



WASTE GENERATION AND ITS MANAGEMENT IN SCHOOLS

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Abstract:

Waste management in schools continues to generate thoughts, interest and research because of the huge amount of the refuse that schools generation which include papers, cartons, cans, broken bottles, polymers which can be recycled but are rather turned out as rubbish to be collected as refuse. These refuse from schools are collected alongside other household refuses and heaped on streets or refuse dump with it antecedent health challenges which include unsightly heap of refuse, the odour emanating from such heap and the heap being a breeding ground for disease vectors like mosquitoes, cockroaches, rodents, reptiles among others. Among all the significant contributors of environmental waste, schools have been chosen for this write up since the waste generation rate and its corresponding composition has not been reported or has been underestimated. Hence, the present paper is an attempt to fill up this gap in knowledge. The objective of this paper specifically is to raise awareness among educators, learners and their families of the cause and effect of poor waste management and the benefits of recycling, reuse and reduce as waste management strategies. Also, to provide environmental tools to enhance quality of life and assist schools with portfolio development and waste minimization projects.

Keywords: waste products, reuse, reduce, recycle, school, environment, management

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1. Introduction

Environment is the collective term used to describe all the living and non-living things that make up ones' surrounding. The environment consists of three components: physical environment, biological environment and social environment respectively. The physical environment consists of all the non-living things in the surrounding. The biological environment comprises all the living things in the surrounding. On the other hand, the social environment is made up of all the man-made materials in the surrounding (Akinsola, 1990). The health and even survival of man depends on his ability to adjust to his environment and how he takes care of the environment especially in terms of waste generation and management.

Every house or industry/establishment or concentration of human generates waste materials such as human excreta, urine, waste water, leaves, broken bottles and pots (ceramic and glass) etc. waste can be classified into two as follows: solid waste such as leaves, bottles, cans, maize husk, papers etc. and sewage comprising human excreta, urine and waste water from the kitchen, toilet and bathroom. All these must be disposed of in the safest simplest and reliable methods to avoid environmental pollution. According to Heymann (2003) unhealthy environment and overcrowded housing in the slums exposes the urban poor to high rate of infectious diseases. Waste from urban drains and municipal dumping of waste especially human excreta pollute drinking water sources that affect the health of the urban population. Ebegbulem (2010) noted that children were susceptible to diseases when they are born and developed in an environment characterized by overcrowding, poor hygiene and lack of space for recreation and study.

One of the greatest threats to human's health is inefficient disposal of waste (Ajala, 2003), while Hubley (1993) pointed out that it is a known fact that filthy environment often turn out as breeding ground for germs which can spread communicable diseases. According to Oyerinde (2000); the lifestyles of Nigerians in urban cities aid environmental pollution. This is because Nigerians have carefree attitude towards disposal of their wastes. Nwankwo (2004) revealed that improper disposal of solid waste constitutes serious threat to human health and to the achievement of sound environmental sanitation.

2. Classification of wastes

There are two classes of waste: solid waste and sewage (liquid waste). Solid waste is also referred to as refuse. There are different types of refuse like domestic refuse, industrial refuse and street refuse. Street refuse comprises public and commercial

refuse. The indiscriminate disposal of refuse constitutes a health hazard for the following reason:

- it attracts insects and rodents which can spread diseases;
- it is unsightly;
- it produces offensive odour;
- it can cause pollution of air, water and food;
- it may cause fire.

Bassis (2004) identified three types of wastes by their consistency: solid, liquid and gaseous wastes. Aibor and Olorunda (2010) grouped domestic solid wastes into five groups namely: (a) garbage, (b) rubbish, (c) ashes, (d) house sweeping and (e) bulky wastes, while Briggs (2010) reported that refuse disposal methods widely used are as follows: (a) open dumps, (b) sanitary landfill, (c) sea disposal, and (d) incineration.

3. Ways of waste generation

Each year, schools dispose of paper, newspaper, cardboard, clothing, yard waste, wood pallets, food waste, cafeteria waste, glass, metal, disposable tableware, plastics and endless varieties of other types of School Solid Waste (SSW). A school can produce more than 4.3 pound of SSW each year (Payne and Hahn, 2000). Although SSW is an important problem, it makes up only a small amount of the solid waste discarded in a country. Agricultural, mining, and industrial waste contribute much more to a country's solid waste problems. As an example, it is estimated that 800 million discarded cans are found in piles around the country. Regardless of the source, solid waste requires some form of disposal. Traditionally, these forms have been the following:

- Open dumping: solid waste is compacted and dumped on a dump site. Open dump is discouraged or illegal in many urban areas.
- Sanitary landfill: solid waste is compacted and buried in huge open pits. Each day, a layer of solid is pushed over the most recently dumped material to encourage decomposition, reduce unpleasant odours, and contain the material to keep it from being scattered.
- Incineration: solid waste can be incinerated. Several kinds of incinerators are used, including cement kilns, boilers and furnaces, and commercial incinerators.
- Ocean dumping: when solid waste is close enough to the ocean, it can be collected, loaded into barges, and taken to off shore dump site.

Olanrewaju (1990) classified sewage as human wastes which are discharged from the body and flushed through toilet facilities and household wastes from laundry

operations, bathing, cooking, kitchen wastes, and dish washing. Olanrewaju (1990) further stated that sewage water is a form of household waste that flows into covered channels or drains. Likewise, storm water from rain and erosion may either flow directly to become waste in the open channels along with sewage water or may be collected with human wastes (combined sewerage), while industrial waste are produced from manufacturing processes and constitute community waste water.

3.1 Types of refuse disposal

Major types of waste generated in schools are: food waste; plastic; paper; floor sweeping; aluminum foils; others (stationary items, pencil sharpening, etc.) which are basically solid waste. Solid waste poses serious dangers to human health and environment. Studies have shown that man suffers in no small measure from diseases associated with solid wastes (Igbanugo, 1986; Oyeshola, 1995). Managing solid waste is a very expensive urban service (Okpara, 2001). NEST (1999) observed that local government authorities in the country have failed in the management of wastes. It is estimated that up to 3-5 million tons of solid waste is generated in urban centres annually, and more than 50 percent of this are not cleared at all (WHO, 1997 cited in Ogueri and Oparah, 2007).

3.1.1 School waste

Evidence from evaluations of school waste reduction programs in developed countries indicates that success in achieving waste management outcomes occurs when schools adopt a whole-school approach (Griffiths, Richards & Winters, 2016). A whole-school approach involves effectively integrating school plans, school operations and curriculum engagement. Outcomes for schools take the form of economic savings, environmental, social and educational benefits. A whole-school approach is the key to lasting success as it involves all members of the school community working together to change waste management behaviour. Waste management can be seen as a set of independent activities or an arena where all activities are planned and carried out in relation to disposal of waste (UNEP, 1996). The situation of waste management in schools in developing countries is appalling. There are no equipment for collection and disposing of waste. Even so called dumpsites are badly managed, and they impact negatively on human health and the environment. Waste management services are largely inadequate, with more than half, the refuse generated remaining uncollected, and large areas of the town receiving no sanitary attention. In other for an adequate waste management system in school, there should be a mechanism to assess the waste generated in schools.

3.2 How to assess waste generation in schools

Assessing a school's waste will help school management identify where problem areas exist and where there is room for implementing or expanding a recycling program. It also will provide indicators for areas in which waste reduction strategies could be implemented. The methods of school's assessment might involve one of the following methods or a combination of approaches. Walking through the school building is a quick way to assess a school's waste generation practices. Taking a tour of the school and its grounds - including hallways, cafeteria, media center/library, gymnasium, athletic fields, and any specialty classrooms, such as art studios or the tuck shop will bring to lime light the waste the school is generating, so also observing the activities and current practices in each area. One can identify each component of one's school's waste and calculate its percentage of the school's total waste generation by organizing a waste sort. Waste sorts can focus on an entire school's waste stream or target specific areas, such as the cafeteria or the classrooms. Schools should determine which assessment is best for them based on factors such as size of the school, types of waste generated, resources such as money, time, labor, or equipment available to implement the program of waste management, and the scope of the efforts involved.

3.3 Waste Management as a part of School Curriculum

Adeolu, Enesi and Adeolu (2014) stresses the environmental attitude of young people which appears to be crucial as they ultimately play a direct role in providing knowledge-based solutions to in- coming environmental problems. This underpins the importance of environmental knowledge in school curriculum across the three tier of the educational pyramid (primary, secondary and tertiary levels of education). Waste management as a component of environmental education should be part and parcel of the curriculum in order to inculcate in the minds of future adults the need to generate less waste and convert waste to wealth.

In a study of National School Sanitation Initiative organized by Ecosan Services Foundation on solid waste management in schools, came up with the pyramid below showing the most and least favoured solid waste management options among school children. From the pyramid, prevention and minimization of waste are at the apex of the pyramid while disposal of waste was at the base of the pyramid showing a minimal understanding of the effect of waste generation and management to the environment and health. This knowledge is very vital to human existence. School environmental programs, although addressed to students if properly channel can also influence the environmental knowledge, attitude and behaviour of adults (parents, teachers and local community members) through the process of intergenerational influence.

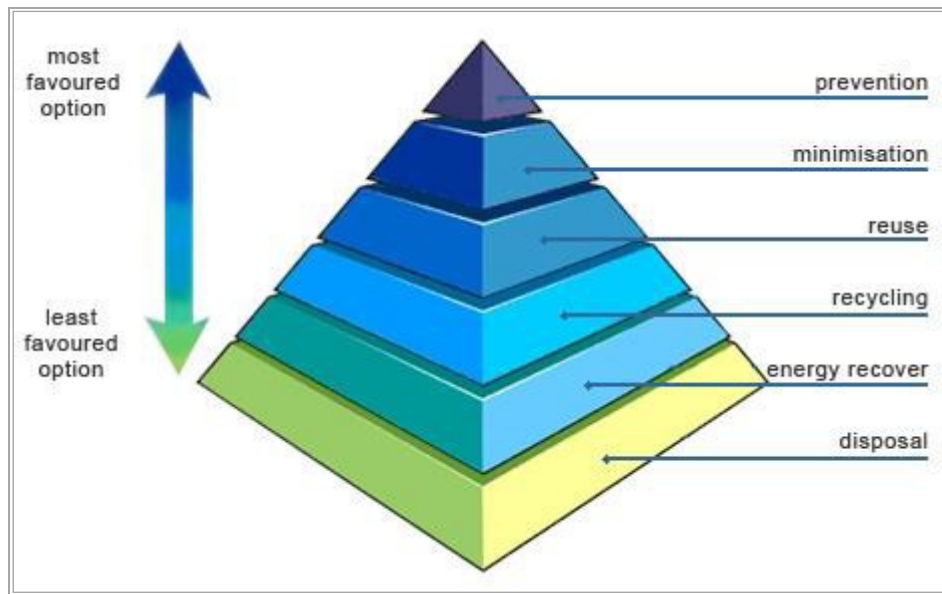


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3.4 Portfolio development and waste minimization strategies in schools

The first step in setting up a successful waste management programme in a school is to make sure that all parties which could affect the programme's success namely; school governing body, teachers, parents, students, and the school cleaning staff, buy-in to the idea and are committed to making it work. One of the best ways to do this is to create a waste project committee that includes representation from each of the key groups. After setting up a waste management committee, the next step is conducting a waste audit. A waste audit will help establish how much, and what type of waste a school currently throws away. This audit will give information such as where a school produces its waste (classrooms, cafeteria, playground etc), what types of waste are produced, and how much is produced. The next step is to calculate the daily, weekly and yearly waste totals for the school. Multiply daily totals by five for the weekly results, and the weekly totals by 38 weeks (the average number of weeks per year spent at school). Work out the percentage of different types of waste produced, compare waste data from different areas around the school to identify the waste 'hot-spots' (places where most of the waste is being generated). What are the most common types of waste? Is any of it recyclable? Which type of waste would make the biggest difference if recycled? This is the information you will use in planning how to REDUCE, REUSE AND RECYCLE the school's waste.

3.5 Reduce Waste at School

The best way to solve waste problem is to firstly reduce the amount of waste produce. So, depending on the outcome of a school's waste audit, school should try and focus on

the waste stream(s) it is producing the most of and see where the school can reduce the waste output.

Here are some more tips on how to reduce the waste a school generates:

- Avoid buying products with excessively packaging.
- Reduce packaging by buying the items that are used frequently in bulk and by purchasing refills and concentrates.
- Try to buy products with packaging that is made from recycled materials
- Try not to buy disposable products such as paper plates.
- Choose glass over plastic as it can always be recycled.
- Avoid all toxic and hazardous products where possible so try and use organic cleaning products in school and at home. They are safer for the environment.
- Avoid using non-recyclable materials such as cling wrap or tin foil in the school.

3.6 Reuse Waste at School

Always bear in mind that waste is not waste until it is wasted. Finding clever and effective ways to reuse waste will save school money, help a school to make money, and help to cut down the volumes of waste being sent to landfills.

Here are some more handy tips to help school reuse the waste that it is generating:

- Before disposing of something one no longer need, try and think about other ways in which the school could use it e.g. discarded paper could be used to make paper Mache, discarded cans could be used in arts and crafts classes and glass jars could be used to hold crayons or pencils in the classroom. One could probably think of plenty of other ideas if one put one's mind to it. Once a person has identified ways to reuse certain waste streams ask the students to bring those streams of waste into school from home, thereby reusing waste that is generated in households as well.
- Look outside of the school for people who may want to reuse the waste the school is producing. For example, artists may use recycled waste to produce their art. A school may even be able to sell its waste to external parties thereby making some money for the school.
- Where possible, repair items that are broken instead of throwing them away out rightly. By repairing broken furniture and clothing, the local seamstress and carpenters are patronised. This will both reduce waste and stimulate employment, growth and development in the community.
- When it comes to organic waste such as leftover food, create compost. There are different ways to make compost so select one that suits specific situation.

3.7 Setting up the recycling centre

Having established a waste committee, done waste audit, looked at ways to reducing waste and reuse the materials before they are wasted, the final step in the move towards effective waste management is to set up a school's recycling centre. Recycling refers to the separation of recyclable waste from the general waste stream, and the eventual using of the recyclable items in the manufacture of other materials or same material. Recycling not only saves resources but also reduces the environmental impact of manufacturing new products, and the impact of waste at landfills.

3.8 Implication of waste generation and its management in school

The key to establishing a successful waste minimization program in a school is to involve the whole school community. That community is made up of: principal and leadership team, teachers, students, school council, ancillary staff, administration, cleaners and canteen operator, parents, broader school community. It is only when all hands are on deck that success can be achieved.

4. Conclusion

As consumers and environmental concerned citizens, we need to commit to the three Rs: reduce, reuse, and recycle. The first step is to find ways to reduce our use of materials that eventually pollute our environment. We need to become willing to do with less, such as expecting less packaging materials used with small consumer products. Second, as concerned citizens, we all must learn to reuse as much as possible. Refilled milk rather than the dairy can so that it can be reuse, as well as cloth diapers rather than the non-degradable disposable diapers, are examples of reuse. Finally, we must recycle as much materials as possible. Recycling will grow only as much as the demand and a market for recycled materials allows. The cost of recycling and a lack of market for reclaimed materials often discourage municipalities and industries for practicing more recycling. Lack of time and interest, failure to understanding how to recycle, messiness, and a lack curbside pickup are also frequently mentioned as reasons for not recycling in the home. When combined, the three 'Rs' of Reduction, Reuse, and Recycle could significantly manage wastes generated.

4.1 Recommendations

School curriculum should have a multi domain focus and should be designed to engage students in their understanding about litter and waste minimization related concepts. The curriculum broken into syllabus and within each unit of the scheme of work should be evaluation techniques to assist schools to assess students. Where relevant, links to

tools and resources should be made, and indications given as to how school operations can be integrated in a meaningful way.

The government should work on a proposal to incorporate waste management in school curriculum in order to sensitize the younger generation about managing municipal solid waste in a hygienic and scientific manner.

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