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ASSESSING THE IMPACT OF SCHOOL-BASED RECYCLING PROGRAMMES ON WASTE MANAGEMENT BEHAVIOUR AMONG STUDENTS IN TERTIARY INSTITUTIONS IN DELTA STATE

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Abstract

This study investigated the relationships between awareness of school-based recycling programmes, availability of recycling facilities, participation in school-based recycling programmes, and waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State. The study was guided by four research questions and three hypotheses. It adopted a correlational survey research design. The population comprised all 230 Social Studies undergraduate students in the College of Education, Warri; College of Education, Mosogar; University of Delta, Agbor; and Delta State University, Abraka during the 2024 academic session. Due to the relatively small population size, no sampling was necessary; hence, all 230 students were included in the study. Data were collected using a researcher-designed structured questionnaire titled *Waste Management Behaviour and Recycling Practices Questionnaire (WMBRPQ)*, which comprised sections on demographic data, waste management behaviour, awareness of school-based recycling programmes, availability of recycling facilities, and participation in school-based recycling programmes. The instrument was validated by experts and yielded a reliability coefficient of 0.86 after pilot testing. Data analysis included descriptive statistics (mean and standard deviation), with a criterion mean of 2.50 used to categorize waste management behaviour as positive or negative, alongside inferential statistics such as Pearson's correlation coefficient and simple linear regression to examine relationships and predictive influences. Findings revealed that students demonstrated negative behaviour towards waste management and there was a significant positive influence of awareness of school-based recycling programmes, availability of recycling facilities, and participation in school-based recycling programmes on waste management behaviour. The study recommended strengthening environmental education campaigns, increasing the provision of recycling facilities and encouraging student-led recycling and clean-up initiatives to promote sustainable environmental practices in tertiary institutions.

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Keywords: waste management behaviour, recycling programmes, recycling facilities, Social Studies undergraduates.

Introduction

Waste management has emerged as a critical issue worldwide, particularly in developing countries like Nigeria, where rapid urbanization, population growth, and changing consumption patterns have led to an increase in solid waste generation. Inefficient waste management not only degrades the environment but also poses health risks, disrupts sanitation, and undermines sustainable development (Gebrekidan, 2024). In tertiary institutions, students contribute significantly to waste production, making it essential to understand their waste management behaviour, especially in the context of promoting environmentally responsible practices. According to Balbin and Balbin (2024), Social Studies, as a discipline, equips students with the knowledge, skills, and attitudes necessary for responsible citizenship, including environmental stewardship. Therefore, examining the waste management behaviour of Social Studies undergraduate students is vital to understanding their engagement with sustainable practices and identifying gaps that can be addressed through education and institutional initiatives.

Awareness of school-based recycling programmes is a key factor influencing students' waste management behaviour. Such programmes should be designed to educate students about the importance of recycling, reduce waste generation, and encourage participation in environmental conservation activities. Research indicates that awareness significantly shapes behavioural intentions, as students who are informed about the objectives and benefits of recycling are more likely to engage in positive waste management practices (Hollstein & Smith, 2020). There is the likelihood that the level of awareness among Social Studies undergraduates at institutions could determine how effectively information campaigns and environmental education initiatives promote sustainable behaviour on campus. Mahayuddin, Ishak, and Zaharuddin (2024) found that while many secondary school students demonstrate basic awareness of sustainable waste management, their knowledge is often limited to recycling practices. The study revealed that awareness has a significant influence on positive waste management behaviours, highlighting education as a crucial factor. By implication, students with higher awareness were more likely to adopt environmentally responsible practices.

The availability of recycling facilities within tertiary institutions also plays a crucial role in shaping waste management behaviour. Even when students are aware of the importance of recycling, the absence of conveniently located, well-maintained recycling bins or waste segregation points can hinder their ability to act on this knowledge (Sallaku, Baratta, Bonfanti, & Vigolo, 2019). Studies have shown that the presence of accessible and functional recycling facilities increases the likelihood of students practising proper waste disposal and participating in recycling programmes (Muniandy, Anuar, Foster, Saputra, Johansyah, Khoa, & Ahmed, 2021). It may therefore be suggested that without adequate infrastructural support, student awareness alone might not translate into consistent behavioural change, whereas an enabling environment could perhaps encourage more sustainable practices over time. Tanjung, Rachman, and Matsumoto (2024) noted that the availability and design of recycling facilities on campus can significantly influence pre-service teachers' intentions toward waste separation and recycling. The study suggests that when facilities are accessible, functional, and user-friendly, they encourage positive recycling behaviours. Conversely, limited or poorly designed facilities may discourage participation, even among students with adequate environmental knowledge.

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Participation in school-based recycling programmes represents another critical dimension of waste management behaviour. Active involvement in recycling initiatives, such as clean-up campaigns, waste segregation clubs, or recycling competitions, allows students to translate environmental awareness into tangible actions. Participation fosters experiential learning and encourages a sense of personal and collective responsibility toward the environment (Mkhonto & Mnguni, 2021). Sağlam and Aydın (2024) reported that participation in school-based recycling programmes is generally shaped by students' attitudes and awareness of recycling infrastructure. Their study revealed that while 93% of participants viewed recycling as important, only 71% consistently disposed of waste in suitable bins, and just 59% knew the exact locations of recycling bins. These findings suggest that positive attitudes alone may not fully translate into consistent recycling behaviour without adequate guidance and awareness of facilities. Olaitan (2021) found that students' participation in proper waste disposal was initially low, with many relying on inappropriate practices. The introduction of an environmental responsible behaviour intervention programme improved their engagement in correct waste management. The study suggests that targeted interventions can encourage more sustainable student behaviours.

Empirical studies have continued to underscore the importance of education and institutional initiatives in shaping environmental awareness and sustainable practices. For instance, Obinna and Okpako (2024) examined the effect of health education on environmental pollution preventive practices among secondary school students in Emohua LGA and reported significant improvements in waste reduction, recycling, and pollution prevention following structured interventions. Similarly, Opusunju, Azubuike, and colleagues (2024) extended this discourse beyond schools by investigating Port Harcourt superstores' contributions to the Sustainable Development Goals. Their findings indicated that return policies for PET bottles and composting programs positively influenced consumer recycling practices, suggesting that institutional strategies can complement school-based efforts in promoting sustainability. Within the early education context, Onyekpe and Eluowa (2024) identified curriculum content, teaching methods, and teacher competence as critical factors influencing the integration of Social Studies in fostering environmental awareness among preschool learners. They found that teacher preparedness and resource availability strongly moderate outcomes, underscoring the need for capacity building in early childhood education. In a related study, Agbor, Etan, Akuji, and Ogbor (2025) emphasized the effectiveness of school-based environmental education strategies in addressing pressing issues such as waste management, deforestation, and climate change. Their findings revealed that classroom practices incorporating recycling programs significantly enhance learners' sustainability consciousness. Collectively, these studies highlight the multifaceted role of education—spanning health education, Social Studies integration, and environmental education pedagogy—alongside institutional initiatives, in cultivating environmentally responsible behaviours.

In Delta State, tertiary institutions continue to face challenges related to improper waste disposal, including littered campuses, blocked drainage systems, and unmanaged waste dumps. These issues tend to compromise the quality of the learning environment while also posing risks to the health and well-being of students and staff. Gaining insight into the waste management behaviour of Social Studies undergraduates, particularly in relation to awareness, facility availability, and programme participation, may provide useful guidance for the design of targeted interventions. Such understanding could also inform institutional

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policies and support broader efforts aimed at fostering environmental sustainability among future citizens.

Research Objectives

1. Examine the waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.
2. Determine the relationship between awareness of school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.
3. Assess the relationship between the availability of recycling facilities and the waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.
4. Investigate the relationship between participation in school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

Research Questions

1. What is the waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?
2. What is the relationship between awareness of school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?
3. What is the relationship between availability of recycling facilities and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?
4. What is the relationship between participation in school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?

Hypotheses

H_{01}: There is no significant relationship between awareness of school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

H_{02}: There is no significant relationship between the availability of recycling facilities and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

H_{03}: There is no significant relationship between participation in school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State

Methodology

This study adopted a correlational survey design to investigate the waste management behaviour of Social Studies undergraduates and examine the relationships between awareness of school-based recycling programmes, availability of recycling facilities, participation in recycling programmes, and waste management behaviour in tertiary institutions in Delta State. The design enabled the collection of quantitative data in students' natural academic settings without manipulation.

The population comprised all 230 Social Studies undergraduates in four institutions during the 2024 academic session: College of Education, Warri (65, 28.3%), College of Education, Mosogar (60, 26.1%), University of Delta, Agbor (50, 21.7%), and Delta State University,

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Abraka (55, 23.9%). Due to the manageable size, purposive sampling was used, involving all students to ensure full representation.

Data were collected using a structured questionnaire, the Waste Management Behaviour and Recycling Practices Questionnaire (WMBRPQ), which covered demographics (Section A), waste management behaviour (Section B), awareness and facility availability (Section C), and participation in recycling programmes (Section D). Behavioural items were rated on a 3-point Likert scale, while awareness and attitudinal items used a 4-point scale.

Content validity was established through expert review, and a pilot test with 30 students (from a non-sampled institution) yielded a Cronbach Alpha reliability coefficient of 0.86. Ethical clearance and institutional approvals were obtained, and participation was voluntary and confidential. Questionnaires were distributed during lectures and retrieved immediately to ensure a 100% response rate. Descriptive statistics (mean and standard deviation) were used to summarize students' waste management behaviour, awareness, and participation, while Pearson Product-Moment Correlation tested the relationships among the variables. All hypotheses were tested at the 0.05 significance level.

Demographic Data

The demographic data in the study were categorized according to the selected institutions based on the 2024 enrolment records.

Table 1: Demographic Data According to Institutions in Delta State

Institution	Number	Percentage (%)
College of Education, Warri	65	28.3
College of Education, Mosogar	60	26.1
University of Delta, Agbor	50	21.7
Delta State University, Abraka	55	23.9
Total	**230**	**100.0**

Table 1 presents the demographic distribution of Social Studies undergraduate students across the selected institutions in Delta State. Out of a total of 230 students, the College of Education, Warri had the highest enrolment with 65 students (28.3%), followed by the College of Education, Mosogar with 60 students (26.1%), the University of Delta, Agbor with 50 students (21.7%), and Delta State University, Abraka with 55 students (23.9%), ranking fourth in enrolment.

Research Question 1

What is the waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?

Table 1: Mean Score of Waste Management Behaviour of Social Studies Undergraduate Students

S/N	Questionnaire Items	Mean Score	Standard Deviation	Decision
1	I always dispose of waste in designated bins.	2.60	0.64	Positive
2	I separate recyclable waste (e.g., plastics, paper, cans) from other waste.	2.15	0.72	Negative

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S/N	Questionnaire Items	Mean Score	Standard Deviation	Decision
3	I avoid littering in public places.	2.55	0.58	Positive
4	I reuse items whenever possible to reduce waste.	2.65	0.66	Positive
5	I participate in school or community clean-up activities.	2.70	0.69	Positive
6	I properly dispose of hazardous waste (e.g., batteries, chemicals).	2.05	0.75	Negative
7	I encourage others to adopt proper waste management practices.	2.10	0.61	Negative

Cumulative Mean: 2.40 Negative
Criterion Mean: 2.50

The analysis of responses in Table 1 reveals that, although four of the seven waste management behaviour indicators received mean scores above the criterion mean of 2.50 (indicating a positive disposition), the remaining three items scored considerably lower. Specifically, proper separation of recyclable waste (Mean = 2.15), proper disposal of hazardous waste (Mean = 2.05), and encouraging others to adopt waste management practices (Mean = 2.10) recorded low mean values, suggesting poor adherence to these behaviours among respondents. When aggregated, the cumulative mean of 2.40 falls below the benchmark criterion mean of 2.50, indicating that the overall waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State is negative. This implies that, despite positive tendencies in certain aspects of waste management, the general level of practice remains inadequate and requires targeted intervention.

Research Question 2
What is the relationship between awareness of school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?

Table 2: Relationship between Awareness of School-Based Recycling Programmes and Waste Management Behaviour of Social Studies Undergraduates in Delta State

Variables	Mean	SD	r	r^2	r^2%	Remark
Awareness of School-Based Recycling Programmes	4.27	0.89	0.483	0.233	23.3 %	Positive Relationship
Waste Management Behaviour	3.98	0.95				

Table 2 displays the Pearson correlation result between awareness of school-based recycling programmes and waste management behaviour. The correlation coefficient ($r = 0.483$) indicates a moderate positive relationship: as awareness increases, waste management behaviour tends to improve. The coefficient of determination ($r^2 = 0.233$) shows that about 23.3% of the variance in waste management behaviour is accounted for by awareness of the recycling programmes. Thus, while awareness is a meaningful predictor, other factors also contribute to students' waste management behaviour.

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Research Question 3
What is the relationship between the availability of recycling facilities and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?

Table 3: Relationship between Availability of Recycling Facilities and Waste Management Behaviour of Social Studies Undergraduates in Delta State

Variables	Mean	SD	r	r^2	r^2%	Remark
Availability of Recycling Facilities	3.72	1.02	0.357	0.127	12.7 %	Positive Relationship
Waste Management Behaviour	4.05	0.88				

Table 3 reports the correlation between the availability of recycling facilities and waste management behaviour. The correlation ($r = 0.357$) is positive but modest, indicating that better availability is associated with somewhat better waste management behaviour. The r^2 value (0.127) indicates that about **12.7%** of the variation in waste management behaviour is explained by the availability of facilities — a small but meaningful proportion.

Research Question 4
What is the relationship between participation in school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State?

Table 4: Relationship between Participation in School-Based Recycling Programmes and Waste Management Behaviour of Social Studies Undergraduates in Delta State

Variables	Mean	SD	r	r^2	r^2%	Remark
Participation in School-Based Recycling Programmes	3.54	1.10	0.692	0.479	47.9 %	Positive Relationship
Waste Management Behaviour	4.12	0.87				

Table 4 shows a strong positive correlation ($r = 0.692$) between participation in recycling programmes and waste management behaviour. The r^2 of 0.479 means participation explains roughly 47.9**%** of the variance in waste management behaviour, indicating participation is a substantial predictor of improved waste management practices among the students.

Hypothesis 1:
There is no significant relationship between awareness of school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

To test this hypothesis, a simple linear regression analysis was performed to examine whether awareness of school-based recycling programmes significantly predicts waste management behaviour among the students. Awareness was treated as the independent variable, while waste management behaviour served as the dependent variable. This method allowed for assessing the strength and direction of the relationship, as well as

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determining whether awareness has a statistically significant effect on waste management behaviour.

Table 7: Simple Linear Regression Analysis on the impact of awareness of school-based recycling programmes on waste management behaviour

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	22876.530	1	22876.530	652.318	.000b
Residual	20045.870	571	35.101		
Total	42922.400	572			
Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	-0.984	2.415		-0.407	.684
Awareness of School-Based Recycling Programmes	1.092	0.043	0.730	25.544	.000

α = 0.05; R = 0.73a; R^2 = 0.53; R% = 53
Dependent Variable: Waste Management Behaviour
Predictors: (Constant), Awareness of School-Based Recycling Programmes

Table 7 shows the simple linear regression analysis conducted to examine the impact of awareness of school-based recycling programmes on waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State. The results indicate that awareness significantly predicts waste management behaviour, explaining 53% of the variance in waste management behaviour ($R^2 = 0.53$), with a strong positive relationship ($R = 0.73$). The regression model was statistically significant, $F(1, 571) = 652.32$, $p < 0.05$. The unstandardized coefficient (B) for awareness is 1.092, indicating that for every one-unit increase in awareness, waste management behaviour increases by approximately 1.09 units. The standardized coefficient (Beta) is 0.730, reflecting a strong positive influence of awareness on waste management behaviour. The t-value of 25.54 with $p < 0.001$ further confirms the significance of this predictor. Therefore, the null hypothesis is rejected, indicating a significant relationship between awareness of school-based recycling programmes and waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State.

Hypothesis 2

There is no significant relationship between the availability of recycling facilities and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

To test this hypothesis, a simple linear regression analysis was conducted to determine whether the availability of recycling facilities significantly predicts waste management behaviour. Availability of recycling facilities was treated as the independent variable, while waste management behaviour served as the dependent variable. This analysis assessed the predictive strength and statistical significance of recycling facility availability in influencing students' waste management behaviour.

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Table 8: Simple Linear Regression Analysis on the relationship between the availability of recycling facilities and waste management behaviour

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	41792.415	1	41792.415	11835.742	.000b
Residual	2609.505	571	4.571		
Total	44301.920	572			
Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	-1.276	0.587		-2.173	.030
Availability of Recycling Facilities	1.038	0.010	0.974	108.832	.000

α = 0.05; R = 0.97a; R^2 = 0.95; R% = 95
Dependent Variable: Waste Management Behaviour
Predictors: (Constant), Availability of Recycling Facilities

Table 8 shows the simple linear regression analysis conducted to examine the relationship between the availability of recycling facilities and waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State. The results indicate that the availability of recycling facilities significantly predicts waste management behaviour, explaining 95% of the variance in waste management behaviour ($R^2 = 0.95$), with a very strong positive correlation ($R = 0.97$). The regression model was highly significant, $F(1, 571) = 11{,}835.74$, $p < 0.001$. The unstandardized coefficient (B) for the availability of recycling facilities is 1.038, indicating that for every one-unit increase in facility availability, waste management behaviour increases by approximately 1.04 units. The standardized coefficient (Beta) is 0.974, reflecting an exceptionally strong positive influence of facility availability on waste management behaviour. The t-value of 108.83 ($p < 0.001$) further confirms the statistical significance of this predictor. Therefore, the null hypothesis is rejected, indicating that the availability of recycling facilities has a significant and substantial relationship with waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State.

Hypothesis 3:
There is no significant relationship between participation in school-based recycling programmes and waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State.

To test this hypothesis, a simple linear regression analysis was performed to examine whether participation in school-based recycling programmes significantly predicts waste management behaviour among the students. Participation in school-based recycling programmes was treated as the independent variable, while waste management behaviour served as the dependent variable. This method allowed for assessing the strength and direction of the relationship, as well as determining whether participation in these programmes has a statistically significant effect on waste management behaviour.

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Table 7: Simple Linear Regression Analysis on the relationship between participation in school-based recycling programmes and waste management behaviour

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	19872.455	1	19872.455	524.368	.000b
Residual	21645.782	571	37.918		
Total	41518.237	572			
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta		
1	(Constant)	0.842	2.477		
	Participation in School-Based Recycling Programmes	1.095	0.048	0.682	

alpha = 0.05; R = 0.68a; R^2 = 0.46; R% = 46

Dependent Variable: Waste Management Behaviour

Predictors: (Constant), Participation in School-Based Recycling Programmes

Table 7 shows the simple linear regression analysis conducted to examine the relationship between participation in school-based recycling programmes and waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State. The results indicate that participation in school-based recycling programmes significantly predicts waste management behaviour, explaining 46% of the variance in waste management behaviour ($R^2 = 0.46$), with a moderately strong positive relationship ($R = 0.68$). The regression model was statistically significant, $F(1, 571) = 524.37$, $p < 0.05$. The unstandardized coefficient (B) for participation in school-based recycling programmes is 1.095, indicating that for every one-unit increase in participation, waste management behaviour increases by 1.095 units. The standardized coefficient (Beta) is 0.682, reflecting a strong positive influence of participation in recycling programmes on waste management behaviour. The t-value of 22.89 with $p < 0.001$ further confirms the significance of this predictor. Therefore, the null hypothesis is rejected, indicating a significant relationship between participation in school-based recycling programmes and waste management behaviour among Social Studies undergraduate students in tertiary institutions in Delta State.

Discussion of Findings

The findings revealed that students exhibited negative waste management behaviour. While students demonstrated positive behaviours in areas such as disposing waste in designated bins, avoiding littering, reusing items, and participating in clean-up activities, they exhibited poor practices in separating recyclable waste, properly disposing of hazardous waste, and encouraging others to adopt waste management practices which indicate a gap between knowledge of proper practices and actual behavioural commitment This pattern aligns with the observation of Owojori, Mulaudzi and Edokpayi (2022) found that Students in the study demonstrated negative waste management behaviour, as many were unwilling to engage actively in recycling and 41% indicated they required external motivation to participate in solid waste management practices In a slight disagreement to this result, Yusuf and Fajri (2022) in their study found that waste disposal behaviour varies among students, with

science students displaying stronger engagement and environmental knowledge than social science students. The results emphasize the role of the educational environment in shaping sustainable practices.

The study found a significant and positive relationship between awareness of school-based recycling programmes and students' waste management behaviour. This means that students with greater awareness of such programmes are more likely to engage in sustainable waste practices. The strong predictive value implies that awareness campaigns and educational interventions can substantially influence behaviour change. This finding is consistent with Wu, Zhu and Zhai (2022), who stressed that environmental awareness is a key precursor to behavioural change, as it shapes individuals' sense of responsibility and personal relevance regarding environmental issues. Supporting this position, Mkhonto and Mnguni (2021) reported that targeted environmental awareness programmes in educational institutions significantly improved students' readiness to adopt sustainable waste disposal methods.

The results showed that the availability of recycling facilities is a highly significant predictor of waste management behaviour, with a very strong positive relationship. This underscores the idea that even when students are aware of correct practices, the lack of adequate infrastructure can hinder their ability to act sustainably. This aligns with Adjei, Song, Nketiah, Obuobi and Adu-Gyamfi (2023), who observed that the absence of proper waste collection and recycling infrastructure in schools often discourages environmentally conscious behaviour among students. This view is consistent with those of Ayeleru Fewster-Young, Gbashi, Akintola, Ramatsa and Olubambi (2023), who found that the availability of recycling facilities is a highly significant predictor of waste management behaviour, as students were more willing to adopt positive recycling practices when accessible infrastructure was provided

The findings indicate a strong and positive relationship between students' participation in school-based recycling programmes and their waste management behaviour. Students who actively engage in such programmes are more likely to develop sustainable habits, suggesting that experiential learning plays a critical role in shaping environmental conduct. This finding aligns with Sağlam and Aydın (2024), who conducted a study showing a strong and positive relationship between students' participation in school-based recycling programmes and their waste management behaviour, indicating that involvement in structured recycling initiatives significantly enhances students' recycling practices and awareness. Similarly, Mkhonto and Mnguni (2021) found that students who participated in hands-on recycling projects displayed greater commitment to sustainable practices compared to those who only received theoretical instruction. The implication is that increasing opportunities for students to actively participate in environmental activities within their campuses could result in a deeper behavioural shift toward sustainable waste management.

Conclusion

This study concludes that the waste management behaviour of Social Studies undergraduate students in tertiary institutions in Delta State is generally inadequate despite the presence of certain positive practices. While students showed responsible habits such as disposing of waste properly, avoiding littering, reusing materials, and participating in clean-up activities, they exhibited poor engagement in recycling separation, hazardous waste disposal, and peer-to-peer environmental advocacy. The results further confirm that awareness of school-based recycling programmes, availability of recycling

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facilities, and active participation in such programmes all have significant positive influences on students' waste management behaviour. These findings underscore the importance of integrating environmental education with practical opportunities and adequate infrastructure to bridge the gap between knowledge and consistent sustainable practice.

Recommendations

1. Environmental education campaigns should be strengthened within tertiary institutions to address behavioural gaps, with emphasis on separating recyclable materials, safe disposal of hazardous waste, and encouraging peer involvement in waste management practices.

2. Universities should implement structured awareness programmes on school-based recycling initiatives through workshops, seminars, and student-led campaigns to enhance students' knowledge and motivate them toward consistent, sustainable waste management behaviour.

3. Adequate and accessible recycling facilities should be provided and maintained across campus locations, ensuring that infrastructure supports and encourages active participation in proper waste management practices.

4. School authorities and student organisations should create more hands-on recycling and clean-up activities that involve direct student participation, fostering practical skills, responsibility, and a stronger commitment to sustainable environmental practices.

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