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Strategies adopted by principals for waste management in public secondary schools in Anambra state, Nigeria

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Abstract
The study investigated strategies adopted by Principals for waste management in public secondary schools in Anambra state, Nigeria. Three research questions and one hypothesis guided the study. Descriptive survey research design was adopted. The population comprised 71public secondary school principals from three education zones. 63 principals were drawn as the sample using incidental sampling method. Simple random sampling was used to draw the education zones. A 15 item questionnaire, developed by the researchers was used for data collection. The validation of the instrument was done by three experts, two from Educational Management and Policy and one from Measurement and Evaluation, Educational Foundations Department, all in Nnamdi Azikiwe University, Awka. The reliability of the instrument was tested using Cronbach Alpha statistic and it yielded an index of 0.83 which was considered high enough for measuring the consistency of the items in the instrument. Data obtained were analyzed through mean, and t-test statistic. The findings indicate that construction of drainages for flood, use of offal holes, pits, evacuation of rubbish are principal's strategies for liquid waste management. Provision of landfills for sewage, ash deposits and enacting laws to penalize culprits that litter the school environment are principals' solid waste management strategies. Gender of the principals do not significantly differ in the strategies used for waste management. Based on the findings, the study recommended among others that intensive orientation and re-orientation for change of psyche should be adopted by principals for waste management. Government should enhance the procurement of gadgets for separation, recycling and disposal of wastes in secondary schools.

Keywords: strategy, waste, waste management, principal, secondary school

Introduction
Waste generation is inherent in man across the globe. Waste being an unavoidable by-product of human activities has been conventionally regarded as any rejected material resulting from domestic activities and industrial operations for which there is no economic demand and thus must be disposed. Okwesili, Ndukwe & Nwuzor (2016) [7] opined that, wastes are substances or objects discarded as worthless or unwanted, defective or of no further value from manufacturing or production process. Attah (2013) [1] corroborated the above view that waste is something that is not or no longer useful and is to be thrown away or disposed of. To that effect, wastes in view of this study were classified into solid and liquid waste.

The types of waste mostly generated in secondary schools include solid and liquid wastes and these two among the three major types of wastes were discussed for the purposes of this study. Solid wastes in the secondary schools include: dead leaves, waste papers, uprooted weeds, dead grasses, plastic materials, broken bottles, glasses, logs of wood, metals, broken ceramics, torn cloths, dysfunctional electrical gadgets like computer parts. Others are bulbs, meat trimmings, vegetable peelings, biscuit wrappings among others. Consequently, Bassis (2004) [2] explained that solid wastes are materials that contain less than 70 percent water. They include: garbage food wastes, rubbish paper, wood, used containers, glass, demolished products, bricks, masonry, sewage treatment residues, sludge from domestic sewage and discard materials. In the same vein Park (2005) classified solid waste as garbage, plastic, paper, metal, discarded containers which when accumulated gave room for their decomposition and breeding of flies, attracts rodents and vermin and leads to soil pollution among others. Liquid waste in the school environment includes floods, contaminated water, sewage, feces, dirty effluents and urine among others. Furthermore, Bassis (2004) [2] explicitly noted that liquid wastes are water that contain 1% solid, and may contain high concentration of salt and metals. Kebede (2002) explained that liquid wastes comprised of urine, human tissue, blood and other body fluids which require adequate handling, that in most cases these fluids were often channeled to pits or wells to avoid land and air pollution. In suggesting strategies for liquid waste disposal, Wahab (2003) [11] posited that not only drainages are used in channeling liquid wastes; pipes and the likes are materials that have been useful and economical in transfer of liquid waste to their destinations.

In premediaval periods, disposal of both human and organic wastes did not constitute major problem to the society because the population was relatively small and available land space for assimilation of waste was relatively large too. Thus, Ezema (2009) in Chukwuemeka, Igwegbe and Ugwu (2012) [3] asserted that waste management was not a serious problem in the early preindustrial times because the population was small and wastes generated, insignificant. Furthermore, common wastes produced during early ages were mainly ashes and human wastes; these were released back into the ground, which did not cause any harm to the

environment. However, in present times, the scenario changed that management of waste in public secondary schools becomes imperative, else the attendant consequences may impair students health and cause environmental degradation. In view of the foregoing, National Environmental Health Association (2011) [6] ascribed rapid intense waste generation to economic development, urbanization, improved living standards in cities and increase in quantity and complexity of generated waste. The negative effect of rapid waste generation in secondary schools in Anambra State leads to environmental degradation and attendant health issue on the students wellbeing. Hence, Central Pollution Control Board (CPCB, 2000) [4] noted that, accumulation of waste leads to degradation of environment, stresses natural resources, habitat and leads to health issues including impairment. Some developed societies are facing higher level of pollution resulting from waste degradation and the under-developed or less-developed countries are not left out or even worse due to inadequate provision of basic services such as sanitation facilities, transport infrastructure and waste collection (United Nations Centre for Human Settlements, 2001) [10].

Day by day, solid waste generation rapidly increase especially in urban and densely populated areas, for which the public secondary schools in some areas of Anambra state is a part. Thus, Olafusi (2004) opined that, an estimate of 44 pounds (20 kilograms) of mainly solid waste is generated per capita per year in Nigeria. Majority of these garbage generated in secondary schools are collected, dumped indiscriminately and in some cases transferred to illicit dump sites instead of the designated area, a practice which poses serious health challenges to the school inhabitants. Over the years, inadequate provisions for waste evacuation and proper disposal appear as challenging malaise to public secondary schools in Anambra State, Nigeria.

Every school in Anambra State, Nigeria generates waste accruing from daily routine activities which includes sweeping, bush cutting, snacks wrappers, papers used during class work, peels of banana, oranges, corn cubs, groundnut shells among others. Wahab (2003) [11] identified the common types of solid wastes found in various schools to include: paper, grass, cellophane bags for sachet water, biscuits, pop corns, ice cream, sweet candy wrapper, sugar cane, maize or corn cubs and groundnut shells.

Economic development, urbanization, improved living standards and increase in enrolments in schools due to government policies enhance the quantity and complexity of generated solid waste in schools. In effect, waste management seems to be one of the principals administrative problems in secondary schools in Anambra State.

The problems associated with inadequate disposal of wastes in public secondary school in Anambra state are multifaceted. The effect may breed rats and other vectors which impair public health. Apart from the damaging effect to human health, rats can destroy school records and other valuable documents. Instance of the such effect was highlighted by Wahab (2003) [11] when he noted that, the report of United States Public Health Services indicates that 22 human diseases are traceable to have relationship with improper solid waste management.

Waste management succinctly put, is the organized systematic disposal of wastes to the approved dumping site with the aim of enhancing acceptable public health and environmental safeguard. Attah (2013) [1] concurring with the above view conceptualized waste management as the collection, keeping, treatment and disposal of waste in such a way as to render them harmless to human life and the environment in general. Furthermore waste management does not end at adequate disposal instead it encompasses, the sorting, arrangement and recycling of waste in order to transform waste to wealth which boost the healthcare, environmental sanitation as well as the economy of any nation that adopts such a strategy for waste management. There is no gainsaying that technological advancement has enabled some developed societies to use their wastes in producing building materials, hence, ensuring adequate waste management even in secondary schools.

Consequently, waste management is a strategy for school environmental sustainability. Public secondary school principals resort to various strategies in evacuation and disposal of solid and liquid wastes through burning, burying in landfills in secondary schools in Anambra state, but these are not adequate strategies for waste management. Waste is said to be properly managed only when utilized to serve other purposes and add marginal utility. Thus, Madu (2001) [5] encapsulated that wastes management depict all administrative, financial, legal and planning functions, as well as, the physical aspects of solid and liquid waste handling.

For the purposes of this study, wastes management entail adequate strategies in disposal of materials, solid and liquids that are not useful to students, teachers and principals to avert environmental nuisance, degradation and health hazards.

In a bid to achieve the above, the principal has the obligation of adopting the necessary strategies for adequate management of waste in public secondary schools. Amidst the predominant and conventional strategies, which encompass provision of landfills for sewage and ash deposits, construction of drainages for flood, use of offal holes, evacuation of waste and enacting laws for punishment of defaulters among others. The study advocates that re-orientation geared towards change of students psyche for the re-implementation and re-establishment of the societal ethical norms and core values regarding waste management will yield best amongst other laid down strategies. Orientation of secondary school students on several strategies on how to manage waste will be of immense benefit. The principal adopting these strategies in public secondary schools will improve the environmental health status of the school and reduce all round degradation for which secondary schools in Anambra state are inclusive.

Public Secondary schools are considered as important learning platform where students spend quality time for study and outdoor activities. Principals of public secondary schools are assumed to be abreast of the increasing waste accumulation and its attendant health challenges to occupants of the school environment. Therefore, it is an obligation for principals to adopt adequate strategies of managing wastes accrued in their schools.

It is against this backdrop that the researchers were spurred into investigation of strategies adopted by principals for waste management in public secondary schools in Anambra State.

Statement of the Problem

Waste management and improper disposal of waste in some public secondary schools in Anambra state appear worrisome and unsatisfactory. The unhealthy and inadequate nature of waste management in some secondary schools seem unfriendly to students and staff who are liable to the health implications.

Observations from various schools indicate that some school principals resort to strategies such as digging of pits where solid and liquid wastes are deposited. However, drainages in some schools are blocked with sands and garbages waiting for evacuation indefinitely. Some refuse dump sites in schools stink, littering and spillages of the school environment are among challenges noticeable in secondary schools in Anambra state. Some students indiscriminately urinate in school premises notwithstanding the hazardous effect of the illicit act to human health, others defecate in unauthorized places within the school in a despicable manner. One needs not be informed of some occasions when there are blockages in dormitory conveniences with used sanitary towels to mention but a few.

Unfortunately inadequate management of these wastes paved ways for algae, rodents, vectors which may habit and feed on the school documents, electronics, infrastructures and infect students foods. The ugly sights of dump sites found in some public secondary schools deface the flora and fauna outlook of the schools with its attendant health impaired conditions. Instances where rats ate up some statutory records of the school throwing the principal into confusion are among the challenges facing proper waste management in schools.

In view of the foregoing, the onus lies on every school principal to device adequate waste management strategies to guard against the dastardly effects of poor waste management. Seeing therefore the need for principals adoption of adequate strategies for waste management in their schools, impelled the researchers to investigate the problem of the study.

Research Questions

1. What are principal's strategies for solid waste management in public secondary schools of Anambra State?
2. What are principal's strategies for liquid waste management in public secondary schools of Anambra State?
3. What additional waste management strategies were adopted by principals in public secondary schools in Anambra State?

Hypothesis

Ho1. There is no significant difference between strategies adopted for management of wastes by male and female principals of public and private secondary schools in Anambra State.

Method

Descriptive survey research design was employed for the study on strategies adopted by principals for waste management in public secondary schools in Anambra State. The population of the study comprised 71 public secondary school principals drawn from three education zones randomly selected for the study. Through incidental sampling method, 63 principals were drawn as sample for the study. The instrument for data collection was a questionnaire validated by three experts, two from Educational Management and Policy and one from Measurement and Evaluation in Educational Foundations Department, Nnamdi Azikiwe University, Awka. The data obtained were analyzed through mean statistics and t-test. Any item with a mean point above 2.50 is regarded a accepted whereas mean values less than 2.50 were regarded as not accepted.

Results

Research Question 1

What are principal's strategies for solid waste management in public secondary schools of Anambra State?

Table 1: Mean responses on principals strategies for solid waste management

S/N	ITEMS	X	Decision
1	Provision of different containers for deposit of varieties of renewable and nonrenewable solid waste	1.8	Rejected
2	Provision of landfills for deposit of ashes and sewages	3.1	Accepted
3	Inviting refuse disposal agencies from the state to assist in transfer of refuse to dumping site	1.6	Rejected
4	Enacting laws to penalize culprits found littering the school environment with solid waste	3.2	Accepted
5	Orientation/Re-orientation of students psyche for adequate refuse disposal.	1.8	Rejected

Table 1 above shows that the means for items 1, 3 and 5 were below 2.5 and therefore rejected, while the mean responses for items 2 and 4 were above 2.5 which are accepted. This indicates that principals do not invite refuse disposal agencies from the state to evacuate waste to dump sites, re-orientate students psyche towards adequate disposal and do not provide different containers for renewable and non-renewable solid wastes in public secondary schools.

Research Question 2

What are principal's strategies for liquid waste management in public secondary schools in Anambra State?

Table 2: Mean responses on principals strategies for liquid waste management

S/N	ITEM	X	Decision
6	Construction of drainages to channel floods outside the school environment	3.3	Accepted
7	Construction of offal holes/pits to absorb sewages from bathrooms and toilets	3.7	Accepted
8	Provision of equipment to transfer liquid wastes to government approved designated sites.	3.2	Accepted
9	Evacuating rubbish at drainages to aid flow of floods	2.9	Accepted
10	Laws to prohibit indiscriminate disposal of liquid waste by students and teachers	3.3	Accepted

From the above table, analysis of research question 2 indicates that all the items had means above 2.5 which depicts acceptance that school principals adopt strategies such as: construction of drainages, pits, engage equipment that transfers liquid wastes to government approved designated sites, evacuate rubbish and institute prohibitory laws against indiscriminate disposal of liquid wastes.

Research Question 3

What additional waste management strategies were adopted by principals in public secondary schools in Anambra State?

Table 3: Mean responses on principal's additional waste management strategies.

S/N	Item	X	Decision
11	Construction of incineration to burn solid waste like papers, nylon and rubbish	2.8	Accepted
12	Employment of labour to assist in management of solid waste in school.	3.4	Accepted
13	Separation of waste by providing label containers for categories of bin.	1.7	Rejected
14	Employment of temporal labour to assist in clearing blockages in drainages that prevents flow of liquid waste.	3.3	Accepted
15	Provision of rakes to help gather dropped dead leaves and rotten fruits.	3.0	Accepted

Table 3 shows that the mean scores for items 11-15 were above 2.5 except item 13 which was rejected due to mean score below 2.5. This reveals that school principals adopt strategies such as incineration, provision of rakes, engage temporary labour in clearing blockages, and employment of labour to assist in waste evacuation. On the other hand, response item 13 indicates that principals do not provide label containers for different categories of bin

Ho1: There is no significant difference between strategies adopted for management of wastes by male and female principals in public secondary schools in Anambra State.

Table 4: t-test difference in mean responses of strategies adopted by male and female principals in waste management

Variable	N	X	SD	DF	Sign level	t-cal	t-crit	Decision
Males	25	2.7573	0.5627	61	0.05	0.3828	1.980	Not significant
Females	38	2.8246	0.8309					

Based on the result on table 4, the calculated t –value at 61 degree of freedom and 0.05 level of significance is 0.3828. Since the calculated t –value is less than the critical table value of 1.98, the null hypothesis is therefore accepted.

Discussion

The findings revealed that principals in public secondary schools in Anambra state adopt conventional strategies which are inadequate for waste management in their schools. However, there are some strategies needed by the schools which they do not adopt. The implications tantamount to the depletion of the flora and fauna status of the school. In addition, health impairment for occupants of the schools may ensue. The result corroborated the views of Central Pollution Control Board (CPCB, 2000) [4] which showed that accumulation of wastes leads to degeneration of environment, stresses natural resources, habitat and leads to health issues including impairment. There is no gainsaying that poor waste management engender unhealthy environment for teaching and learning. Therefore the need for adequate strategies for waste management is imperative in public secondary schools.

Table 1 highlighted strategies adopted by secondary school principals on solid waste management such as, provision of landfills for waste deposits and enacting of laws for punishing culprits found littering the school environment. Corroborating with the above findings, Remachandra and Varghese (2003) [8] opined that solid waste management may be provided among urban schools such as landfills, but that refuse landfills need to be burnt to avoid their accumulation and liable to cause health hazards. Concurring with the views of the latter, Medina (2003) further noted that laws have been found very useful in restricting occupants of the schools in ameliorating illicit dumping of waste at the school premises.

Without mincing words, burning of landfills as suggested by Remachadra and Varghese should not be considered as an adequate strategy due to the adverse effect of gaseous pollution emanating from burning which equally enhances health hazard and depletion of the ozone layer.

Table 2 showed basically that principals in public secondary schools construct drainages, pits, evacuate rubbish from gutters, provide equipment for transferring waste to government approved refuse dump sites and institute laws prohibiting student's disposal of liquid waste as strategies. However, it must be noted that these strategies adopted have not truly addressed the challenges of illicit dumping of liquid waste in public secondary schools in Anambra State. Unacceptable behaviours such as indiscriminate urination still abound in some school environment till date. The ooze of urine at the back of classroom blocks, laboratories among other areas still stare at the face of credible school sanitation advocated by the government. Hence, the researchers advocated for change of psyche of both students and teachers in various institutions for which secondary school is a part, regarding adequate strategies for waste management.

Data obtained from principals additional strategies for waste management indicate that, principals do not separate waste through the use of label containers for categories of bin. Thus, the development depicts that government's advocacy for conversion of waste to wealth is thwarted. The impending danger associated with lumping all sorts of waste in the same bin is unimaginable and as such must be guarded against. In that regard, Takele (2004) [9] suggested that, "waste sorting and segregation as well as recycling could improve the hygiene of school environment." Above all, the researchers opine that in addition to whatever strategy adopted by the principals for waste management in public secondary schools, orientation, re-orientation of the students psyche towards proper management of waste as enshrined in the nations core norms and values would yield the best result. It is based on this educational platform that secondary schools students would behave like members of

well civilized societies and true citizens who day by day uphold national consciousness of the country. Asides adequate strategies adopted by public secondary principals ensure improved health condition for school occupants.

Hypothesis one showed that gender of the principals do not significantly differ in the strategies adopted for management of waste in public secondary schools. However, there is still the concern over the poor management of waste in public secondary schools in Anambra state. Therefore, improved orientation/re-orientation to change the psyche of both teachers and students should be integrated as an important strategy for waste management, irrespective of gender affiliations.

Conclusion

Based on the findings of the research, the following conclusions were drawn:

Strategies adopted for waste management by principals of public secondary schools are effective service delivery geared towards public health and protection of the flora and fauna environmental conditions of the schools. Amongst the various strategies adopted by the principals in Anambra State as shown by the study, it is evident that secondary school wastes are still poorly managed. Hence, the need for adequate strategies through orientation and re-orientation which can only change the psyche of the school occupants had been advocated. This remains an important panacea that will ameliorate poor waste management in public secondary schools.

The findings of the study showed that, principals do not adopt separation of waste by providing containers for categories of bin. Although the cost implication is there, but this strategy will engender discipline and aid recycling of wastes, geared towards waste to wealth advocacy initiated by the government. Adoption of waste to wealth strategy equally enhances the developmental strides of any economic driven society.

In line with the findings of the study there is no significant difference in strategies adopted by male and female public secondary school principals in waste management. This indicates that gender has no effect on the strategies adopted by principals for waste management. Succinctly put, principals adopt various strategies in management of wastes which generally appear inadequate for a conducive and enabling school environment irrespective of their gender differences. Hence, the need for intensive orientation and re-orientation geared towards change of psyche for secondary schools occupants in waste management must be adopted in secondary schools. When there is proper education in this regard, there will be enhanced health conditions, a face lift in the flora and fauna outlook of the schools.

Recommendations

1. Principals of public secondary schools should adopt enhanced strategies involving separation of wastes by providing label containers for categories of bin.
2. Intensive orientation and re-orientation geared towards change of psyche of school occupants should be adopted by principals for waste management in schools.
3. Advocacy towards waste to wealth education for students and government provisions of recycling equipment will engender better strategies for waste management in public secondary schools.

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