    2.2 Emotional Response;
    2.3 Perceived Importance; and

2.4 Perceived Effectiveness?

3. How may the practices on Ecological solid waste management be described in terms of:

   3.1 Segregation;

   3.2 Storage;

   3.3 Transfer; and

   3.4 Disposal.

4. Is there a significant relationship between the level of awareness and practices of the respondents on the implementation of Ecological Solid Waste management?

5. Is there a significant relationship between the attitude and practice of the respondents on the implementation and practice of ESWM?

6. Is there a significant difference between the level of awareness and attitude of the teachers and learners on the implementation and practice of ESWM?

7. What are the perceived challenges and barriers faced by teachers and learners in implementing and practicing Ecological Solid Waste Management in Junior High Schools in San Rafael, Bulacan?

8. What program of activities can be crafted from the findings of the study?

Hypotheses

The following hypotheses will be tested in the study:

1. There is no significant relationship between the level of awareness and practices of the respondents on the implementation of Ecological Solid Waste Management.

2. There is no significant relationship between the attitude and practice of the respondents on the implementation and practice of Ecological Solid Waste Management.

3. There is no significant difference between the level of awareness and attitude of the teachers and learners on the implementation and practice of Ecological Solid Waste Management.

METHODOLOGY

The information about the research and sampling procedures that will be utilized by the researcher is provided in this chapter. The research design that will be employed, as well as the data-gathering techniques, and data analysis scheme are also discussed in this chapter.

Research Design

For this study, the researcher used a mixed-methods research design. It is a research approach that combines both quantitative and qualitative research methods into a single study or research project. This methodological approach involves collecting and analyzing both numerical (quantitative) and narrative (qualitative) data to gain a more comprehensive and in-depth understanding of the research topic (George, 2023). Starting with the collection and analysis of quantitative data. Following that, qualitative data were gathered and analyzed to ascertain in determining the challenges perceived by teachers and learners in the implementation of ecological solid waste management.

In the first stage, the research questions are primarily addressed through the collection and analysis of quantitative data. The gathering and analysis of qualitative data come after the quantitative phase. The qualitative phase's data gathering and analysis are guided by the quantitative phase's findings. To further understand the quantitative data, qualitative results are employed (Creswell and Plano Clark, 2018).

To gain a more in-depth understanding of the level of awareness in the context within which they occur, researchers conducted interviews with the respondents.

Sampling and Respondents

The respondents of the study was chosen by applying Proportional stratified random sampling. In proportional stratified random sampling, each stratum has a sampling fraction that is proportionate to the population size of the strata when examined across the entire population. (Crossman, 2023). The researcher randomly select 2 samples of teachers and learners from each stratum. This would ensure that the sample is representative of the population and that all subgroups are properly represented. The table below shows the number of respondents and the distribution of respondents per junior high school.

Table 1

Respondents of the Study: Junior High School Teachers

School Name	Total
San Rafael National Trade School	54
Maronquillo National High School	27
Carlos F. Gonzales National High School	139
Salapungan National High School	28
Lydia D. Villangca Trade School	28
Grand Total	276

Table 2

Respondents of the Study: Junior High School Learners

School Name	Total no. of respondents for grade 7	Total no. of respondents for grade 8	Total no. of respondents for grade 9	Total no. of respondents for grade 10	Total no. of respondents per School
San Rafael Nat'l Trade School	20	19	19	19	77
Maronquillo National High School	9	8	8	8	33
Carlos F. Gonzales National High School	45	44	44	44	177
Salapungan NHS	10	10	9	9	38
Lydia D. Villangca Trade School	11	11	10	10	42
Grand Total	95	92	90	90	36

To ensure the validity and reliability of the survey results, the researcher decided to use 367 learners and 276 teachers among the population of the five public junior high schools in San Rafael, Bulacan. This approach minimized the risk of sampling bias and ensured that the results were representative of the entire population.

For the qualitative part, 2 students and 2 teachers were asked to participate in the semi-structured interview.

Locale of the Study

The study was conducted in the Municipality of San Rafael, Bulacan, which is experiencing rapid urbanization and has a growing population. San Rafael has different schools with varying levels of ESWM implementation, providing a unique opportunity to compare and contrast the experiences of teachers and learners. The municipality's relatively young population is more receptive to embracing new ideas and practices related to ESWM. Additionally, the municipality has committed to promoting sustainable waste management practices through the adoption of the Ecological Solid Waste Management Act of 2000.

By conducting this study in San Rafael, the researcher anticipates gaining valuable insights into the awareness and attitudes of both teachers and learners regarding the implementation and practice of ESWM. Additionally, the researcher aims to explore the perspectives on ESWM knowledge, attitudes, challenges, and practices. Ultimately, the findings of this research endeavor will prove invaluable to policymakers, educators, and various stakeholders, enabling them to develop and implement effective ESWM education and practice programs not only in San Rafael but also in other rapidly urbanizing municipalities throughout the Philippines.

Instrument

This study evaluated the level of awareness and attitudes of teachers and learners on the implementation and practice of ecological solid waste management. A survey questionnaire based on the ones used by Bona et. al (2023) and Benosa (2021) was prepared by the researcher. The questionnaire was modified to make it relevant to the local setting. It will be divided into three sections: Awareness on Ecological Solid Waste Management (ESWM), Attitude towards Ecological Solid Waste Management (ESWM), and Practices on Ecological Solid Waste Management (ESWM).

There were two types of data – quantitative and qualitative that are collected through a survey and an interview. For the first part, the participants answers the Awareness on Ecological Solid Waste Management (ESWM) survey using a scale that has different levels of responses as adapted from Bona (2023): 5 - Highly Aware (HA); 4 - Very Aware (VA); 3 - Moderately Aware (MA); 2 - Slightly Aware (SA); and 1 - Not at all Aware (NA). The second part of the survey adopted from Benosa in 2021 about Attitudes towards Ecological Solid Waste Management (ESWM) has different levels of feedback that correspond to 5 – Strongly Agree (SA); 4 - Agree (A); 3 - Neutral (N); 2 - Disagree (DA); and 1 – Strongly Disagree (SD). The last part of the survey is about the practices on Ecological Solid Waste Management which has a different level of practice that corresponds to 5 - Always Practice (AP); 4 - Often Practice (OP); 3 - Sometimes (S); 2 - Rarely Practice (RP); and 1 - Almost Never Practicedddd (ANP).

In-depth follow-up interviews were conducted with a select group of junior high school learners to gain a deeper understanding of their experiences and perspectives.

Data Gathering Procedures

In accordance with the ethical guidelines set forth by the Bulacan Agricultural State College, Memorandum No.9, s. 2022 and the DepEd Region III, Regional Memorandum No. 228, s. 2020 "Policy Guidelines on the Adherence to Ethical Research Principles and Responsibilities in Studies involving Teaching, Teaching-related, Non-teaching Personnel and Learners", the researcher employ a rigorous data collection procedure that ensures the privacy and confidentiality of all participants. Data were collected through surveys, and face-to-face interviews (recorded interviews), however, the participants can also choose not to be recorded following their will. Before data collection, informed consent was obtained from all participants, and for those below 18 years of age, an assent form was secured from their parents or guardians. All data will be anonymized, stored securely in password-protected files, and will not be linked to any personally identifiable information. Participants were informed that they have the right to withdraw from the study at any point without any consequences. Upon the conclusion of the research, all data will be disposed of securely, specifically by shredding and electronic deletion, to prevent any potential reconstruction of information. This procedure is designed to respect the autonomy of our participants while ensuring the integrity of our research data.

Data Analysis

After collecting all the questionnaires, these will be organized, tallied, tabulated, and analyzed using some statistical tools.

Descriptive statistics such as mean and standard deviation will be computed to describe the scores for awareness and attitude for teachers and learners separately.

Correlation analysis will be conducted to establish whether a significant relationship exists between the independent variables (implementation and practice of ecological solid waste management) and the dependent variables (level of awareness and attitude of teachers and learners towards ESWM).

T-tests will be employed to analyze the data, offering insights into whether statistically significant differences exist between the variables under study. This will allow for a more robust understanding of the relationships and potential disparities in awareness and attitudes toward ecological solid waste management among different groups within the educational community.

For the gathered qualitative data, thematic analysis will be used for interpretation. Thematic analysis is a qualitative data analysis technique. It is frequently used to describe a group of texts, such as an interview or transcripts. The researcher carefully studies the data to uncover common themes - subjects, concepts, and meaning patterns that appear again (Caulfield, 2023).

Ethical Considerations

In this study, the researcher is committed to upholding ethical standards by adhering to the following considerations: voluntary participation and withdrawal, informed consent, language sensitivity, privacy and anonymity, proper attribution, objectivity, and data protection compliance. The researcher will ensure that participants provide their consent and respect their right to withdraw from the study at any time without any consequences. The researcher will obtain informed consent from all participants, provide comprehensive information about the research's purpose, methods, risks, and benefits, and maintain a respectful and unbiased research environment by avoiding offensive or inappropriate language. The researcher will take rigorous measures to protect the privacy and anonymity of respondents, acknowledge the contributions of other authors, maintain the highest level of objectivity, and adhere to the Data Protection Act of the Philippines. By actively incorporating these ethical considerations into the research, the researcher aims to conduct a responsible and principled study that respects the rights and well-being of all participants and upholds the integrity of the research process.

RESULTS AND DISCUSSIONS

Relationship between the level of Awareness and Practice of the respondents on the implementation of Ecological Solid Waste Management

Table 15 presents the results of the correlation analysis which was done to determine if a significant relationship existed between the awareness and practices of the implementation of Ecological Solid Waste Management.

Table 15.

Test of Significant Relationship between the level of Awareness and Practice of the respondents on the implementation of Ecological Solid Waste Management

Variables		**p-value**	**Decision**	**Verbal Interpretation**
Awareness on the implementation of Ecological Solid Waste Management	Practice on Ecological Solid Waste Management	0.00	Reject Ho	Significant

Legend: p <0.01 = significant

Table 15 reveals the test of a significant relationship between respondents' levels of awareness and practice in the implementation of ecological solid waste management, with a p-value of 0.00, which is less than the significance level of 0.01. As a result, the null hypothesis was rejected, indicating that there is a substantial association between respondents' levels of awareness and practice regarding the implementation of Ecological Solid Waste Management.

In an interview conducted with the respondents they were asked *"Can you describe your understanding of Ecological Solid Waste Management (ESWM)? What are some specific ESWM practices you're familiar with?"* they said *"When we talk about ecological waste management, it's about managing waste from different components of the environment... These wastes, in terms of management, implement programs to manage them in order to lessen their impact on the environment. So, the most common practice here in our school is segregation."* This response suggests that individuals with a better understanding of ESWM practices are more likely to engage in them. Therefore, there is a likelihood that respondents who demonstrate a similar level of awareness through their responses are also actively practicing ESWM in their schools.

The results imply that awareness, and practices on ecological solid waste management are crucial in promoting sustainable waste management. Minimizing waste, promoting positive public attitudes, using environmentally friendly technologies, and promoting recycling and waste reduction are essential in managing solid waste. This suggests that increasing awareness about waste management can lead to more sustainable practices, It also means that efforts to raise awareness could be a key strategy in improving waste management practices.

Furthermore, the study was in consonance with the findings of Alvarez, D.A. (2022) that there is a very strong relationship or correlation between environmental practices and awareness in promoting sustainable solid waste management practices among public elementary schools in Sto. Tomas North District.

The Relationship between the Attitude and Practice of the respondents on the implementation of Ecological Solid Waste Management

Table 16 presents the results of the correlation analysis which was done to determine if a significant relationship existed between the attitude and practice of the implementation of Ecological Solid Waste Management.

Table 16.

Test of Significant Relationship between the Attitude and Practice of the respondents on the implementation of Ecological Solid Waste Management

Variables		**p-value**	**Decision**	**Verbal Interpretation**
Attitude on Ecological Solid Waste Management	Practice on Ecological Solid Waste Management	0.00	Reject Ho	Significant

Legend: p<0.01 = significant

As displayed in table 16, the test of a significant relationship between attitude and practice of the respondents on the implementation of ecological solid waste management, with a p-value of 0.00, which is less than the significance level of 0.01. As a result, the null hypothesis was rejected, indicating that there is a significant relationship between respondents' attitude and practice of the respondents on the implementation of ecological solid waste management.

In an interview conducted with the respondents they were asked *"What do you think are the main barriers preventing students, teachers, and other school personnel from actively participating in ESWM practices? Are there any incentives or rewards that could encourage greater involvement?"* they said *"The student itself. Even though there's a program about solid waste, there are still times when you can't minimize waste because some students still don't practice these practices. By simply throwing away plastic, some students still don't care about it."* This response highlights the attitude of some students towards ESWM practices, indicating a lack of concern or motivation to participate actively. A negative attitude towards waste management, as indicated by the student's response, may lead to a lack of active participation in ESWM practices. Therefore a positive attitude towards ESWM can lead to increased engagement and consistency in practicing sustainable waste management behaviors

The result implies that there is a crucial role of positive attitudes in driving effective and sustainable practices in managing ecological solid waste. This means that as the attitude towards ecological solid waste management becomes more positive, so does the practice of sustainable waste management strategies. This indicates that increasing knowledge and fostering positive attitudes towards waste management can lead to more sustainable practices.

In consonance with the findings of Laor et al (2018), who discovered that higher levels of knowledge and attitude had a beneficial effect on practice levels of ecological waste management. Furthermore, according to the study of Mensah and Ampofo (2021), the results of the study showed that the environmental attitudes of managers significantly influence the waste management practices of hotels, specifically the anti-anthropocentrism, anti-exceptionalism, eco-crisis, and balance-of-nature dimensions of the New Ecological Paradigm scale.

The Relationship between the Awareness and Attitude of the respondents on the implementation of Ecological Solid Waste Management

Table 17 presents the results of the correlation analysis which was done to determine if a significant difference existed between the awareness and attitude of the implementation of Ecological Solid Waste Management. Thus, serves as a crucial tool in understanding the relationship between respondents awareness and their attitudes towards Ecological Solid Waste Management

Table 17.

Test of Significant Difference between the level of awareness and attitude of the teachers and learners on the implementation and practice of Ecological Solid Waste Management

Variables		**p-value**	**Decision**	**Verbal Interpretation**
Teachers' responses on the Awareness on Ecological Solid Waste Management	Learners' responses on the Awareness on Ecological Solid Waste Management	0.00	Reject Ho	Significant
Teachers' responses on the Attitude on Ecological Solid Waste Management	Learners' responses on the Attitude on Ecological Solid Waste Management	0.00	Reject Ho	Significant

Legend: p<0.01 = significant

Table 17 displays the test of a significant relationship the level of awareness and attitude of the teachers and learners on the implementation and practice of ecological solid waste management, with a p-value of 0.00, which is less than the significance level of 0.01. As a result, the null hypothesis was rejected, indicating that there is a significant difference between the level of awareness and attitude of the teachers and learners on the implementation and practice of ecological solid waste management.

The result implies that teachers, who are extremely aware and have a highly positive attitude, might be more knowledgeable, more committed, or more experienced in implementing and practicing ecological solid waste management compared to the learners, who are very aware and have a positive attitude. This finding highlights the importance of continued education and engagement to further enhance the learners' awareness and attitudes towards ecological solid waste management. It also highlights the potential role of teachers as leaders and role models in this area.

Further perusal of the table also suggests that a person's awareness and understanding of waste management practices can significantly influence their attitude towards these practices. If individuals are more aware of the importance and benefits of solid waste management, they are likely to have a more positive attitude toward implementing these practices. On the other hand, if individuals lack awareness, they may not understand the importance of these practices, leading to a less positive or indifferent attitude.

In consonance with the findings of Lalamonan, and Comighud (2020), revealed that respondents had a high level of awareness of SWM Practices, as perceived by teachers and students, and that these practices were widely implemented. Furthermore, a significant relationship was observed between levels of awareness and SWM Practice implementation. It can be concluded that the level of awareness had a significant impact on the extent to which teachers and students in District 2, Bayawan City Division. Furthermore, in the study of Fazal et al (2020) showed that there is a significant relationship between teacher-student interactions and student motivation. If teachers take the time to build positive relationships with their students, they should or will be able to develop a desire for fulfillment. The strength or perception of positive teacher-student interaction correlated with student motivation.

Perceived Challenges and Barriers Faced by Teachers and Learners in Implementing and Practicing Ecological Solid Waste Management

In the conducted interview with the participants, there's a shared understanding of Ecological Solid Waste Management (ESWM) as involving waste segregation, recycling, and proper disposal. Participants commonly understand Ecological Solid Waste Management (ESWM) as a system focusing on waste segregation, recycling, and proper disposal. Most of the participants described it as *"a holistic approach to handling solid waste, emphasizing sustainability and environmental protection. It involves waste segregation, composting, recycling, waste-to-energy technologies, and public education."* The biggest obstacle to implementing ESWM practices is often the *"lack of facility,"* which hold back effective implementation. Most participants feel their schools lack adequate resources, noting *"our school lacks adequate resources such as sufficient bins, composting facilities, and recycling infrastructure. The missing components include more bins, better composting facilities, and improved recycling systems."* Barriers to active participation include a *"lack of understanding of the ESWM practices and its importance,"* and participants believe that recognition could motivate involvement, suggesting *"students, teachers, and other personnel will be encouraged if they are recognized as role models of ESWM practices."* To improve ESWM implementation, most participants recommended that *"rewards and punishments may be a good help. Consistent and active implementation by the assigned club/department. Learners can see the concrete benefits of ESWM like producing organic fertilizer and earning from selling or reusing recyclable materials."*

The thematic analysis reveals a common recognition among participants of the importance of ESWM practices but also highlights significant challenges in implementation. Lack of resources, particularly facilities like composting areas and recycling infrastructure, emerges as a primary concern. Additionally, there's a notable emphasis on the need for education and awareness-raising efforts to overcome barriers to participation. Recognition and incentives are suggested as strategies to motivate involvement.

In consonance with the study of Mulyawan et al., (2019) lack of solid waste management budgets, garbage transport equipment, and the habit of littering pose significant challenges in solid waste management. Additionally, the management of municipal solid waste (MSW) poses serious challenges due to environmental issues associated with waste generation and inadequate waste collection, transport, treatment, and disposal (Sakanyi, 2022).

Intervention/s or Program of Activities could be Crafted from the Results of the Study

The results of this study revealed the importance of raising awareness, fostering positive attitudes, and addressing practical challenges to promote sustainable waste management practices in educational settings. Hence, in the matrix below, the researcher proposed an action plan that will increase the level of awareness, attitudes, and practice of ecological solid waste management.

Table 18.

Proposed Program of Activities

Objectives	**Action**	**Timeline**	**Persons Involved**	**Expected Output**
To be able to disseminate the information about RA 9003 to all students, teachers and non-teaching personnel and understand the importance of implementing a school-based solid waste management	• Seminars and Workshops/Trainings- Provide training and workshops on waste segregation, composting, and other sustainable waste management techniques.	July-April	-School Head - Barangay Officials - Teachers - Student and student leaders - School Official of Canteen - NGO's/ MENRO (Municipal Environment and Natural Resources Officer)	Equip attendees with practical skills and strategies for implementing effective waste management practices in schools. Develop innovative solutions and initiatives for waste reduction and recycling within their schools, leading to the implementation of creative projects and programs.
Enhance the development of values among the learners on waste management and environmental protection.	Develop school-wide waste management policies and guidelines, outlining procedures for waste segregation, recycling, composting, and proper disposal.	July	School Head Teachers School Maintenance	Establish policies and guidelines Implement waste management policies.
Improve efficiency and profitability by promoting, reuse, recycling, and recovery of waste, rather than disposal.	Establishment of the Material Recover Facility(MRF)	July-April	School Head Class Adviser YES-O Club School Maintenance	Profit from sold waste material. The profit can help the school for programs or projects inline with solid waste management.
Implement Composting and Organic Waste Management	Introduce composting systems to manage food waste and organic materials generated in the school canteen.	Year-Round	Canteen School Manager YES-O Club School Maintenance Gulayan sa Paaralan Coordinator	Reduction of biodegrable waste and production of fertilizer.
Give Recognition and Incentives	Recognize and reward students, teachers, and staff who actively participate in waste reduction, recycling, and sustainability efforts.	Every end of the month	-School Head - Teachers - Students	Inspire others to follow suit, creating a ripple effect where individuals are encouraged to adopt environmentally friendly behaviors and contribute to collective efforts towards waste reduction and conservation.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Findings

This study determined the level of awareness and attitude of teachers and learners on the implementation and practice of Ecological Solid Waste Management of Junior High Schools in San Rafael, Bulacan during the School Year 2023-2024.

The answers to the problems raised in this study were ascertained and summarized

as follows: Findings revealed awareness of reduce, reuse, recycle, and repair were rated as extremely aware by the teachers and very aware by the students.

Meanwhile, the teachers' and learners' attitudes towards ESWM in terms of personal responsibility, emotional response, perceived importance, and perceived effectiveness were described as strongly agree by the teachers and agree by the students showing positive attitudes.

The practices of ecological solid waste management in terms of segregation, storage, transfer, and disposal were often practiced by the teachers and students. on the other hand, students shows lower level of commitment thus, the learners need more improvement in the practice of ESWM.

There was a significant association between respondents' levels of awareness and their practices regarding the implementation of Ecological Solid Waste Management. Students have a lower level of awareness.

Similarly, there was a significant relationship between respondents' attitudes and practices regarding the implementation and practice of ESWM. Teachers' attitudes and practices are more consistent than the students.

There is a significant relationship between the attitude and awareness of respondents regarding the implementation of ecological solid waste management (ESWM). The low p-value indicates strong evidence to reject the null hypothesis, suggesting that there is indeed a significant difference between respondents' attitudes and their level of awareness regarding ESWM practices.

Common challenges perceived by the teachers and students in ecological solid waste management included a lack of discipline among students, insufficient resources, limited time, and the need for constant awareness programs.

Conclusions

Based on the findings of the study, the following conclusions were drawn: The study found a high level of awareness and strong agreement showing positive attitudes towards ecological solid waste management (ESWM) among both teachers and learners. Teachers and students practiced key actions like waste segregation and disposal responsibly.

The results revealed a strong connection between awareness, attitude, and practices. Higher awareness of ESWM led to more responsible waste management behavior, and a positive attitude towards it further increased engagement. Despite the positive results, there were challenges like lack of discipline and resources.

Recommendations

In light of the findings and conclusions of the study, the following recommendations are hereby presented:

1. Schools should start education programs to improve understanding of Ecological Solid Waste Management among teachers and students.
2. Schools could introduce reward programs to encourage participation in waste management practices.
3. Future researchers could expand on this study by using senior high school students as participants.

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