Application of Waste Management Strategies by Principals for Sustainable Development in Public Secondary Schools in Anambra State

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Abstract

The study investigated principals' application of waste management strategies for sustainable development in public secondary schools in Anambra State. Two research questions guided the study. The descriptive research design was utilized for the study and the population of the study comprised 263 principals of public secondary schools in Anambra State. The instrument for data collection was a structured questionnaire which was validated by three experts in education. Test of reliability of the instrument yielded co-efficient values of 0.86 and 0.88 were obtained for clusters 1 and 2 respectively with an overall reliability co-efficient value of 0.87. Mean and standard deviation was used to analyze data for the study. The findings of the study revealed that waste recycling and waste re-use strategies were applied by principals for sustainable development in public secondary schools in Anambra State. Based on these findings, the researchers recommended among others that principals should be made aware of the importance of waste recycling and re-use strategies. This could be done through workshops, seminars, and training sessions.

Keywords: Waste, Refuse, Strategies, Sustainable development

Introduction

Environmental pollution is one of the biggest challenges that we face in the 21st century. It is caused by various human activities such as industrialization, transportation, and waste disposal. The World Health Organization estimates that air pollution causes 7 million premature deaths per year, while water pollution affects the health of over 1 billion people. The effects of pollution are felt worldwide, with major cities like Beijing, Delhi, and Mexico City experiencing severe air pollution that affects the health of their residents. The oceans and marine life are also severely impacted by plastic pollution, with plastic waste accounting for up to 80% of marine litter. The situation is the same in Nigeria, according to the Global Burden of Disease in UNICEF (2021), children under the age of five accounts for the largest percentage of pneumonia mortality due to air pollution of any age group worldwide at 78%. The issue is not different in secondary schools in Anambra State in particular and Nigeria in general.

Environmental pollution in Nigerian schools is a major issue that requires urgent attention. The pollution of the environment in and around schools has a negative impact on the health and well-being of students and teachers alike. One of the major causes of environmental pollution in

Nigerian schools is poor waste management strategies. Many schools lack proper waste disposal systems, leading to the accumulation of refuse and other waste products (Woko, 2019). This can lead to the breeding of pests and diseases, which can spread to students and teachers, leading to illnesses. The sanitation condition in some secondary schools in Anambra State seems to be deplorable. It is pertinent to state that indiscriminate dumping of waste and widespread littering have become serious environmental problems in Anambra State, secondary schools inclusive. Poor hygiene and sanitation appear to be prevalent in some public secondary schools in Anambra State. This seems to be evident in some public secondary schools where basic water and sanitation facilities, and hygiene education programmes are often inadequate. It is common to see in some public secondary schools wastes like papers, leaves and nylons among others littering the school premises. According to Resource Smart Schools (n.d.), the major types of waste generated in schools are: food waste, plastic, paper, floor sweepings, aluminum foils and others (stationary items, pencil sharpening, and so on). These forms of wastes are prevalent in secondary schools and seem to pose serious environmental problems in Anambra State secondary schools. It is therefore imperative that school administrators apply waste management strategies in order to mitigate the hazards resulting from the excess waste generated in public schools.

Waste management is defined as the generation, prevention, characterization, monitoring, treatment, handling, reuse, and residential disposal of solid waste. It also refers to the interactions between waste generation, storage, collection, and final disposal. Adu-Boahen et al. (2014) defined waste management as generally concerning the purposeful, systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovery and disposal of waste in a sanitary, aesthetically acceptable and economical manner. The goal of waste management, according to Achor and Nwafor (2014), is to ensure that its disposal does not result in environmental pollution or degradation and poor sanitary conditions. To put it more succinctly, the researcher defined waste management as the generation, collection, transportation, processing, or disposal of waste materials, typically ones produced by human activities in an effort to reduce their effects on human health and communities. Thus, waste management strategies refer to the methods and processes used to handle, dispose of, and reduce the amount of waste generated by human activities. Effective waste management strategies aim to minimize the environmental and health impacts of waste, conserve resources, and promote sustainable development. Suleiman (2013) lists waste minimization, waste recycling, and waste re-use as part of waste management techniques. Waste segregation, waste reuse, waste recycling, waste minimization, and waste disposal techniques are some of the waste management strategies listed by Okoye and Odoh (2014). According to Okoye and Odoh (2014), composting, waste minimization, reuse, recycling, and waste separation are all effective waste management strategies for schools. This study will focus on waste recycling and wastes re-use strategies.

Waste recycling in schools is a crucial aspect of environmental conservation and sustainability. Schools generate a significant amount of waste, including paper, plastic, food, and electronics. By recycling these materials, schools can reduce their environmental impact, save resources, and teach students valuable lessons about responsible waste management (Adeolu et al., 2014). One of the primary ways, schools can promote waste recycling is by setting up a recycling programme. This programme can involve placing recycling bins in strategic locations around the school, such as in classrooms, hallways, and cafeterias (Okoye & Odoh, 2014). The bins should be clearly labeled and separated according to the type of material being recycled. For instance, there could be separate bins for paper, plastic, and aluminum cans. To ensure the success of the recycling program, it is essential to educate students and staff about the importance of recycling and how to properly use the recycling bins (Woko, 2019). This can be done through classroom discussions, assemblies, and posters around the school. Schools can also partner with local waste management companies or environmental organizations to provide educational resources and support for their recycling programme.

Waste reuse refers to the practice of finding new uses or purposes for materials that have been discarded or are considered to be waste. Rather than disposing of these materials, they are redirected into new applications or products, often through some form of processing or treatment. This approach can help to reduce waste and conserve resources by keeping materials in use for longer periods of time. It can also offer environmental, economic, and social benefits by reducing the need for new resource extraction, conserving energy, and creating new opportunities for businesses and communities. Waste reuse refers to the utilization of discarded materials for the same or different purposes by a different user, as defined by Ikem (2015). This process involves using items that are typically disposed of as waste, such as glass jars, bottles, and plastic bags. Waste reuse is a cost-effective solution that provides an accessible resource for those who are less fortunate and have limited resources (Nwosu & Chukwueloka, 2020). Reuse entails the repeated use of a product for the same or different purposes without the need for additional processing, which eliminates the need to discard a material as waste after its initial use has ended. This process has become increasingly important for many waste management and environmental organizations because it reduces our reliance on new raw materials and diverts significant amounts of waste that would have ended up in landfills, resulting in a decrease in the amount of waste that is disposed of (Olukanni et al., 2018). Adoption of proper waste management strategies would help to facilitate sustainable development in Anambra State in particular and Nigeria in general.

The concept of sustainable development emerged in the 1980s, and it was popularized by the Brundtland Commission, which defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Since then, sustainable development has become an important policy objective for governments, international organizations and civil societies. Sustainable development refers to a development

model that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is based on the principle of balancing economic, social, and environmental considerations, and ensuring that development is pursued in a way that is both equitable and sustainable. Sustainable development involves the integration of economic, social, and environmental objectives, and it recognizes that these three dimensions are interdependent and must be addressed together. It requires the adoption of long-term strategies that promote economic growth, social inclusion, and environmental protection.

a) Waste management is an important component of sustainable development in schools. It involves the proper handling, storage, and disposal of waste materials in a way that minimizes negative environmental impacts and promotes resource conservation. By implementing effective waste management practices, schools can contribute to sustainable development in several ways: Environmental protection: Improper waste disposal can have negative impacts on the environment, including soil and water pollution, greenhouse gas emissions, and habitat destruction. Effective waste management practices can help schools reduce their environmental footprint and protect natural resources.

b) Resource conservation: Many waste materials, such as paper, plastics, and metals, can be recycled and reused, reducing the need for new resources to be extracted and processed. By implementing recycling programmes, schools can conserve natural resources and reduce waste disposal costs.

c) Health and safety: Improper waste disposal can pose health and safety risks to students, staff, and the surrounding community. By implementing safe and hygienic waste management practices, schools can reduce the risk of exposure to harmful substances and prevent the spread of disease.

It is therefore imperative to determine the extent to which principals apply waste management strategies for sustainable development in public secondary schools in Anambra State.

Theoretical Underpinning

The theoretical framework of this study is based on the Theory of Planned Behaviour and Rational Choice Theory. The theory of planed behaviour is proposed by Ajzen (1985). The theory states that an individual's behavioural beliefs, normative beliefs and control beliefs respectively determine his/her attitude towards a given behaviour, subjective norm, and perceived behavioural control, which collectively influence the behavioural intention and actual behaviour of the individual when participatory decisions in an action are voluntary and under an individual's control. The Theory of Planned Behaviour (TPB) is a psychological theory that can be used to understand and predict human behaviour. It suggests that people's actions are determined by their attitudes towards the behaviour, their subjective norms (perceived social pressure to engage in the behaviour), and their perceived behavioural control (the perceived ease or difficulty of performing the behaviour). When it comes to the application of waste recycling and reuse strategies in

public secondary schools in Anambra State, the TPB can be applied to understand why some schools are more successful in implementing these strategies than others. For example, if a school has a positive attitude towards waste recycling and reuse, and if the school's stakeholders (teachers, students, and parents) perceive recycling and reuse as socially desirable, this could lead to more successful implementation of waste recycling and reuse strategies. Similarly, if the school has the necessary resources and infrastructure to support recycling and reuse, this could increase the school's perceived behavioural control and lead to greater success. Overall, the TPB can be a useful tool for understanding and predicting human behaviour related to waste recycling and reuse in public secondary schools in Anambra State, and can provide guidance for developing effective strategies to promote and encourage sustainable waste management practices.

The Rational Choice Theory (RCT) was propounded by Gary Becker in 1976. The theory states that individuals choose the best action based on personal functions and constraints facing them. The basic idea of rational choice theory is that patterns of behaviour in societies reflect the choice made by individuals as they try to maximize their benefits and minimize their costs. In other words, people make decisions about how they act by comparing the costs and benefits of different courses of action. According to RCT, principals will only implement waste recycling and reuse strategies if they perceive that the benefits of doing so outweigh the costs. For example, if a principal perceives that waste recycling and reuse strategies will lead to cost savings, environmental benefits, and improved school image, they may be more likely to implement these strategies. On the other hand, if they perceive that implementing these strategies will be too costly or time-consuming, they may choose not to do so. Moreover, principals may also be influenced by the incentives and disincentives that are present in their environment. For instance, if there are regulations or policies that incentivize waste recycling and reuse, or if there is pressure from stakeholders such as parents and students, principals may be more likely to implement these strategies. Overall, RCT can be a useful framework for understanding the decision-making processes of principals when it comes to waste recycling and reuse strategies in public secondary schools. By understanding the costs, benefits, incentives, and disincentives associated with these strategies, policymakers and stakeholders can develop effective strategies to encourage principals to implement them.

Statement of the Problem

The establishment of a congenial and healthy environment is of paramount importance in achieving human welfare and productive life. Nevertheless, the cleanliness of both the internal and external environments of some educational institutions in Anambra State is unsatisfactory. This is due to environmental issues arising from the careless disposal of solid and liquid wastes within and outside the school premises. Regrettably, school administrators, educators, researchers, and other stakeholders in education have failed to give this matter the

attention it deserves. The researcher contends that neglecting this aspect of the learning process would be detrimental to the fervent efforts aimed at realizing the Nigerian educational philosophy, as espoused in the National Policy on Education (2013).

It is a common occurrence in some Anambra State secondary schools to find classrooms littered with debris such as banana peels, peanut shells, corn cobs, sachet water bags, biscuit wrappers, and empty soda cans, among others. In their dormitories, used sanitary pads and papers are scattered about and, in some cases, block the toilets. Some students even resort to urinating and defecating on the bare floors of public restrooms. All of these factors point to a low level of awareness or poor implementation of waste management techniques by school principals. Many secondary schools in Anambra State suffer from poor hygiene and sanitation conditions, placing both students and staff at risk. In certain cases, the schools are overgrown with grass, which is hazardous for both staff and students since it may harbour snakes and other dangerous animals, insects, and pests. The researcher is concerned that, despite this looming environmental disaster, there is a significant lack of literature detailing strategies for managing waste in secondary schools. Against this backdrop, the researcher aims to determine, through empirical means, the application of waste management strategies by public secondary school principals for sustainable development in Anambra State.

Aim and Objectives of the Study

The main purpose of the study was to determine the application of waste management strategies by principals of public secondary schools for sustainable development in Anambra State. Specifically, the study determined the extent principals of public secondary schools apply:

1. waste recycling strategies for sustainable development in Anambra State.
2. waste re-use strategies for sustainable development in Anambra State.

Research Questions

The following research questions guided the study.

1. To what extent do principals of public secondary schools apply waste recycling strategies for sustainable development in Anambra State?
2. To what extent do principals of public secondary schools apply waste re-use strategies for sustainable development in Anambra State?

Method

The descriptive survey design was adopted for the study. The design was considered suitable for this study since it will collect data through a questionnaire from a specified sample of public secondary school principals and teachers in Anambra State. The population of the study comprised 263 principals of public secondary schools in Anambra State. The entire population of the study was used for the study without sampling because the population was manageable.

The instrument for data collection was a structured questionnaire developed by the researcher based on literature and suggestions by experts. The instrument was titled "Questionnaire on Application of Waste Management Strategies by Public Secondary School Principals for Sustainable Development (QAWMSPSSPSD)." The instrument was structured on a 4-point rating scale of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE). The data collected were analyzed with Cronbach Alpha and coefficient values of 0.86 and 0.88 were obtained for clusters 1 and 2 respectively with an overall reliability co-efficient value of 0.87. Mean and standard deviation were used to analyze data for the study. In analyzing the mean, any item with mean rating between 2.50 and above was regarded as high extent while any item with mean rating below 2.50 was regarded as low extent.

Results

Research Question 1

To what extent do principals of public secondary schools apply waste recycling strategies for sustainable development in Anambra State?

Table 1: Respondents' Mean Responses on Principals Application of Waste Recycling Strategies for Sustainable Development (n=222)

S/N	Item Description:	Mean	SD	Remarks
1.	Involving teachers and students in making the compost by adding materials like leaves, plant cuttings and grass trimmings to the compost heap.	2.09	0.85	Low Extent
2.	Involving students by allowing them to create posters and bright labels for the recycle bins	2.01	0.75	Low Extent
3.	Setting up a paper collection scheme for each classroom by making 'paper only' boxes for the students and teachers to put used papers in.	2.11	0.88	Low Extent
4.	Briefing the teachers about the recycling schemes.	1.90	0.72	Low Extent
5.	Instituting a green club or a waste club in the school to sensitize and oversea the task of waste management in the school	2.19	0.70	Low Extent
6.	Contacting the state or local government authority to provide your school with a paper recycling bin.	2.22	0.76	Low Extent
7.	Buying recycled print cartridges for the school printers	2.00	0.77	Low Extent
8.	Placing clearly labeled can/plastic recycling bins	2.05	0.87	Low Extent

	in the school dining hall or cafeteria.			
9.	Collaborating with the local government council to provide a compost bin in your	2.15	0.90	Low Extent
	Cluster Mean	**2.08**		**Low Extent**

Data in Table 1 reveal that the respondents applied all items on waste recycling strategies for sustainable development in public secondary schools in Anambra State to a low extent with mean ratings ranging between 1.90 to 2.22. The standard deviation scores ranging between 0.70 and 0.90 indicate that the respondents' opinions were close. The cluster mean of 2.08 show that principals of public secondary schools in Anambra State applied waste recycling strategies for sustainable development to a low extent.

Research Question 2

To what extent do principals of public secondary schools apply waste re-use strategies for sustainable development in Anambra State?

Table 2: Respondents' Mean Responses on Principals Application of Waste Re-use Strategies for Sustainable Development (n=222)

S/N	Item Description:	Mean	SD	Remarks
10.	Donating used computers, cell phones, textbooks and other items to the community.	2.13	0.88	Low Extent
11..	Reusing office supplies such as file folders, binders, and envelopes (manila and padded).	2.33	0.84	Low Extent
12.	Hosting a schoolyard sale for old school equipment.	2.00	0.83	Low Extent
13.	Making available reusable containers for students in the classroom	2.37	0.77	Low Extent
14.	Buying durable school products which can be repaired rather than replaced.	3.01	0.94	High Extent
15.	Reusing the other side of used paper.	2.40	0.80	Low Extent
16.	Making available reusable containers for staff in the administrative block.	2.21	0.86	Low Extent
17.	Using refillable pens and pencils for	2.44	0.92	Low Extent

administrative purposes.		
Cluster Mean	**2.36**	**Low Extent**

Data in Table 2 revealed that the respondents applied item 14 to a high extent with mean rating of 3.01. However, they rated items, 10, 11, 12, 13, 15, 16 and 17 to a low extent with mean ratings ranging between 2.00 to 2.44. The standard deviation scores ranging between 0.77 and 0.94 indicate that the respondents' opinions were close. The cluster mean of 2.36 indicates that principals of public secondary schools in Anambra State applied waste re-use strategies for sustainable development to a low extent.

Discussion

The findings of the study revealed that principals of public secondary schools in Anambra State applied waste recycling strategies for sustainable development to a low extent. The findings further revealed that principals do not apply waste recycling strategies like involving teachers and students in making the compost by adding materials like leaves, plant cuttings and grass trimmings to the compost heap, involving students by allowing them to create posters and bright labels for the recycle bins, setting up a paper collection scheme for each classroom by making 'paper only' boxes for the students and teachers to put used papers in, briefing the teachers about the recycling schemes and instituting a green club or a waste club in the school to sensitize and oversea the task of waste management in the school for sustainable development in Anambra State. This finding agrees with Adeolu et al. (2014) who reported that waste management was not practiced to a great extent in secondary schools. Adeolu, et al. also noted that a larger proportion of people employed indiscriminate means for disposing of solid waste, such as open burning and dumping. In the same vein Woko (2019) stated that public secondary schools are faced with issues related to poor management of wastes. According to Chatira-Muchopa et al. (2019), inadequate facilities, limited money, inadequate policy execution, and unfavorable lifestyles (consumption patterns) are to blame for the low rate of waste recycling practices. Woko (2019) also stated that the lack of a sensitization campaign by the government and the organizations in charge of waste management may be the reason of these situations of poor knowledge of such waste management practices as garbage reuse.

Furthermore, findings of the study revealed that principals of public secondary schools in Anambra State applied waste re-use strategies for sustainable development to a low extent. This finding indicates that principals do not apply waste re-use strategies like donating used computers, cell phones, textbooks and other items to the community, reusing office supplies such as file folders, binders, and envelopes, making available reusable containers for students in the classroom, reusing the other side of used paper and making available reusable containers for staff in the administrative block for sustainable development in secondary schools in Anambra State. This is in line with the results of Ikemike (2015), who claimed that Nigeria had a very low degree of waste re-use. Ikemike further noted that large amounts of garbage will accumulate if

waste cannot be reused. In order to decrease the financial incentive for garbage picking at disposal locations, Woko (2019) urged for increased efforts from schools, homes, business enterprises, and institutional buildings to implement source segregation of non-hazardous re-usable wastes. Additionally, source segregation is advised to provide wastes more value. In order to identify the trash that may be recycled, source segregation and separate collection of hazardous wastes must be implemented in schools.

Conclusion

Based on the findings the researchers conclude that the application of waste management strategies by principals for sustainable development in secondary schools in Anambra State is low. The study has shown that the application of waste recycling and waste re-use strategies for sustainable development by principals of public secondary schools in Anambra State is relatively low. This implies that there is a need for a more concerted effort towards promoting sustainable waste management practices in public secondary schools. The findings of this study call for urgent action by the relevant authorities to create awareness on the importance of waste recycling and re-use, and to provide the necessary resources and support to encourage the adoption of sustainable waste management practices. It is important that principals, teachers, students and other stakeholders work together to promote sustainable waste management practices in order to ensure a cleaner, healthier and more sustainable environment for present and future generations.

Recommendations

The researcher makes the following recommendations based on the findings of the study:

1. Principals should be made aware of the importance of waste recycling and re-use strategies. This could be done through workshops, seminars, and training sessions. By understanding the benefits of waste recycling and re-use strategies, principals will be more likely to adopt them.
2. Government at all levels should introduce waste management policies that make it mandatory for public secondary schools to implement waste recycling and re-use strategies. This could include providing recycling bins and waste sorting facilities in schools.
3. Students should be encouraged to take an active role in waste recycling and re-use strategies. This could be achieved by introducing environmental clubs in schools and encouraging students to take part in recycling and waste reduction activities.
4. Principals should be provided with financial support to enable them to implement waste recycling and re-use strategies in their schools. This could be done through grants, loans, or subsidies.
5. Schools should collaborate with local recycling companies and waste management agencies to establish effective waste recycling and re-use strategies. This would help to ensure that waste is disposed of in an environmentally friendly and cost-effective manner.

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