



EMPOWERING ENVIRONMENTAL GUARDIANS: A HOLISTIC ASSESSMENT OF SOLID WASTE MANAGEMENT PRACTICES AMONG STUDENTS AT UNION NATIONAL HIGH SCHOOL, PHILIPPINES

¹Jhondel P. Baranggan, ²Sheilla D. Yamba

Corresponding author email: barangganlpt@gmail.com

Abstract

The indiscriminate disposal of solid waste poses a significant threat to environmental integrity and human well-being, necessitating robust waste management approaches. This study comprehensively assesses students' involvement in solid waste management practices at Union National High School in the Philippines, aiming to evaluate awareness, attitudes, and practices regarding waste management. The main objective is to identify strengths and areas for improvement in students' awareness, attitudes, and practices regarding solid waste management, providing insights to support targeted interventions and programs promoting responsible waste management practices. A descriptive survey spanning grades 7 to 12 assessed levels of awareness, attitudes, and practices, revealing varying levels of awareness among students, positive attitudes towards waste management, and practices ranging from adherence to desirable behaviors to concerns such as improper waste disposal. Analysis of the mean percentage indicated consistent awareness, attitudes, and practices among students with affirmative responses, suggesting a need for targeted educational interventions to enhance understanding, foster positive attitudes, and reinforce responsible practices. Overall, the findings underscore the importance of holistic waste management education to bridge knowledge gaps, shape attitudes, and develop practical skills among students, empowering them to contribute actively to sustainable waste management efforts and promote a cleaner, healthier environment.

Keywords: *waste management education, environmental stewardship, student engagement, responsible behavior, sustainable practices*

Introduction

The indiscriminate disposal of solid waste presents a considerable threat to environmental integrity and human well-being (Ejaz, Akhtar, Hashmi, 2010; Neller & Neller, 2015). This concern holds significant relevance in the Philippines, a nation acknowledged for its relatively high efficiency in garbage collection within Southeast Asia (Ranada, 2015) yet simultaneously admitted as the third-largest source of plastic waste entering the world's oceans (Suarez, 2015). These concerning figures highlight the urgent requirement for robust waste management approaches.

A strategic approach to address this environmental challenge involves solid waste management. This comprehensive method is essential for combating the escalating global waste crisis, which poses threats to humanity, contributes to environmental pollution, and harms communities. Solid waste management encompasses a range of activities, including storage, collection, transportation, processing, and disposal of solid waste, all guided by conservation, public health, engineering, economics, and environmental concerns (Rahmaddin et al., 2015).

Moreover, raising awareness about solid waste management is pivotal. This environmental campaign aims not only to educate individuals about the consequences of waste creation and management but also to cultivate the proper attitudes that encourage positive waste disposal practices. Numerous studies have explored the correlation between responsible environmental behavior and factors such as knowledge, attitudes, verbal commitment, and sense of responsibility (Liou, 1992; Hines, Hungerford & Tomera, 1986).

Despite efforts to address solid waste management, there are still significant gaps in the local policies. The Department of Education (DepEd) and local government units (LGUs) play critical roles, with educational institutions serving as influences, especially among the youth. Proper SWM training for DepEd is imperative, given its large student population. Schools demonstrating effective SWM

practices have shown positive responses by implementing recycling options (Smyth et al., 2010; Mbuligwe, 2002; Mason et al., 2003; Malakahmad et al., 2010; De Vega et al., 2003; 2008), indicating the potential for schools to serve as frameworks for addressing SWM issues.

Therefore, this study comprehensively assesses students' involvement in solid waste management practices at Union National High School in Union, Dapa, Surigao del Norte, Philippines. It aims to evaluate students' awareness, attitudes, and practices regarding solid waste management to identify strengths and areas for improvement. The study seeks to provide insights to support targeted interventions and programs promoting responsible waste management practices and fostering environmental stewardship within the school community.

Furthermore, the introduction provides a comprehensive overview of the necessity of the study concerning solid waste management (SWM), it lacks explicit clarification regarding the selection of variables under examination. It is essential to elucidate why the specific variables of awareness, attitudes, and practices were chosen for assessment. Providing a rationale for selecting these variables would enhance the readers' understanding of the research objectives and underscore the relevance of these aspects in addressing the SWM challenges identified in the introduction. Therefore, incorporating a brief statement elucidating the rationale behind selecting awareness, attitudes, and practices as the focal variables for assessment would strengthen the introduction and align it more closely with the subsequent methodology and results sections.

Methodology

Research Locale

Union National High School is situated in Barangay Union, Dapa, Surigao Del Norte, Philippines. Barangay Union is located in the eastern part of the Municipality of Dapa, Surigao del Norte, approximately 6.5 kilometers from the municipality's center. The Barangay is part of the Municipality of Dapa, which is classified as a 4th class municipality in Surigao del Norte. The area's classification suggests it is a rural community, typically characterized by its proximity to natural landscapes and traditional ways of living. Understanding the locale is crucial as it provides insights into the socio-economic and environmental factors that may influence the respondents' awareness, attitudes, and practices regarding solid waste management (SWM).

Research Participants and Sampling Frame

The research employed a purposive sampling method to select 204 respondents from Union National High School, spanning across all grade levels from 7 to 12. The choice of students as respondents was deliberate and aligned with specific criteria to ensure relevance to the research objectives. The sampling frame used focused on students due to their direct relevance to the study's aim of assessing awareness, attitude, and practices related to solid waste management. Students in grades 7 through 12 were considered appropriate participants as they represent a diverse range of ages and educational backgrounds, likely reflecting different levels of environmental literacy and engagement. This sampling approach allowed the researchers to intentionally target students who were likely to provide valuable insights into SWM practices and attitudes. Moreover, by including students from various grade levels, the research aimed to capture a comprehensive understanding of SWM awareness and practices across different stages of schooling.

Inclusion and Exclusion Criteria

Inclusion criteria for selecting respondents involved students currently enrolled in Union National High School from grades 7 to 12. Exclusion criteria may have included students who were absent during the survey period or those who did not provide consent to participate. These criteria were established to ensure the selection of participants who were actively engaged in the school community and willing to contribute to the study.

Literature Supporting Sampling Frame

The decision to focus on students as the primary respondents aligns with previous research emphasizing the importance of youth engagement in environmental education and advocacy programs (Cruz & Tantengco, 2017). Additionally, studies by Babaei et al. (2015), Licy et al. (2013), Ugulu et al. (2013), Ifegbesan (2010), and Ifegbesan (2011) have highlighted the significance of collecting baseline data on awareness, attitudes, and practices related to environmental issues, including SWM, among school-age populations. These studies provide a theoretical basis for selecting students as respondents, as they are considered key stakeholders in promoting sustainable environmental practices and policies within their communities.

Materials Used in the Study

The survey questionnaire utilized in this study was adapted from previous research conducted by Licy et al. (2013), Ifegbesan (2010), and Ifegbesan (2011). These questionnaires were chosen as they were already validated tools used in assessing awareness, attitudes, and practices related to solid waste management (SWM) in various contexts. However, necessary modifications were made to tailor the questions to the specific context of Union National High School in Union, Dapa, Surigao del Norte, Philippines.

Validity and Reliability Testing

Validity and reliability testing of the adapted questionnaire were conducted to ensure the accuracy and consistency of the survey instrument in measuring the intended constructs. For validity testing, content validity was initially assessed by subject matter experts to

ensure that the questionnaire items adequately captured the dimensions of awareness, attitudes, and practices related to SWM among students in the study locale. Following content validation, construct validity was assessed using statistical techniques such as factor analysis to confirm that the questionnaire items indeed represented the intended constructs. Reliability testing was conducted to assess the internal consistency of the questionnaire items. This involved calculating Cronbach's alpha coefficient for each section of the questionnaire (awareness, attitudes, and practices) to measure the extent to which the items within each section were correlated with each other. A high Cronbach's alpha value indicates greater internal consistency among the questionnaire items.

Components of the Questionnaire

Awareness Section: This section comprised 16 questions aimed at assessing students' knowledge and understanding of solid waste management practices, including segregation, recycling, and proper disposal methods. Questions in this section may have covered topics such as the types of waste, environmental impacts of improper waste management, and awareness of local SWM policies.

Practices Section: This section contained 5 questions focusing on students' actual behaviors and practices related to solid waste management. Questions may have addressed habits such as waste segregation at home and school, recycling practices, and participation in community clean-up activities.

Attitude Section: This section consisted of another 5 questions designed to gauge students' attitudes and perceptions towards SWM. Questions in this section may have explored attitudes towards waste reduction, environmental responsibility, and willingness to adopt sustainable waste management practices.

In addition, the questionnaire was structured to provide a comprehensive assessment of students' awareness, attitudes, and practices regarding SWM, with each section targeting specific aspects of their behavior and beliefs. Validity and reliability testing ensured that the questionnaire was a robust tool for collecting accurate and consistent data for the study's objectives.

Statistical Tools Used in the Study

Descriptive statistics, including mean percentages, were utilized to summarize the central tendency and distribution of the data collected through the survey questionnaire. The mean percentage may provide insights into the average level and responses across different aspects of SWM. However, percentages will be emphasized to ensure clarity in presenting the prevalence or distribution of responses among respondents.

Descriptive statistics, including mean percentage is employed to provide a concise summary of the data, facilitating easy interpretation and comparison across different groups or variables. Mean percentages will be emphasized to ensure clarity in presenting the prevalence or distribution of responses among respondents.

The utilization of these statistical tools will enable the effective presentation and interpretation of the study's findings, providing valuable insights into the levels of SWM awareness, attitudes, and practices among students at Union National High School. By employing these tools, the study can offer meaningful conclusions and recommendations for enhancing SWM education and advocacy efforts within the school and community.

Results and Discussions

Level of Awareness Among Students towards Solid Waste Management (SWM)

Table 1. Level of Awareness Among Students towards Solid Waste Management (SWM)

<i>Grade Level</i>	<i>YES</i>	<i>NO</i>	<i>Not Sure</i>	<i>Total</i>
7	35%	29%	35%	100%
8	37%	36%	27%	100%
9	53%	21%	26%	100%
10	38%	16%	46%	100%
11	52%	11%	38%	100%
12	51%	22%	27%	100%
TOTAL	46%	21%	33%	100%

The results of the study on solid waste management (SWM) awareness among students reveal several noteworthy trends. Firstly, across all grade levels, there is a significant portion of students who exhibit some level of awareness regarding SWM, with the highest level observed among Grade 9 students at 53%. This suggests that educational interventions or environmental initiatives targeting younger students might be effective in instilling awareness and understanding of SWM practices. Conversely, Grade 7 and Grade 8 students demonstrate lower levels of awareness compared to higher grades, indicating a potential gap in educational outreach or curriculum integration for younger students.

Furthermore, the proportion of students who are uncertain or lack awareness about SWM decreases as grade level progresses. This trend is particularly evident among Grade 10, Grade 11, and Grade 12 students, where the percentage of those unsure decreases notably compared to lower grades. This suggests that as student progress through their academic journey, they might become more informed or exposed to SWM concepts, possibly through specialized coursework or extracurricular activities.

However, despite these positive trends, it is concerning that a considerable portion of students across all grade levels still express uncertainty or lack

of awareness regarding SWM. For instance, approximately one-third of students across all grades fall into the "Not Sure" category. This highlights the ongoing need for comprehensive and targeted educational programs to enhance SWM awareness among students. Additionally, efforts should be made to identify and address the factors contributing to this lack of awareness, such as insufficient educational resources, cultural attitudes, or socioeconomic factors.

In addition, while there are encouraging signs of SWM awareness among students, the study results underscore the importance of continued efforts to improve education and awareness regarding solid waste management across all grade levels. By addressing these gaps and implementing effective strategies, we can empower students to become active participants in sustainable waste management practices, thereby contributing to a cleaner and healthier environment for future generations.

Attitude of Students towards Solid Waste Management (SWM)

Table 2. Attitude of Students towards Solid Waste Management (SWM)

<i>Grade Level</i>	<i>YES</i>	<i>NO</i>	<i>Not Sure</i>	<i>Total</i>
7	54%	15%	31%	100%
8	55%	20%	26%	100%
9	54%	22%	24%	100%
10	50%	12%	39%	100%
11	62%	4%	34%	100%
12	72%	6%	21%	100%
TOTAL	58%	13%	29%	100%

The study's results on students' attitudes towards solid waste management (SWM) reveal several significant findings. Firstly, there is a generally positive attitude towards SWM across all grade levels, with the highest proportion observed among Grade 12 students at 72%. This indicates a commendable level of awareness and positive perception regarding the importance of SWM practices among older students. Moreover, the trend of increasing positive attitudes towards SWM as grade level progresses is evident, with Grade 11 and Grade 12 students demonstrating notably higher levels of affirmation compared to younger peers. This suggests a potential correlation between age and understanding of the environmental implications of waste management, indicating that as students advance academically, they may become more cognizant of the significance of SWM.

However, it is noteworthy that a substantial portion of students, particularly those in lower grades, still express uncertainty or negative attitudes towards SWM. For instance, approximately one-third of Grade 7 students are either unsure or hold a negative stance toward SWM. This highlights the need for targeted educational interventions to foster a more positive and informed attitude towards waste management practices from an early age. Additionally, the decline in the "Not Sure" category among Grade 12 students compared to lower grades suggests that as students mature, they tend to form more definitive opinions about SWM, underscoring the importance of continued education and advocacy efforts throughout the academic journey.

In addition, while there is an overall positive trend in students' attitudes toward SWM, the study results emphasize the necessity of ongoing education and awareness initiatives to cultivate a stronger sense of responsibility and engagement in waste management practices among students of all grade levels. By addressing knowledge gaps and promoting positive attitudes towards SWM from an early age, we can empower future generations to contribute towards building a more sustainable and environmentally-conscious society.

Practices of Students towards Solid Waste Management (SWM)

Table 3. Practices of Students towards Solid Waste Management (SWM)

<i>Grade Level</i>	<i>YES</i>	<i>NO</i>	<i>Not Sure</i>	<i>Total</i>
7	36%	24%	40%	100%
8	42%	21%	37%	100%
9	53%	25%	22%	100%
10	39%	17%	44%	100%
11	57%	21%	22%	100%
12	52%	24%	25%	100%
TOTAL	48%	22%	30%	100%

The results of the study on students' practices towards solid waste management (SWM) offer valuable insights into the current state of waste management behaviors among different grade levels. Overall, a notable proportion of students engage in SWM practices, with Grade 9 students demonstrating the highest percentage at 53%. This indicates a positive trend towards environmental responsibility among younger individuals. The gradual increase in the percentage of students practicing SWM as grade level progresses, particularly evident in Grade 11 and Grade 12, suggests a correlation between age and the adoption of responsible waste management behaviors, possibly influenced by a deeper understanding of environmental issues and increased maturity.

However, a concerning aspect is the significant portion of students, particularly in lower grades, who either do not engage in SWM practices or are uncertain about their participation. For instance, Grade 7 students show the highest percentage of uncertainty at 40%, indicating a need for targeted educational initiatives to promote hands-on involvement in waste management activities from an early age. Additionally, the prevalence of uncertainty among Grade 10 students suggests a critical period where efforts should be concentrated to encourage and guide students towards adopting sustainable behaviors.

The study results underscore the importance of ongoing education and practical training to enhance students' commitment to waste management initiatives. By addressing barriers to participation and providing resources for students to actively engage in SWM practices, educators and policymakers can foster a culture of environmental responsibility and empower students to play an active role in mitigating waste pollution. Overall,

the findings highlight the need for continuous efforts to cultivate environmentally-conscious individuals who are equipped with the knowledge and skills to address pressing environmental challenges and contribute to the creation of a more sustainable future.

Conclusion

Based on the results and discussions of the research on students' involvement in solid waste management practices at Union National High School in the Philippines, several key conclusions can be drawn. Firstly, the study reveals varying levels of awareness among students regarding solid waste management (SWM), with older students demonstrating higher levels of understanding compared to their younger peers. However, a considerable number of students across all grade levels still lack adequate awareness of SWM practices, highlighting the necessity for targeted educational interventions, mainly aimed at younger students, to address knowledge gaps comprehensively.

Secondly, there is an overall positive trend in students' attitudes towards SWM, with older students exhibiting more positive perceptions compared to younger students. Nonetheless, a notable proportion of students, especially in lower grades, express uncertainty or negative attitudes towards SWM, emphasizing the ongoing need for continuous education and advocacy efforts to instill positive attitudes and cultivate a sense of responsibility towards waste management practices from an early age.

Thirdly, the study indicates a significant portion of students engaging in SWM practices, particularly among older students, although there are still students, especially in lower grades, who do not participate or are uncertain about their involvement. This underscores the importance of providing practical training and resources to encourage active participation in waste management initiatives and foster a culture of environmental responsibility among students of all grade levels.

Overall, the findings underscore the importance of holistic waste management education, emphasizing the continuous efforts needed to bridge knowledge gaps, shape attitudes, and develop practical skills among students. By implementing targeted educational interventions and providing resources for active participation in SWM practices, educators and policymakers can empower students to contribute actively to sustainable waste management efforts, promoting a cleaner, healthier environment for present and future generations. In conclusion, the study highlights the significance of addressing awareness, attitudes, and practices related to SWM among students at Union National High School. It provides valuable insights to support the development of targeted interventions and programs to foster environmental stewardship within the school community and beyond.

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Compliance with Ethical Standards

The authors assert that there were no conflicts of interest.

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Affiliations and Corresponding Information

Jhondel P. Baranggan

Union National High School
Department of Education – Philippines

Sheilla D. Yamba

Union National High School
Department of Education – Philippines