

FACTORS ENHANCING SUSTAINABLE WASTE MANAGEMENT IN RUSINGA SCHOOLS

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ABSTRACT

Most schools in developing countries dustbins are used in collecting waste and unfortunately burn the waste in the open. The majority of the schools have inadequate facilities that would help in waste management. The aim of this study was to establish the factors that enhance sustainable waste management in Rusinga schools. A descriptive research design with qualitative and quantitative approaches was used in the study. Data was collected using self-administered questionnaires and face to face interviews with a target population of 330 students, 7 staff members of Rusinga School, 9 from County Government of Nairobi and 4 from Taka Taka solutions. The sampling procedure was guided by both probability

and non-probability sampling techniques. Findings showed that factors that enhance sustainable waste management include knowledge and skill on waste management, regular collection of garbage, recycling programmes, sorting and collection of garbage and making informed decisions on the goods we use that lead to waste formation. The study observes that knowledge and skill is an essential factor in sustainable waste management in schools.

Key Words: Sustainable waste management, School Curriculum, Acquired knowledge, Interest in Acquiring Knowledge, Social media, awareness

INTRODUCTION

Management of solid waste remains a global problem. Some communities have started practicing alternative waste management practices like waste recycling and transforming it into energy with the use of technology [1]. Some of the emerging global drivers pushing for more and better-organized waste management are resource scarcity and climate change. Current developments in technology all over the world in terms of digital evolution and mobile phone development are further complicating the issue. These technologies have introduced a new era to human behaviour hence an urgent need for solid waste management programs [2].

Sustainable solid waste management is one way to deal with the solid wastes we produce. It enhances the notion that we reduce the waste produced as well as their environmental harm. The waste produced does not have to be useless, since much of it can be put to the production of certain goods. In this regard, innovative ways can be found to ensure that waste becomes a source of income and livelihood. The discourse on sustainable waste management is on whether this waste can be mixed and then transferred from one part of the environment to another in a way that ensures sustainability and promotion of a safe environment [3].

In his letter on “Care for Our Common Home”, Pope Francis urgently advocates for “sustainable and integral development”. He especially implores young people to think of the environmental crisis as they build a future. He further draws our attention to the statement by the Bishops of South Africa, which states that “Everyone’s talent and involvement are needed to redress the damage caused by human abuse to God’s creation. All of us can cooperate as instruments of God for the care of creation, each according to his own culture, experience, involvements and talents” [4].

The main objective is to ensure that every person in whichever location gets the relevant information and awareness for sustainable development. The lifestyle should be in harmony with nature. Management mechanisms should be created to avoid a possibility of exploiting natural resources by those who are selfish and greedy [5]

Involving students globally in SWM is one of the most recommended ways of creating the right mechanisms in enhancing sustainability. However, Jurczak [6] states that in Poland, for instance, environmental knowledge and awareness among students continues to be relatively low at all educational levels. Some of the “knowledge children have of the environment and nature” is not only limited but also only partially correct or altogether incorrect. This, therefore, prevents students from relating the causes and effects of natural phenomena and to employ this knowledge daily. Unfortunately, some of them have no knowledge about the sustainable measures concerning the environment. Most of them showed little sensitivity and did not pay sufficient attention to their degradation.

In addition to basic education subjects, there is need to include environmentally related subjects in the education curriculum. It should also have compulsory lessons on environmental awareness and waste management to “seek active support from professionals in the fields of education and ‘environment and waste management’”. Schools can approach and collaborate with institutions of higher learning, NGOs, as well as government agencies in implementing environmental aspects in their curriculum. In Africa, even though the national policy on environmental education emphasizes the need for learners to take part in educational activities related to the environment, teachers tend not to enforce and encourage children’s participation in waste management. Their actions (teachers) tend to limit children’s participation. Environmental education though seen as core, waste management programs in most schools have been reduced to simple tasks such as collecting litter around the compound

of the school and cleaning classrooms. There is little connection made between how these tasks improve the waste problems at the school, and why they are being undertaken in the first place.

In the context of a school, the school community, which includes both the school children and the staff, could be considered as contributing to the total waste hence the need of adequate resources in the management. The amount of waste produced in a school does not depend on the size of the school or the number of occupants in it. However, it is the type of activities carried out. Furthermore, the human resource is also a crucial aspect in SWM [7].

In Kenya, the challenges of waste management are quite prevalent. Available statistics indicate that Kenya intentionally produces 2,800g of the toxic equivalent of Unintentional Persistent Organic Pollutants annually. The waste burning makes emissions significantly environmentally toxic. Kenya is a trailblazer in Africa in addressing environmental concerns. Influencing disposal habits of citizens, partnerships as well as a systematic approach to handling waste can play a big role in waste management [1].

Waste management is essential in reducing environmental menaces and providing a safe and healthy work environment for students, teachers, employees and visitors in a school. Khitoliya [8] affirms that from Kindergarten to the university, education aims to create an awareness that every individual has to share in the various causes as well as consequences of environmental programs. Currently, the Nairobi city, doesn't have an effective waste management system. This has negative effects on people's health and the environment.

There is great potential to promote sustainability through education and practice. Although the literature in Kenya is too old, it focuses on inefficient collection and disposal of waste, failing to address the issue of sustainability [9]. Also, most recent studies focus on analysing "the existing policy framework on solid waste management and its effectiveness in addressing SWM in Nairobi City County" [9], as well as large municipalities [10]

This presents a gap in Kenya in the sense that it has not been ascertained whether students in Kenyan schools are part and parcel of solid waste management processes. It therefore raises the issue of waste in educational institutions, leaving a gap in how schools can have sustainable solid waste management programs. This study, therefore, seeks to assess the sustainability of solid waste management in Schools.

Abbreviations

NGC	Nairobi County Government
RGS	Rusinga Group of Schools
SWM	Solid Waste Management
WM	Waste Management

MATERIALS AND METHODS

Study location

The study site of the research was at Rusinga School, Nairobi. Rusinga School is located in the Lavington area, Nairobi County, and has a proximate relationship to the Kawangware suburb, which is known for lack of evident sustainable waste management systems or programs in place (See figure 1).

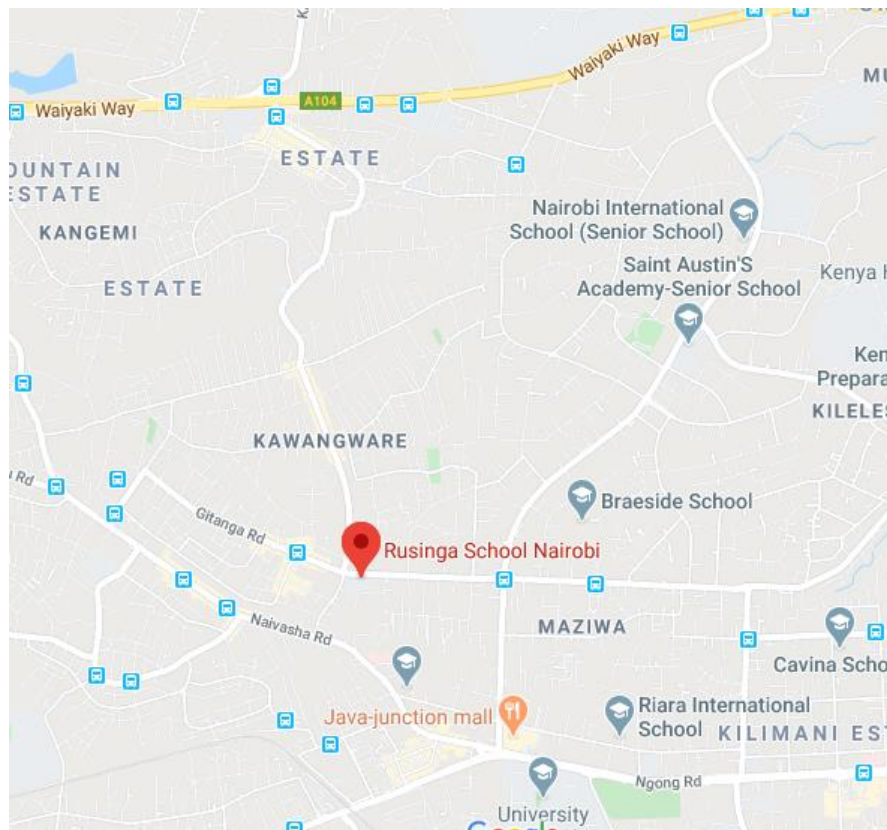


Figure 1. Map of Kawangware, Source Google maps

Target Population

The study targeted the senior school students' section to assess whether their proficiency/efficiency in knowledge and skills, attitudes and understanding of resources available vis-a-vis government policies are well inculcated in them considering their age and time that the learners have spent in school. The research also drew respondents from the general population who deal with solid waste management in and around the school's external environment. The study selected employees from the school as well as employees of Nairobi County Government and Taka Taka Solutions, which is an organization that collects and processes solid waste in the school.

Sample Size

Kothari [11] refers to sample size as the number of items to be selected from the total population as a representation. For this study, a sample size of 195 respondents was selected as shown in table 1. These included a random sample of 175 students selected from the total population of 330 students and 20 respondents who were purposively selected from other stakeholders. For the students, the researcher used proportion sampling to select students from each grade based on the population of each grade. Besides the students, the researcher used purposive sampling to select respondents that participated in the key informant interviews. A purposive sample or judgmental sampling was used because of the researcher's knowledge of the population in relation to the purpose of the study. In this study, seven employees of Rusinga School, nine employees of Nairobi City Council, and four Management team members from Taka Taka Solutions were purposively selected.

Table 1. Sample framework of respondents

	Rusinga School	Nairobi County D/ North	City Employees of Rusinga School	Taka Solutions	Taka	Total
Population	330	27	22	12		391
Sample Size	175	9	7	4		195

Sampling entails the selection of representative elements from the study's population of which the researcher will use to make generalization. It is a technique that is used to select a sample. The study employed the use of probability as well as non-probability sampling techniques. To pick the desired elements to be included in the final sample size, random sampling was adopted in sampling key informants from the general public. For this study, the researcher sampled 175 students from a student population of 330 (N = 330).

For this study, the researcher sampled 175 students from a student population of 330 (N = 330). The study used a confidence level of 95% with a corresponding z-scores which can be found using an equation or widely available tables like the one provided in table 2 based on the chosen confidence level.

Table 2: Distribution of respondents per year group and gender

		Gender		Total
		Male	Female	
Grade	10	10	15	25
	11	25	18	43
	7	23	16	39
	8	15	22	37
	9	13	18	31
Total		86	89	175

Table 2 shows that most respondents were drawn from grade 11 with 43 respondents, followed by 39 from grade 7, 37 from grade 8, 31 from grade 9, and 25 from grade 10. With more respondents drawn from grade 11, it was assumed that their responses could highly influence the quality of knowledge on SWM due to their age and length of stay in school regarding the development of cognitive skills in the same field.

Table 3: Published tables for determining sample size

Size of Population	Sample Size (n) for Precision (e) of:	
	±5%	±10%
100	81	51
125	96	56
150	110	61
200	134	67
250	154	72
300	172	76
350	187	78
400	201	81
450	212	82

source: Singh & Masuku, 2014)

(Sample size for ±5% and ±10% Precision Levels Where Confidence Level is 95% and P=0.5)

Research Instruments

For this case, the instruments used to collect data included, a structured questionnaire for the students and an interview guide for the key informant interviews administered through face-to-face interviews. The key informant interviews were recorded following consent from the interviewees. The questionnaires were distributed to students for self-administration, of which, 100% were correctly filled and returned.

Data Analysis

Qualitative and quantitative analysis were used. For qualitative analysis, the researcher used content analysis, which involved analysing the interview recordings to understand the relationship between the experiences of individuals and their social framework. Quantitative data were analysed using descriptive statistics while using the Statistical Package for Social Sciences (SPSS) software. The findings of this research are discussed in detail in the next section of this thesis.

RESULTS AND DISCUSSION

Factors that enhance sustainable waste management

Knowledge on SWM already acquired.

To ascertain whether the respondents were aware of waste management, they were asked whether they have ever been taught about the importance of waste management. From the findings in table 2, many (69.9%) of the respondents agreed that they had been taught about the importance of waste management, 16.4 % of them reported not to have received any training on with the remaining 13.6 % remaining neutral of receiving any education on solid waste management in their school. The findings further depict that more males have received training on waste management than their female counterparts, with a further 7.7% of females stating that they do not know whether they have been educated on the importance of waste management compared to 6% of the males. This finding indicates that there is a lower knowledge level of waste management in females than males in the school.

Table 4. Knowledge already acquired

Do you have any knowledge about the importance of waste management?				
Count		Gender		Total
		Male	Female	
	yes	66	62	120
	no	11	19	30

management?	I don't know	11	14	25
Total		88	95	175

The study also sought to establish where much of the transfer of knowledge and skill on waste management was exchanged, the school scored the highest rank with about 42.3%, responses, education at homecoming second with 28.2% responses, third was education from elsewhere 15.4%, for both school and home 10.1% responses while home, school and elsewhere got 2.6% and school and elsewhere got 1.3% of the responses respectively. This implies that the best way to transfer knowledge on waste management is through schools and at home as indicated in table 3 below.

Table 5. Respondents' views on where they learnt WM education

If yes, where did you learn about the importance of waste management Cross tabulation

Count

		Gender		Total
		Male	Female	
If yes, where did you learn about the importance of waste management	Home	22	20	42
	School	34	29	63
	Elsewhere	9	14	23
	home and school	9	6	15
	home, school, elsewhere	1	3	4
	school and elsewhere	0	2	2
Total		75	74	149

Interest in Acquiring Knowledge on Solid Waste Management.

The study also shed light on whether or not the respondents were interested in acquiring knowledge of solid waste management. The majority of (85.2%) of the learners reported being interested in acquiring knowledge on waste management, whereas only 14.8% did not wish to have information on the same. The study isolated and focused on the responses that were not interested in knowledge about waste management. The findings are thus presented in table 4

Table 6. Respondents who would not like to know about waste management.

No, would not like to know about waste management Cross tabulation

Count

		Gender	Total
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	Male	Female	
No, would not like to know about No waste management	14	14	28
Total	14	14	28

Adequate curriculum content on solid waste management

The study sought to establish student’s views as to whether the curriculum content teaches correct management of SWM in the school. According to the findings as presented below, the majority of the respondents (89.2%) indicated that correct waste management was taught in schools, while only 10.8% opined that the content was not adequate. This response of 10.8% perceived that the curriculum was not adequate, had more males concerned than female students in the school i.e., 14 responses against 5 responses, respectively (See table 7) Better still, learners should be exposed to innovations, technologies and best practices from around the world.

Table 7. Adequate curriculum content on SWM

No, correct waste management content not taught Cross tabulation

Count		Gender		Total
		Male	Female	
No, correct waste management taught	No	14	5	19
Total		14	5	19

The finding disagrees with views of the members of staff from Rusinga School who participated in the study. Most of them remarked that “the students are not taking the issue of waste management seriously as evident from the way they throw litter all over”. These respondents indicated that environmental lessons taught in the school focused on solid waste management should focus on the issue of how they can implement what they are learning, and that it is an area that needs further research.

Table 8. shows the findings on student’s views as to whether the curriculum content teaches correct management of SWM in the school. The findings are shown with responses from male and female

Table 8. Adequate curriculum content on SWM

		Gender		Total
		Male	Female	
No, correct waste	No	14	5	19

management taught			
Total	14	5	19

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Discussion of findings

The factors that enhance sustainable waste management include knowledge and skill on waste management, regular collection of garbage, recycling programmes, sorting and collection of garbage and making informed decisions on the goods we use that lead to waste formation. The study observes that knowledge and skill is an essential factor in sustainable waste management in schools. In general terms, increasing awareness creation as well as integrating waste management trainings in education important [14]. The level of knowledge and understanding of SWM is a major component of sustainability. This was revealed in a study by Jurczak, [6] which highlighted the fact that people who are knowledgeable about waste management would be willing to take action in order to manage it more often than those with less knowledge. It recommended that people need to be trained more about SWM specially to encourage pro-environmental attitudes.

From the findings, 69.6% of the respondents who were the majority agreed that they had been educated about the importance of waste management. The Rusinga school has included waste management in the curriculum the school has taken up the issue of waste management, whereby environmental issues are now an important aspect of curriculum development in line with career awareness [16] . Therefore, all schools should be encouraged to include this aspect in their school programs as a way of enhancing sustainable waste management programs. However, although more than half of the students in the school are aware of the curriculum on waste management, more has to be done to attain a 100% educational training on waste management to achieve efficacy and sustainability. This finding is in support of Lagbas [14] who states that “education and awareness in the area of waste and waste management is increasingly important from a global perspective of resource management”.

Likewise, the impact of knowledge cannot be underestimated as it was a variable that correlated to practice which according Talonghari and Jamais[19] it made people to t act. Theoretically, this can be supported through the cognitive, social learning theory by Albert Bandura. The theory suggests that behaviour is learned by imitation, observation, beliefs, and expectations. In this perspective, learners can use cognitive processes to learn waste management practices and processes.

Even though in this study, their preferred mode of feedback was social media, according to Diaz and Otoma [17], there is a need to adopt also other platforms like the combination of the education on environment. They recommend that it is good to educate young people about the value of the environmental and the need for its care. If this education is done in schools, the study concludes, the social impact of it will trickle down to the families. Therefore, the study supports the educational and skill development of learners in solid waste management as a sustainable approach to waste management.

Conclusion

Concerning what factors enhance sustainable waste management in schools, the research revealed that students learn by bringing together new knowledge learnt and what they prior knew as concepts hence constructing new meanings. This research found out that a student's knowledge in waste management programs is paramount and that such knowledge contributes to the success or the failure of sustainable waste management programs. The study focused on the source of information, preferred feedback methods the curriculum and student skills. It was evident that its good practice to have students aware of sustainable waste management programs. However, academic pressures have made the process slower in schools, and waste management is not a priority. Whereas knowledge is the awareness gained by learning about SWM, skill is the ability to effectively put the acquired knowledge into proper use. Development of continuous awareness about waste and its management is important for resource management hence should be done about recycling as lack of students' awareness was one of the major concerns. The leadership of schools ought to come up with adequate avenues of increasing students' knowledge and awareness.

Future Research

This study focused on the Factors that enhance sustainable waste management in Rusinga schools and the results were limited to the Rusinga schools only. This study, therefore recommends that similar studies be carried out on other organizations.

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