Original Article

A Study on the Knowledge, Attitudes, and Practices on Solid Waste Management among High School Students in a Private School in Kabankalan City

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Abstract

Solid waste management represents a pressing environmental challenge. Although schools play a crucial role in shaping sustainable behaviors, a persistent gap exists in which students' environmental awareness does not consistently translate into physical action. This study assessed the knowledge, attitudes, and practices regarding solid waste management among high school students at Fellowship Baptist College in Kabankalan City to determine their interrelationships and demographic influences. The researchers employed a descriptive-correlational design and administered a validated survey checklist to a proportionally stratified sample of 310 respondents drawn from 779 junior and senior high school students. Data analysis involved descriptive statistics, Spearman's rho correlation, independent samples t-tests, and Analysis of Variance. The results showed that respondents have "High" knowledge and "Very High" attitudes, which significantly connect with their "High" daily practices. Strong positive relationships were found among all three variables. Although sex did not significantly affect waste management practices, age and grade level significantly influenced adherence to environmental protocols. Notably, the findings suggest a possible gap between students' strong internal attitudes and their actual daily practices. Rather than firmly concluding that a lack of school infrastructure is the absolute bottleneck, the study points out that high environmental values do not automatically guarantee perfect daily execution. School leaders are encouraged to

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explore simplifying waste-sorting systems on campus, while future research should use direct observations and physical waste audits to identify true behavioral barriers.

Keywords: attitude-practice gap, environmental education, solid waste management, student behavior, sustainability

1. Introduction

Solid waste management (SWM) represents one of the most critical environmental challenges of modern society, driven by rapid urbanization, population growth, and shifting consumption patterns. Globally, society generates over 1.3 billion tons of solid waste annually—a figure projected to escalate to 2.2 billion tons by 2025 (Moya et al., 2017). Poorly managed waste precipitates severe environmental degradation, health hazards, and greenhouse gas emissions (Kaza et al., 2018). Consequently, addressing SWM is central to the United Nations Sustainable Development Goals (SDGs), particularly Responsible Consumption and Production (SDG 12) and Climate Action (SDG 13). Within this global framework, researchers and policymakers increasingly recognize academic institutions as primary catalysts for environmental change. Across the ASEAN region, and specifically in the Philippines under Republic Act 9003 (Ecological Solid Waste Management Act) and Republic Act 9512 (Environmental Awareness and Education Act), schools are legally and morally mandated to integrate environmental stewardship into their curricula to shape the cognitive and behavioral development of the youth.

Despite this robust legislative framework and the widespread integration of environmental education, a persistent disconnect remains between what students know and how they act. Current literature frequently identifies a pervasive "attitude-practice gap" among adolescents; studies across Southeast Asia and the Philippines demonstrate that while students often exhibit moderate to high environmental awareness, their actual day-to-day practices, such as consistent waste segregation and reduction, remain erratic (Boonchieng et al., 2023; Nisa et al., 2025; Reyes & Madrigal, 2020). To understand this discrepancy, this study is anchored on the Knowledge-Attitudes-Practices (KAP) framework and further substantiated by the Theory of Planned Behavior (TPB) (Ajzen, 1991). TPB postulates that while positive attitudes heavily shape behavioral intentions, actual physical behavior is highly moderated by 'perceived behavioral control'—such as the presence of accessible physical infrastructure. This paradigm is frequently mirrored across the ASEAN region, where studies demonstrate that highly positive environmental attitudes decouple from real-world engagement due to underlying systemic constraints (Nisa et al., 2025). Furthermore, the existing body of research predominantly focuses on large, public, or highly urbanized educational institutions (Haniva et al., 2024; Japus et al., 2023). There is a distinct scarcity of contextualized assessments examining private,

faith-based institutions in smaller, developing cities. In environments like Kabankalan City, where religious instruction uniquely intertwines with moral duties regarding the stewardship of God's creation, the specific behavioral dynamics and the extent to which institutional culture mitigates this attitude-practice gap remain underexplored.

Specifically, the research investigates the interrelationships among these three variables to determine if a heightened theoretical understanding and positive attitude successfully translate into consistent physical practice within this unique educational setting. Furthermore, it examines whether demographic factors—namely sex, age, and grade level create significant differences in how students adhere to environmental protocols. The primary hypothesis of this investigation posits that there are significant, positive relationships among the students' knowledge, attitudes, and practices, and that varying demographic profiles significantly influence the extent of their solid waste management behaviors.

The rationale behind this research lies in its potential to transform theoretical environmental education into actionable, systemic change. By empirically illuminating the specific drivers and barriers to effective waste management among the youth, this study provides critical insights for educational administrators and local policymakers. The findings will serve as an evidence-based foundation for designing highly localized, targeted interventions—such as structural campus improvements and community-based service-learning projects—that actively bridge the attitude-practice gap. Ultimately, this research is vital to the field because equipping students with both the knowledge to understand environmental issues and the practical systems to manage waste responsibly not only ensures institutional compliance with national ecological mandates but also fosters a lifelong culture of environmental resilience that actively advances broader global sustainability goals.

2. Methodology

This study employed a quantitative, descriptive-correlational research design. The research was conducted at Fellowship Baptist College (FBC), a private educational institution located in Kabankalan City, Negros Occidental, during the academic year 2025–2026. The rationale for choosing a descriptive-correlational approach was to properly assess the respondents' levels of knowledge, attitudes, and practices regarding solid waste management, while simultaneously testing the interrelationships among these variables and the students' demographic profiles.

The study population consisted of 779 junior and senior high school students (Grades 7 to 12) from the institution's secondary department. To ensure a highly representative sample, the researchers applied Slovin’s Formula with a 4.4% margin of error (0.044), yielding a target sample size of 310 respondents. The researchers selected participants using a proportional stratified random sampling design, allocating proportional fractions across all six grade levels. This approach ensured that each developmental stage was accurately represented and that the variance assumptions required for the One-Way ANOVA were strictly met. For the age-based

ANOVA, the researchers grouped respondents into four categories: 12–13 years (Grades 7–8), 14–15 years (Grades 9–10), 16–17 years (Grade 11), and 18 years and above (Grade 12), reflecting the natural developmental progression within the secondary school structure.

The researchers collected data using a survey checklist adapted from the validated instruments of Madrigal and Oracion (2017) and Japus et al. (2023), which was further modified to suit the local context. The instrument contained four parts: demographic profiling; a 10-item awareness measure on a five-point Likert scale; an 11-item attitude measure on a five-point Likert scale; and a 20-item practices measure on a four-point Likert scale encompassing the dimensions of segregation, reduction, reuse, recycling, and disposal. To establish the instrument's credibility, five specialists in education and environmental studies conducted expert validation using Lawshe's method to compute the Content Validity Ratio and the overall Content Validity Index. The researchers then tested reliability through a pilot study involving 30 non-participating high school students, yielding the following Cronbach's alpha coefficients: Knowledge (10 items, $\alpha = 0.96$), Attitudes (11 items, $\alpha = 0.84$), and Practices (20 items, $\alpha = 0.95$). Per sub-dimension, the practice items yielded: Segregation ($\alpha = 0.85$), Reduction ($\alpha = 0.81$), Reuse ($\alpha = 0.84$), Recycling ($\alpha = 0.85$), and Disposal ($\alpha = 0.82$). All values exceed the acceptable threshold of 0.70, indicating strong internal consistency for each instrument section.

The researchers followed a systematic, chronological procedure throughout data collection. Before gathering any data, they sought and secured formal approval from the High School Principal and the Research Office of Fellowship Baptist College. After obtaining necessary consent, the researchers administered the survey checklists directly to respondents during regular class hours to ensure high accessibility and response rates. The researchers and an enumerator actively controlled the data-gathering environment by providing clear instructions and collecting completed surveys immediately to protect data integrity. The researchers then securely encoded the collected responses and prepared them for statistical analysis.

The researchers maintained strict compliance with ethical standards throughout the research process, adhering to the general policies of the Philippine Health Research Ethics Board (PHREB, 2020) and the Data Privacy Act of 2012. Before participation, the researchers obtained informed consent from parents and explicit assent from the student respondents. The study guaranteed the strict protection of students' anonymity and the confidentiality of their data, ensuring that no names appeared during the final storage and disposal phases. Participation was entirely voluntary, and the researchers informed all participants of their right to withdraw from the study at any point without pressure or consequence.

For data treatment, the researchers applied a combination of descriptive and inferential statistical tools to the encoded results. Descriptively, frequency, percentage, and weighted means were utilized to evaluate the data. To maintain strict mathematical integrity across the mismatched Likert frameworks, the scales were processed as

structurally isolated dimensions using the customized, non-overlapping boundaries detailed in Table 1.

Table 1. Scoring interpretive matrix for 5-point and 4-point likert scales.

Verbal Interpretation	Range (5-point scale) (Knowledge Core)	Range (4-point scale) (Attitudes & Practices)
Very High / Strongly Agree	4.21 – 5.00	3.26 – 4.00
High / Often	3.41 – 4.20	2.51 – 3.25
Moderate / Sometimes	2.61 – 3.40	1.76 – 2.50
Low / Never	1.81 – 2.60	1.00 – 1.75
Very Low	1.00 – 1.80	*(Not Applicable)*

Inferentially, the researchers used Spearman's rank correlation coefficient to evaluate inter-variable relationships and to account for the structural differences between the 5-point and 4-point scales. Because Spearman's rho operates strictly on the monotonic rank-ordering of data pairs rather than on raw numerical intervals, the difference in scale ranges introduces no mathematical bias, avoids data normalization distortion, and satisfies all underlying non-parametric correlation assumptions.

3. Results

A total of 310 junior and senior high school students from Fellowship Baptist College participated in the study, drawn from a total population of 779 learners. The demographic distribution was proportionally allocated to reflect the target group accurately. This foundational demographic profile confirms the sample's representativeness before evaluating the primary variables.

Table 2. Overall mean scores of knowledge, attitudes, and practices on solid waste management.

Variables	Mean	SD
Knowledge on SWM	4.17	0.87
Attitudes on SWM	3.34	0.66
Practices on SWM	3.08	0.61

The primary analysis tested the central hypothesis regarding relationships among students' overall knowledge, attitudes, and practices (Table 3). A Spearman's rho correlation confirmed statistically significant, positive relationships across all tested dimensions. The strongest correlation was between theoretical knowledge and attitudes ($r = .699$, $p < .001$). Actual practices maintained moderately strong, positive correlations with both knowledge ($r = .538$, $p < .001$) and attitudes ($r = .583$, $p < .001$). These findings reject the primary null hypothesis.

Table 3. Correlation matrix among knowledge, attitudes, and practices.

Variables	Knowledge	Attitudes	Practices
1. Knowledge	—		
2. Attitudes	.699**	—	
3. Practices	.538**	.583**	—

*Note: Correlation is significant at the 0.01 level (2-tailed).

Secondary analyses evaluated the variables across demographic subgroups defined in the protocol. Independent samples t-tests (Table 4) indicated significant differences by sex for Knowledge (p = .028) and Attitudes (p = .042). However, the test yielded a non-significant result for overall Practices (p = .598). Conversely, Analysis of Variance (Tables 5 and 6) demonstrated highly significant differences across all primary variables when grouped by grade level and age (all $p \leq .007$).

Table 4. Independent samples t-test comparing SWM variables by sex.

Variables	t-value	p-value
Knowledge	-2.213	.028
Attitudes	-2.043	.042
Practices	-0.528	.598

Table 5. One-Way ANOVA comparing SWM variables by grade level.

Variables	F-value	p-value
Knowledge	15.340	< .001
Attitudes	15.653	< .001
Practices	10.957	< .001

Table 6. One-Way ANOVA comparing SWM variables by age.

Variables	F-value	p-value
Knowledge	3.011	.007
Attitudes	4.316	< .001
Practices	3.843	.001

Further analyses focused specifically on the five sub-dimensions of solid waste management practices. A correlation matrix (Table 7) revealed highly significant internal relationships among the practices (all $p < .001$), with the strongest positive relationship occurring between waste reduction and reuse (r = .655).

Table 7. Correlation matrix on the extent of practices (sub-dimensions),

Variables	Reduction (r)	Reuse (r)	Recycling (r)	Disposal (r)
Segregation	.583**	.441**	.568**	.335**
Reduction	—	.655**	.531**	.403**
Reuse	—	—	.620**	.355**
Recycling	—	—	—	.396**

When testing these specific practice sub-dimensions against demographics (Table 8), grade level significantly influenced all specific behaviors ($p \leq .033$), whereas sex produced strictly non-significant variance across all five sub-dimensions.

Table 8. Differences in the extent of practices grouped by sex and grade level.

Sub-dimensions	Sex (t-value)	Sex (p-value)	Grade Level (F-value)	Grade Level (p-value)
Segregation	-1.602	.110	2.455	.033
Reduction	1.050	.295	9.877	< .001
Reuse	-0.927	.355	10.158	< .001
Recycling	-0.669	.504	5.250	< .001
Disposal	-0.803	.422	15.589	< .001

Finally, treating age as a continuous variable (Table 9), a secondary correlation uncovered a significant negative relationship exclusively with segregation practices ($r = -.168$, $p = .003$). The analysis yielded negative, non-significant results for reduction ($p = .777$), reuse ($p = .883$), recycling ($p = .736$), and disposal ($p = .253$), confirming that chronological age does not broadly correlate with most specific physical waste management habits in this sample.

Table 9. Correlation between age and the extent of specific practices.

Sub-dimensions	Spearman's rho (r)	p-value
Segregation	-.168**	.003
Reduction	-.016	.777
Reuse	.008	.883
Recycling	.019	.736
Disposal	-.065	.253

4. Discussion

The primary objective of this study was to assess the knowledge, attitudes, and practices (KAP) regarding solid waste management among high school students at a private institution in Kabankalan City, and to determine how these variables interact. The findings reveal that students possess a high theoretical understanding of ecological principles and hold highly positive, proactive attitudes toward environmental

preservation. These strong cognitive and affective foundations correlate with highly consistent self-reported daily waste management practices. Consequently, the hypothesis stating that there is no significant relationship among knowledge, attitudes, and practices is rejected; the data unequivocally demonstrate that heightened awareness and positive values are deeply intertwined with actionable ecological behavior.

Furthermore, the hypothesis regarding demographic differences is partially rejected. While a student's sex did not produce significant differences in actual waste management practices, it did yield significant differences in theoretical knowledge and attitudinal orientation. Meanwhile, age and grade level significantly influenced performance across all three KAP variables, indicating that maturity and prolonged institutional exposure foster both better ecological knowledge and stronger positive practices. Contextualizing these findings within the broader academic landscape reveals strong alignments with existing environmental education literature. The highly significant correlations among knowledge, attitudes, and practices mirror the conclusions of Reyes and Madrigal (2020) and Barloa et al. (2016), who found that heightened awareness is a fundamental precursor to sustainable behavior among Filipino youth. The non-significant sex difference in practices is consistent with findings by Decoro and Cajucom (2025), who similarly documented that institutional environmental norms tend to equalize self-reported behavioral compliance across gender lines in school settings.

However, a critical discrepancy emerges when comparing the students' "very high" theoretical knowledge and attitudes with their slightly lower "high" practical application. This descriptive variance points to a possible attitude-practice gap, an operational disconnect that echoes the behavioral inconsistencies documented by Haniva et al. (2024) and Decoro and Cajucom (2025). It suggests that while students fully comprehend Republic Act 9003 and their moral duties as stewards of creation, the translation of knowledge into absolute, routine habit may be moderated by unmeasured external constraints. Viewed through the Theory of Planned Behavior, this gap could be hypothesized as a deficit in perceived behavioral control, where factors like the immediate accessibility of proper disposal infrastructure or the convenience of recycling might hinder physical execution.

The findings offer constructive pathways for educational administration. Theoretically, the study validates the relevance of the KAP model and demonstrates the utility of TPB within a local educational context. Practically, the potential attitude-behavior gap signals to the administration of Fellowship Baptist College that theoretical instruction alone may be insufficient. To proactively address potential structural barriers, institutional policy could explore enhancing highly visible, accessible infrastructure—such as standardizing segregation bins in every classroom and establishing a dedicated Materials Recovery Facility (MRF). On a broader scale, these results provide empirical leverage for local government units in Kabankalan City to collaborate with academic institutions in creating service-learning projects that

seamlessly transition campus-level ecological habits into community-wide environmental resilience.

Despite the robustness of these descriptive findings, a transparent acknowledgment of the study's limitations is necessary to establish credibility. The primary constraint lies in the exclusive reliance on a self-reported survey checklist. This methodology inherently introduces the potential for social desirability bias; students, aware of the school's Christian values and environmental expectations, may have overstated their positive practices to align with socially acceptable norms. Crucially, the survey instrument did not include items measuring the actual availability of segregation bins, monitoring systems, or physical barriers to waste management. Because actual campus waste facilities and observed student behaviors were not empirically audited, the study cannot firmly conclude that limited infrastructure is the definitive cause of the attitude-practice gap. Furthermore, the cross-sectional design captures only a snapshot of student behavior, limiting causal inferences. Finally, because the sample was drawn exclusively from a single private, faith-based institution, the distinct religious and institutional culture restricts the generalizability of the findings to public schools or highly urbanized secular environments.

To address these limitations, future inquiry must integrate objective observational methodologies. It is highly recommended that subsequent studies include physical waste audits, direct observation of classroom waste facilities, or student-reported barrier assessments to empirically triangulate self-reported survey data with actual waste-generation metrics. Longitudinal studies are also highly recommended to track how students' solid waste management practices evolve over time, particularly following the implementation of new school-wide ecological interventions. Ultimately, this study establishes that cognitive awareness and positive environmental attitudes are critical, inseparable drivers of solid waste management practices. By illuminating the vital intersection of educational curriculum, student maturity, and institutional policy, this research underscores the indispensable role of schools in cultivating the next generation of environmental stewards.

5. Conclusion

This study aimed to comprehensively assess the knowledge, attitudes, and practices regarding solid waste management among high school students at Fellowship Baptist College, and to determine the interrelationships and demographic influences that shape their daily environmental behaviors. The data affirmatively answer the primary research question, revealing that students possess an exceptional theoretical understanding of ecological principles and a profound, proactive attitude toward environmental stewardship. By establishing significant positive correlations among these variables and identifying the defining influence of a student's age and grade level on their ecological habits, this research has fully achieved its objectives, providing a holistic understanding of how maturity and sustained academic exposure cultivate environmental responsibility.

The principal contribution of this work to the existing body of knowledge lies in its exploration of a potential attitude-practice gap within a local educational setting. While students exhibited "Very High" positive attitudes, deeply valuing environmental preservation, their theoretical knowledge was rated "High", and their reported execution was slightly lower, at "High". This finding suggests that although students know and value solid waste management, they may not fully translate these intentions into consistent action.

Viewed through the lens of the Theory of Planned Behavior, this variance suggests that, while individual attitudes and subjective norms are strong, students' "perceived behavioral control" might be hindered by external, systemic constraints on campus. While the current self-reported data cannot definitively prove that infrastructure is the sole bottleneck, this study tentatively indicates that institutional interventions may benefit from shifting focus beyond simply raising awareness toward actively exploring and removing potential physical barriers to compliance—a direction that future observational research should empirically test.

Based on this theoretical premise, it is recommended that the administration of Fellowship Baptist College consider implementing practical structural interventions to support students' behavioral control. Specific exploratory steps could include the deployment of strictly monitored, color-coded segregation bins in individual classrooms rather than just in common areas, coupled with the integration of hands-on waste-reduction activities directly into the curricula. To validate these recommendations and address the limitations of self-reported data, future research must incorporate direct observational methods, including weekly classroom waste weighing and physical campus audits, to measure the tangible impact of these policies over time. Ultimately, equipping the youth with both the theoretical knowledge to understand and the specific, localized infrastructure to act could transform academic institutions into vital incubators for lifelong, community-wide environmental resilience in Kabankalan City.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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