THESIS ABSTRACT

Master of Public Health
Environmental Health

Adventist University of Africa

School of Postgraduate Studies

TITLE: SOLID WASTE DISPOSAL PRACTICES OF PRIMARY SCHOOL CHILDREN IN KAJIADO NORTH SUB-COUNTY, KENYA

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Littering is rampant in Kenya and leads to numerous environmental health challenges by contributing to unsanitary conditions that proliferate diseases. Although the national and county governments are increasing investments in solid waste management systems and banning the generation of certain waste material such as single-use plastic bags, it is clear that the behavior of littering is a factor that needs to be addressed to significantly reduce littering.

Numerous studies have been done all over the world to profile litterers and study littering trends to identify the factors that contribute to littering behavior and suggest ways to change littering behavior. However, such studies have not been done in Kenya and especially in Kajiado North Sub-County, which is a settlement area for people who work in Nairobi due to its proximity to the capital city. Being so, it, therefore, experiences waste generation levels and trends akin to those of an urban area. This study examined the solid waste disposal practices of primary school

children to determine reasons for these, and identify potential solutions to curb littering behavior. This is reasonable because by addressing the behavior in children it may be that the cycle of littering can be broken from one generation to another since behavior change usually takes a long time to happen.

The target population consisted of primary school children aged 6-14 years in both private and public schools in Kajiado North Sub-county from which a total of 400 students were sampled. Questionnaires were administered and interviews carried out for the younger children. The data collected was coded, entered, and analyzed using PSPPIRE Data Editor version 3, and both descriptive and inferential analyses were conducted.

The findings of the self-reported littering frequency are that 46.73% of primary school children never litter, while 8.72% always litter and 25.23% litter sometimes. There is also no difference in littering frequency between children in public and private schools, meaning that socio-economic status does not affect littering frequency. Also, boys litter slightly more than girls.

An ordinal logistic regression analysis was carried out between littering frequency and environmental attitude of the children, which was considered a significant factor, and with location significance values of p=0.3, p=0.49, and p=0.453 for the three categories Action-Oriented, Concern, and Apathy, there is no significant relationship between environmental attitude and littering behavior. This pointed to the fact that other significant factors also affect littering behavior and not just environmental attitude, and so though most children have a positive attitude toward the environment, it is not a significant explanatory variable of their littering behavior.

Other factors examined were: understanding of what litter is, parental behavior, lack or presence of punitive measures, size and nature of litter, and place of

littering. Students believe that most people have a wrong environmental attitude which makes them litter, but they recommend that proper infrastructure, especially more littering bins, to be put in place to empower them to reduce littering. Therefore, even though environmental attitudes can be addressed in the long run, the infrastructure to enable proper disposal should be the first intervention that creates immediate impact.

The study recommends that county government, national government, schools, and companies enable primary school children to dispose of litter properly by availing the infrastructure for proper disposal, maintaining cleanliness, educate children on proper waste disposal, carry out environmental awareness campaigns and anti-littering campaigns to the general population, and not over-rely on punitive measures to change littering behavior.

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A thesis

presented in partial fulfillment

of the requirements for the degree

Master of Public Health

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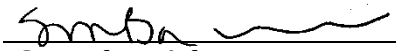

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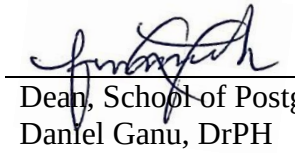

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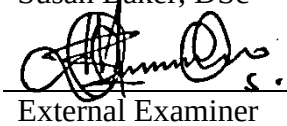

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This study is dedicated to my country, Kenya.

May the glory of the Lord forever shine on you!

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LIST OF ABBREVIATIONS

CBD	Central Business District
EMCA	Environmental Management & Co-Ordination Act
ENCAMS	Environmental Campaigns
KCIDP	Kajiado County Integrated Development Plan
KESAB	Keep South Australia Beautiful
KNBS	Kenya National Bureau of Statistics
NACOSTI	National Commission of Science, Technology, and Innovation
NEMA	National Environmental Management Authority
NSW	New South Wales
SWM	Solid Waste Management
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

Background of the Study

Changing habits is a difficult task even for the most disciplined and determined person. Some habits are more difficult than others to change. Overcoming drug addiction (*eating habits, smoking, lying, etc*) is far more difficult than reducing the hours spent watching television. The strength of a habit, good or bad, cannot be underestimated and people have adopted waste disposal habits that hinder most efforts to manage solid waste effectively. This is evident in that even when solid waste disposal facilities are provided, the visible impact is low, as witnessed in Kajiado County (County Government of Kajiado, 2013).

It may be that the presence or absence of waste disposal facilities is not the biggest or the only key factor contributing to the unacceptable levels of littering and waste dumping in Kajiado County. There may be attitudes towards waste management that need to be addressed and it may be best to address these in the younger generations before they pass them on to their children and fail to break this cycle. Even though "Residents of Nairobi have a positive attitude and negative behavior towards littering" (Wanjohi, 2016, p. 54).

Other studies have found that environmental attitudes play an important role in littering behavior and these are largely influenced by personal and social factors such as childhood experience and social norms (Gifford and Nilsson, 2014). It is important

to understand the causes, both social and structural, of waste disposal habits to channel efforts towards breaking the cycle of poor waste management.

The economic and social development of the Kajiado North Sub-County is overshadowed by the poor state of cleanliness, especially of the public spaces. This was especially noted when the Kajiado County Assembly declared waste management as a 'county disaster' to highlight the situation and draw in support to manage the disaster (Nation Media, 2015). Littering is rampant and it can be assumed that all the residents of the county are contributing to this unsanitary condition. It is, therefore, necessary to study the entire population as well as different population groups within the county to understand their waste disposal habits and develop interventions, based on the findings, to curb the poor waste management practices in the county.

Statement of the Problem

The growing presence and development of solid waste management facilities and infrastructure in Kajiado County should motivate better waste disposal behavior in the county residents. However, changing bad habits such as littering requires more intentional effort to alter the attitudes and beliefs towards littering and this can significantly increase the utilization rate of the existing, and developing, waste management infrastructure in the county. Efforts to change these attitudes in adults may be more challenging than in school-age children since habits tend to be formed during the early ages. The study explored the most important causes of both good and bad waste disposal practices of school-age children to promote good practices and to develop interventions to curb the bad habit.

Objectives of the Study

1. Profile the solid waste disposal practices of primary school children in Kajiado North Sub-County
2. Determine the reasons for the solid waste disposal practices by primary school children in Kajiado North Sub-County.
3. Examine the relationship between the environmental attitude of primary school children and their littering frequency
4. Identify sustainable approaches to ensure proper disposal of solid waste by primary school children in Kajiado North Sub-County.

Null Hypothesis

The study was set to test the following hypothesis:

H_{01}: There is no significant relationship between environmental attitude and the frequency of littering of the school children in Kajiado North Sub-County.

H_{02}: Alternative. The significant level for this study set at p=0.05.

Conceptual Framework

The study utilized the Theory of planned behavior to develop the conceptual framework to explain how the factors that influence behavior change interact and the model below places the theory of planned behavior in the context of this study. The different factors that have been studied over time can fall into these three factors: Attitude, Subjective Norm, and Perceived Behavioral Control, and these influence the intention to behave in a certain way.

One assumption here is that behavior cannot be explained by one factor in a linear relationship, even though some factors may have a stronger influence than others. The other assumption is that the three factors in the model cannot predict behavior and can only influence the intention to behave in a certain way, except for perceived behavioral control which is the empowering factor that leads to practical

steps towards a certain behavior e.g. availability of litter bins to reduce the distance to walk to access one whenever needed.

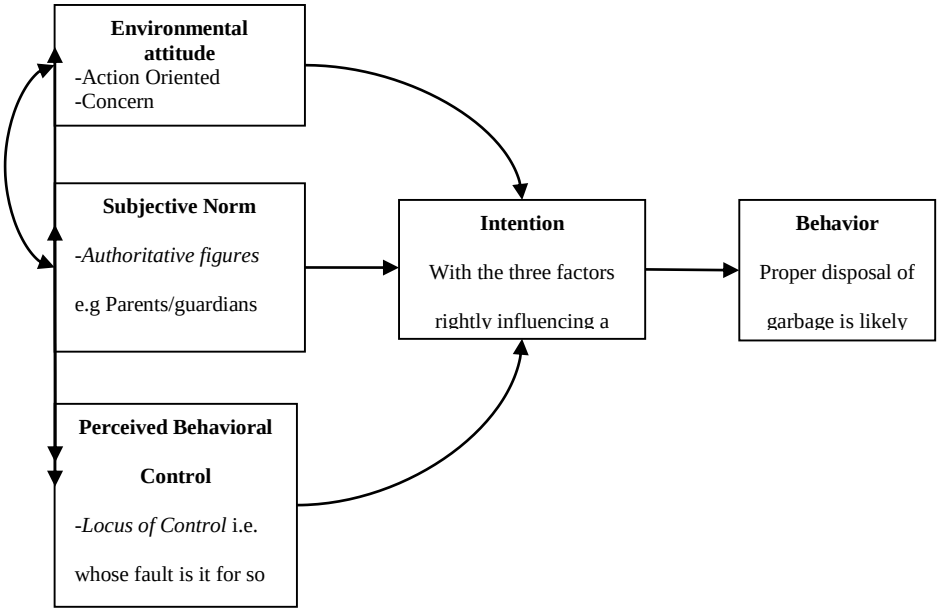

Figure 1. Conceptual Framework

This study will contextualize the factors as Attitude (Environmental Attitude); Subjective Norm (Behavior of authoritative figures and the norms of different spaces); and Perceived Behavioral Control (Participants' perception of who is responsible for litter and their suggestions of what can help them to stop littering).

Significance of the Study

This study will be helpful to the county government and especially the municipalities and local councils of the towns within the counties because it will assist them to develop more effective strategies to clean up and maintain the cleanliness of public places within the county. These municipalities have been trying to collect garbage and litter regularly, but maintaining cleanliness is much more difficult because behavior change strategies have not been developed. Punitive

measures have also been attempted but these are not cost-effective because they require a large and costly policing force and this makes it unsustainable. And aside from significant policy changes, such as the 2017 ban in Kenya of the manufacture and use of single-use plastic bags (NEMA, 2017), behavior change strategies over the long term may be a better strategy and certainly more cost-effective provided that the behavior change campaigns are not as costly as a policing force.

Scope and Limitation of the Study

The study was carried out in Kajiado North Sub-county which has a population of 191,565 as per the 2009 population census, and a population of school children aged 6-14 years of 32,139 (KNBS and SID, 2013). The study was restricted to public and private primary schools within the Kajiado North Sub County. This is because this sub-county contains both urban and rural settlements and is hardest hit by the effects of littering.

The anticipated limitations were:

1. Questionnaires required students to do a subjective allocation of the weight of different influences, e.g. what they believe influences their littering habits;
2. The study carried the risk of social desirability bias whereby the likelihood of the respondents indicating good waste disposal behavior was high as opposed to being as truthful as possible;
3. There was the challenge of the language to use to refer to litter in the questionnaire because most Kenyans refer to it in the Swahili term ‘takataka’ which can be translated to any of the three words ‘litter’, ‘garbage’, or ‘trash’. The most common translation is ‘garbage’ which in English means something different from litter, whereby litter is garbage or trash that has not been disposed of in the proper place; and,
4. About fifteen questionnaires were damaged before data entry, 4.5% of responses, all of which were from one private school. This affected the analysis of the response rate between public and private schools and the analysis of littering frequency between students in public and private schools to gauge whether socioeconomic status affects littering frequency. However, the difference does not affect other factors that were analyzed.

Operational Definition of Terms

Behavior: How a person behaves in response to a particular situation or stimulus.

Environmental Attitude: An enduring positive or negative feeling about some person, object, or issue in this case to the natural environment.

Habit: A regular or repeated behavior that often occurs subconsciously and is usually hard to give up.

Litter: To make a place untidy with rubbish or a large number of objects left lying about.

Perceived Behavior: People's perceptions of their ability to perform a given behavior and with intention can be used to predict behavior.

Primary School Age Children: Age group 6-14years in both private and public schools.

Subjective Norm: The belief that a significant other will approve and support a particular behavior which is determined by the social pressure from the significant other to behave in a certain manner.

CHAPTER 2

LITERATURE REVIEW

Littering is only an offense in major cities in Kenya such as Nairobi (Nairobi City County, 2017), whereby there is usually a policing force that can enforce the council laws. Otherwise, in the rest of the country, it is assumed that each individual will carry out their patriotic duty to keep the environment clean by disposing of solid waste in the appropriate places.

This is seen in the fact that the legal provision for the management of the environment in Kenya i.e. the Environmental Management Coordination Act (EMCA) only outlines regulations and penalties for solid waste handlers (e.g. transporters and operators of disposal sites), and does not outline penalties to individual offenders unless they are disposing of hazardous waste (GOK, 1999). Therefore, whereas waste dumping is an offense, littering is not adequately controlled and this likely contributes to the rampant manner in which littering is done. It is up to town councils to come up with anti-littering regulations but this does not regulate littering outside of the towns, especially along the highways.

There have been credible efforts to curb littering along main roads and highways and the most significant one was the requirement for public transport vehicles to provide a waste bin within the vehicle to prevent passengers from throwing the waste materials out of the window. This has unfortunately not succeeded in reducing littering and further proves that attitudes and behaviors play a much bigger role in littering than the provision of waste bins.

It is an interesting observation that developed countries are usually much cleaner than developing countries but that they also still grapple with the problem of littering even though they usually provide more waste bins, and the populace is more sensitized about proper waste disposal practices. This shows that the existence of the needed infrastructure for proper waste disposal does not halt littering behavior. This likely applies to all behavioral aspects of man.

There needs to be an extra motivation for change in behavior. Therefore, though currently it can be argued in Kenya that the largest cause of littering is the absence of the needed infrastructure to collect the waste, the lack of adequate infrastructure is not the only cause of the SWM problem. Poor environmental and sanitation attitudes and beliefs are significant contributors to the causes of littering behavior.

What is Littering?

The Webster dictionary defines the verb 'litter' as "to scatter (things) about". ENCAMS and Keep Britain Tidy have defined littering as 'Waste in the wrong place caused by human agency' (Brook Lyndhurst, 2013, p. 5).The ENCAMS definition is inclusive of the different ways that litter is left such as dropping it or folding it up and tucking it into small spaces such as cracks, carefully placing litter in specific places, or leaving litter somewhere for a while then abandoning it. The emphasis here is on the location of disposal. The ENCAMS definition, however, does not clearly outline what can be regarded as litter.

Reeve, Ramasubramanian, McNeill, and Coleman (2013) have a more elaborative definition of litter as "any abandoned material that can be held or carried in a person's hand, including such things as drink cans and paper and plastic bags" (Reeve et al., 2013, p. 1). This is an operational definition that includes organic and

inorganic material and the emphasis is on the size of the items. Large items such as abandoned furniture or other equipment can be excluded, even though they may still be unsightly and potentially hazardous. This study will simplify the definition of littering to that of making a place untidy with rubbish or a large number of objects left lying about. The common outcome of littering is therefore unsightliness and the potential of litter being harmful to the environment and to the health of humans.

Litter may not directly affect the health of a population, but it creates a conducive environment for pathogens and vectors of diseases that can affect human health. Litter often ends up in storm and sewage drains, causing blockages and damage to the drainage systems and results in flooding of both stormwater and sewage and this often leads to the contamination of clean water sources, causing health hazards such as waterborne diseases that often result in death, and overwhelming of health services since these diseases tend to spread fast within a population.

Litter also tends to hold stagnant water, even when the litter enters water bodies such as rivers, dams, and lakes, and this stagnant water becomes a breeding ground for pathogens and disease vectors such as mosquitoes. Organic litter can also attract pests such as rats that are also disease vectors. However, possibly the most destructive aspect of litter is its tendency to become a cue to litter, thereby strangling sanitation efforts in any given area.

Laws and Policies on Littering in Kenya

The 2017 ban on plastics in Kenya (NEMA, 2017) should contribute to reduced levels of litter. However, this may not cause a change in behavior because even though people have less access to plastic bags, it does not stop them from littering other items. Plastic bags are not a cue to litter. They are an unsightly and

hazardous type of waste material with numerous negative effects due to their non-biodegradable nature. One such negative effect is their ability to be breeding grounds for disease vectors such as mosquitoes. Littering behavior is driven by attitudes and beliefs and not necessarily by the type of material littered.

Awareness Levels of Littering

The level of awareness of how pervasive littering is can be measured by how subconscious the behavior is. In an experiment done in Australia that combined observational and interview methods of identifying littering behaviors, more than half of the respondents of the interviews stated that they had not littered in the last 24 hours and yet they had been observed littering five minutes earlier since that was the criteria used to select them for the interview (Beverage Industry Environment Council, 1997). This points to how unconscious littering can be. But not all litterers are unconscious of what they are doing. There are other numerous reasons given for littering and are such as:

1. The place is already littered (Lewis, Turton, and Sweetman, 2009), (Keep South Australia Beautiful (KESAB, 2011), (Shukor, Mohammed, Awang and Sani, 2012)
2. When litter is seen as someone else's responsibility (Lewis et al., 2009), (KESAB, 2011)
3. Unavailability/insufficiency of bins or the bins are too far away (KESAB, 2011; Straughan, Ganapathy, Goh and Hosein, 2011)
4. Laziness or habit (Lewis et al., 2009; KESAB, 2011; Straughan et al., 2011)
5. Lack of understanding of what can be considered as litter e.g. Can biodegradable items be classified as litter? (Lewis et al., 2009; Shukor et al., 2012; Straughan et al., 2011).

Littering by Age and Gender

The age of a person may affect their attitude towards different aspects of life. For example, as people grow older, they tend to become more conscious of their

health. Also, young people care more about their friendships and associations than older people do. These differences in concern arise from factors such as physiological changes and socio-economic influences. It is therefore worth considering what the effects of age and gender have on littering behavior.

When it comes to age, studies have found that littering behavior increases during the industrious years. For example, (Lewis et al., 2009) found that people under the age of 15 and over the age of 44 are less likely to litter than those in the ages between, but also that those between ages 15-34 are the most prolific litterer's. This does not indicate that children under the age of 15 do not litter, only that those above age 15 litter more. It is, however, difficult to separate age and gender in the findings of littering behavior because both these studies highlight young men as the biggest culprits.

KESAB (2011) found that young men under the age of 30 were the most persistent litterers. However, the difference in levels of littering between men and women was low and the most likely reason for why women litter less than men, as found by Lewis et al. (2009) was unfortunately that men are more prepared to admit to littering than women.

This was however not the case in a survey carried out in Singapore by Straughan et al. (2011) whereby women indicated that they littered less due to the fear of the social stigma attached to littering, and their desire to be role models for their children in environmental behavior. It was also found that younger people are more willing to admit to littering than older people. On the other hand, the reasons found why men litter more is largely due to a lack of attachment to their communities or open rebellion towards 'the system.' And people who do not have a strong sense of community were 10% more likely to litter (Reeve et al., 2013).

One other significant link between age and littering was that younger people tend to litter more when they are in groups and yet older people litter more when they are alone (Beverage Industry Environment Council, 1997). This raises the question of how social-cultural factors affect littering behavior and points to the likelihood that littering interventions should be designed to target specific groups of people and not be a blanket type of intervention that targets all people.

Looking deeper into the finding that most litterers are from the age of 15 years and that they litter more when in groups, peer pressure seems to be a motivational factor for littering. The question arises of what motivated littering behavior before age 15, and aside from factors such as lack of infrastructure, are there other motivating factors such as parental modeling behavior or a general lack of concern for the environment in their communities?

Environmental Attitudes

There is a general assumption by environmentalists that people know that littering is wrong but they choose to do the wrong thing anyway. This assumption needs to be challenged especially in the case of children who are being taught social norms. It is important to ascertain whether they know that littering is wrong or whether they believe that littering harms the environment and on people's health. The way a person feels about an object or an issue affects their response to it. Positive feelings can lead to greater acceptance and negative feelings can lead to greater rejection of the object or issue. How a person feels towards littering or the environment should therefore not be discounted and in fact, the subject of littering was initially studied by psychologists who tried to make sense of this anti-social behavior. Let us first get a better understanding of attitudes, beliefs, and behavior.

What are Attitudes and Beliefs?

A formative definition of attitude was given by Newhouse (1991) as "an enduring positive or negative feeling about some person, object, or issue" (Newhouse, 1991, p. 26). This definition links attitude to feelings or emotions and is the preferred definition for this study. To gain a better understanding of attitude, we can compare the definition of attitude to that of a belief whereby Petty and Cacioppo (1981), as cited by Newhouse (1991) define beliefs as "the information that a person has about a person, object, or issue that may be factual or based on personal opinion" (Newhouse, 1991, p. 26).

Beliefs are therefore based on information. For example, an officer of the government can believe that a selected intervention to curb littering is the best way to address the issue, but their unconcerned attitude towards littering, as opposed to other important matters such as tax collection, will not motivate them to take effective action.

Environmental Attitudes

The way people feel towards the environment is likely to affect their behavior within that environment. The various environmental attitudes can generally be described as follows (Le Hebel, Montpied, and Fontanieu, 2014): Some are overly sensitive to matters of the environment and do all they can to ensure that ecosystems remain untainted by human activity. Some believe that the earth and all its resources exist for the exploitation of man for his benefits and such people tend to overexploit the environment to its detriment and irreversible destruction such as the extinction of animal and plant species. There is a third group of people who believe that the earth has sufficient resources to support all life and humans just need to make use of the resources while maintaining balance in the ecosystem to avoid destruction. And

finally, there is a group of people who really don't think much or care much about the environment and see things being just fine the way they are. This final group tends to believe that the environment has a way of sustaining and renewing itself without the help of humans. It should be possible to predict how people with these environmental attitudes will respond to the issue of littering. Even though a habit of littering may have been formed in people with all these attitudes, each attitude may result in a different result towards an anti-littering intervention.

However, the question of how these attitudes were acquired remains. Whereas most researchers hold that a person's environmental attitude affects their environmental behavior, some have countered this conclusion. Eilam and Trop (2014) found that the factors that influence adults' environmental attitudes are different from those that influence environmental behavior. This led to the conclusion that efforts to change environmental behavior do not have to attempt to change attitudes, and this is because attitudes take longer to form and also to change whereas behavior can be modified quickly by many factors such as policy enforcement, environmental design, and other such factors. Although this is an interesting finding, it should not dissuade attempts to change attitudes because people and communities that have positive environmental attitudes are likely much easier to motivate to acquire positive environmental behavior and so the cause to change attitudes is still worthwhile.

Looking again into the aspect of environmental attitudes, some theories and models have been developed to map them out such as the Theory of Ecological Attitudes (Wiseman and Bogner, 2003 as cited in Le Hebel et al., 2014). In this model, attitudes such as Apathy, Concern, and Action-Oriented are drawn out and most people can be placed in one of these. Each attitude is measured against the behavior, in this case being the frequency of littering, with Apathy having the highest

frequency and Action Oriented attitude having the least. Basically, the more a person is concerned with the state of the environment, the more likely they are not to litter. However, this model only considers one factor that affects behavior. In fact, according to Kollmuss and Agyeman (2002), Early US Linear Models also made this mistake of considering only one factor which was environmental knowledge. The Models suggested that environmental knowledge determined environmental attitudes that affected environmental behavior.

This led to most interventions that sought to change environmental attitudes to focus on educating the public on environmental matters while assuming that knowledge will increase concern and affect behavior. But this approach was not effective because many people know what is right but are either unable to or choose not to change their behavior, suggesting that factors affecting behavior change are more complex than linear models suggest. The complexity of factors that influence behavior has been demonstrated by decades of research on psychology whereby behavior still cannot be predicted, though we all still benefit by understanding the various factors.

Personal and Social Factors

Gifford and Nilsson (2014) have also attempted to categorize the factors that influence pro-environmental concern and behavior through a review of numerous studies on environmental behavior. The categories that they came up with are two: Personal Factors and Social Factors and they are ranked in Table 1 below. These are factors that have been identified through different studies as affecting the environmental behavior of individuals and they are ranked according to the frequency by which they are cited in studies.

Table 1. Personal and Social Factors affecting Pro-Environmental Behavior

Personal Factors	Social Factors
1. Childhood experiences	1. Religion
2. Knowledge & Education	2. Urban vs. Rural Residence
3. Personality & Self-Construal	3. Norms (Personal & Subjective norms)
4. Sense of Control	4. Social Class
5. Values, Political Views, and World Views	5. Proximity to problem sites
6. Goals	6. Cultural & Ethnic Variations
7. Felt Responsibility (guilt)	7. None of the above (Honeybees)
8. Cognitive Biases	
9. Place attachment (natural & civic place attachment)	
Age	
Gender	
Chosen Activities	

The importance of this review is the appearance of childhood experiences as a common key factor in shaping pro-environmental behavior. This suggests that pro-environmental attitudes are shaped greatly by childhood experiences such as outdoor activities, how much they talk about the environment in their homes, and if they watch nature shows frequently. Childhood experiences are followed by knowledge and education which is a primary activity of school-going children.

These are, however, primarily personal factors. So what is the contribution of social factors on children's environmental attitudes? Is it possible that they may be more affected by social factors than personal factors since they are still under the authority of parents, teachers, and other influencers? For example, if children live in a littered and polluted environment, does this affect their environmental attitude despite the pro-environmental knowledge and education given to them? These are pertinent questions that need to be investigated to understand what shapes the environmental attitudes of school-aged children.

Effective Litter Reduction Interventions and Approaches

Having numerous studies done on effective litter prevention approaches, Shukor et al. (2012) reviewed 50 studies on littering behavior to find the most recommended approaches for littering behavior modification. The most proposed approach, having 29 endorsements, is that of manipulating environmental design to make proper garbage disposal possible. The specific interventions include: making garbage cans more available by both increasing their number and their proximity to littering hot spots, and finally making the garbage cans more attractive.

The second approach was placing prompts as cues to dispose of garbage properly. This was followed by cleaning up spaces that are already littered because litter attracts more litter. The fourth approach endorsed was education campaigns to create awareness of littering behavior and impacts; and the fifth approach, with the least number of endorsements (two), was increasing environmental participation of the population or communities.

Lewis et al. (2009) had found similar interventions in a study on littering behavior in the United Kingdom. However, the ranking was slightly different with educational campaigns on littering being ranked higher than environmental design. They concluded that successful anti-littering efforts depended on education, enforcement, and cleaning up prior litter, with the environmental design being a potential intervention. KESAB (2011) proposed a different approach to interventions following a study done in South Australia. Even though 52% of the respondents in their study stated that their reason for littering was that there were no available bins, followed by other reasons such as laziness and that the bins were too far away, the recommended interventions were that awareness should be raised about what counts

as litter and also that anti-littering campaigns and designs should target specific times and places where littering is highest.

KESAB's recommendations are not surprising considering that these are developed countries that already have the necessary infrastructure in place for waste disposal and so they are only grappling with the challenge of getting people to make more use of them. The challenge in developing countries starts with the non-existence or insufficient presence of solid waste disposal infrastructures such as waste bins, collection systems, and disposal sites. People are likely aware that littering is wrong but feel helpless in trying to avoid it.

By observing these developed countries still dealing with high littering levels, it is, therefore, necessary to consider that even though the first stage of intervention against poor waste disposal practices in Kajiado County and Kenya as a whole is the creation of a functional Solid Waste Management System that includes disposal sites and collection systems, the utilization of these systems will need to be planned for as well, and thus the need to understand behavioral factors that contribute to littering. As Ojedokun and Balogun (2013) aptly concluded 'An integrated approach to litter prevention that combines cognitive, social, and technical solutions is recommended as the most effective tool of improving engagement in anti-littering actions' (Ojedokun and Balogun, 2013, p. 36).

Theoretical Framework

This study utilized the Theory of Planned Behavior (Ajzen, 1991) that considers attitude as a key factor that needs to be addressed to change behavior, while also recognizing that there are other factors to consider. According to the Theory of Planned Behavior, several factors motivate a person to behave in a certain way and all these factors need to be considered when creating a behavior change intervention. The

factors are Attitude, Subjective Norms, and Perceived Behavioral Control. But even these only affect the intention to behave in a certain way but do not necessarily guarantee a change in behavior except for perceived behavioral control. Bamberg and Möser (2007), as cited in Stern (2011), stated that "Pro-environmental behavioral intentions were strongly and independently predicted by perceived behavioral control, attitude, and personal moral norms" (Stern, 2011, p. 5).

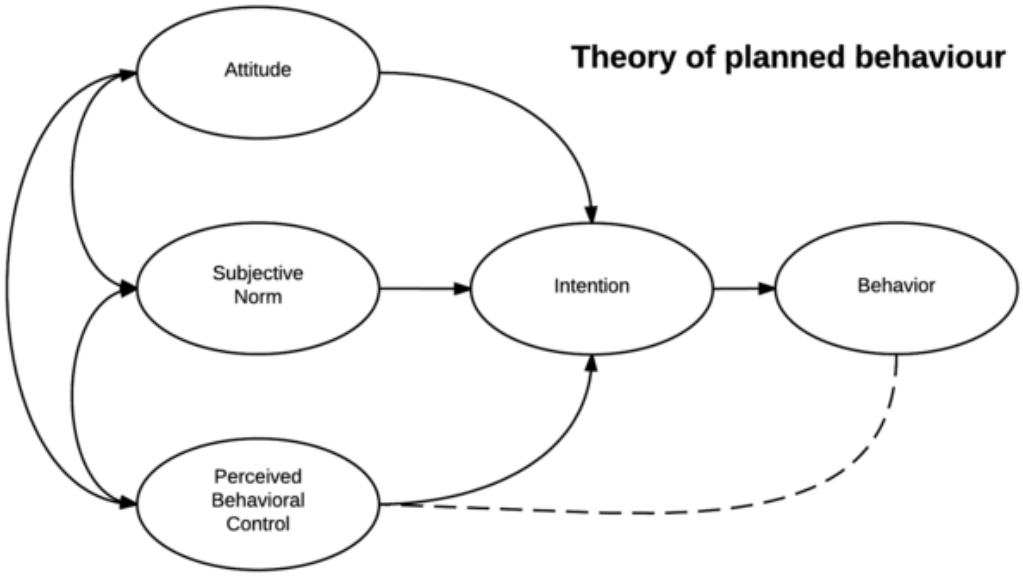

Figure 2. Theory of Planned Behavior
Source: Orzanna (2015)

Cialdini, Kallgren, and Reno (1991) found that there are social norms that influence people's behavior and that these norms are strong predictors of people's littering behavior. While focusing on anti-littering interventions, they proposed that they must be designed in a manner that will consider the social norms which are: i) What other people are doing; ii) What other people approve of, and iii) What other people disapprove of. Therefore, subjective norms are significant predictors of behavior. The result is that the more people act in more positive environmental ways,

the more other people will perceive the positive behavior as being the norm, and this applies vice versa. One example is if children observe the adults around them, parents, teachers, and strangers all littering, they may perceive it as being a social norm. Another example is seen in that a media campaign may be more successful by showing people images of people disposing of litter properly, instead of showing images of people littering.

In a survey across 30 European countries, Torgler, Frey, and Wilson (2009) demonstrated this concept of subjective norms by concluding that "A critical mass of cooperative individuals is required to induce a positive dynamic process of conditional cooperation. On the other hand, a society, which has many non-compliant individuals, will exhibit weaker social norms" (Torgler et al., 2009, p. 27). The Broken Windows Theory (McKee, 2013) also supports the subjective norm factor. The theory argues that when people perceive disorder in their society or environment, such as broken windows in a neighborhood, they tend to believe that disorder is a norm and engage in disorderly acts. Therefore, interventions should target creating a semblance of order, such as cleaning up prior litter and beautification of the environment to motivate pro-environmental behavior.

In the case of perceived behavioral control, two traits determine it and they are Locus of Control and Self-Efficacy (Cialdini et al., 1991). Locus of control refers to an individual's perception that whatever is happening is determined by them or by outside forces. For example, do Kenyans blame the general un-cleanliness of the country on themselves as individuals or on the government? If they feel that their actions (or inaction) have an impact on their environment, then they have a stronger locus of control. But if they feel that it's the government's fault and responsibility to take care of the environment, then they will be less motivated to take any corrective

actions. The second trait is that of self-efficacy, which is the belief that a person has in them the capacity to take a certain action. Therefore, a person may have a strong locus of control by accepting that they can make an impact on the environment by not littering, but they may lack self-efficacy by believing that they cannot afford the one hour a day required to deliver items to the recycling center. The model however suggests that perceived behavioral control may cause a change in behavior much more quickly than attitude and subjective norms, and I believe it is because perceived behavioral control reveals the resourcefulness that a person has to enable change in behavior.

CHAPTER 3

RESEARCH METHODOLOGY

Research Design

The study used a descriptive and inferential cross-sectional design to capture the current behavior and beliefs of primary school students. The study was a cross-sectional survey because it was done at a specific point in time without considering past trends in littering attitudes and behaviors. It was descriptive because analysis used basic statistical tools such as measures of central tendencies and inferential by using the Ordinal Logistic Regression statistical method of analysis. The study collected data to document current behavior and to identify correlative behavior between the pupil's environmental attitudes and their rates of littering.

Population and Sampling Procedure

The study area was Kajiado North Sub-County which is one of five sub-counties in Kajiado County. It is the smallest sub-county in terms of physical size (Appendix C) but it has the highest population, with 191,565 people, as compared to the rest. It is further divided into five wards, namely: Olkeri, Nkaimurunya, Ongata Rongai, Oloolua, and Ngong. The population of children aged 0-14 years is 61,758 while that of children aged 0-5 years is 29,619. Therefore, the population of primary school children aged 6-14 years was estimated at 32,139. (KNBS and SID, 2013).

The average school size in Kajiado County schools, inclusive of both public and private schools, is 279. However, public schools have a significantly larger size of 311 as compared to private schools with 217 pupils per school. The average primary

school classroom, again considering both public and private schools, has 28 pupils. The county has a total of 455 day schools, four boardings, and 84 mixed day and boarding primary schools. Kajiado county has a total of 567 primary schools, 372 public and 196 private (2:1 ratio), distributed across five sub-counties. Kajiado North Sub-County, therefore, has an average of 113 primary schools with a gross ratio of two public schools to one private school (UNICEF, 2014).

It is important to note that Kajiado North-Sub County is a peri-urban area that is home to a growing number of people who work in the CBD of Nairobi but who wish to live away from the city. It is notable for relatively lower rent as compared to housing closer to the CBD and it provides a quieter environment with countryside scenery. However, its population density has dramatically increased over the last few years as a result of these attractive features and the negative impacts of urbanization have come along with the growth, one of which is the challenges of solid waste management (SWM).

Target Population

The target population was pupils aged 6-14years in primary schools in Kajiado North Sub-County who are approximately 32,000 in number (UNICEF, 2014). This age group is usually in grades 1-8 and can read and write. The study was limited to pupils in day schools. This is because the school environment usually promotes great discipline in all areas including waste management, and this study sought to collect data on their waste management behaviors in public spaces. Therefore, boarding students, who have been in such a disciplined and confined environment for long periods, may not have been able to answer accurately about their behavior in public spaces outside of the school compound. The study also collected information about

the behavior of the pupil's parents and would generate more data from pupils who engage regularly with their parents.

Sample Size

Fisher's formula was used to calculate the sample size since the population was greater than 10,000.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n is the sample size

N is the population size

e is the level of precision

The sample size was therefore 386 pupils and this was rounded off to 400 students.

Sampling Procedure

Stratified and simple random sampling was used. Stratification was such that the sample population was distributed proportionally across the five sub-counties. The sample size indicated that each of the five wards should have an average of 80 samples and eight grade levels were surveyed. The ratio of public schools to private schools is 2:1, but only a representative of one private school and one public school in each ward was required and therefore a total of 10 primary schools participated in the survey. Each school, therefore, had 40 participants with five students per class being selected.

The study used simple random sampling. Because the age group that was being studied comprised of pupils from class 1-8, five students were selected from each class. This selection was done by use of a raffle whereby, for example, if a class

had 20 students, the researcher prepared small pieces of paper with only five of them having the numbers 1-5 and the rest of the 15 pieces of paper left blank. The students blind-picked the pieces of paper and those with the numbered pieces were selected to answer the questionnaire.

Sampling Method

The lists of schools in each ward, both private and public, were obtained from the county education office. Random sampling was then be applied to select one private school and one public school in each ward that participated in the survey.

Instrument Validity and Reliability

The survey used questionnaires with mostly closed-end questions. Most questions were either category questions, scale/rating questions (using the Likert scale), and numerical rating scale questions, to measure the pupil's attitudes and beliefs towards litter. The questionnaire was tested through a pilot survey in one private school two weeks before the actual survey to measure reliability and this yielded a Cronbach's Alpha of 0.88 indicating a high level of consistency of the tool.

The private school that ran the pilot test was not selected again for the main survey. A key aspect that was considered in the pilot test was whether or not the pupils understood the questions. It emerged that students from class 1-3 had significant reading and writing challenges that would compromise the quality of the data collected and, as a result, these would be interviewed by the researcher. Validity was ascertained through the supervisory support provided for this academic study.

Type of Data Collected

Quantitative nominal and ordinal data were collected. Nominal data largely consisted of bio-demographic data and yes or no answer questions, while the ordinal

data consisted of the quantitative values that the respondents placed on the beliefs and attitude questions. Some qualitative questions were used to identify reasons for behavior. These responses were coded and categorized to enable descriptive statistical methods to be applied. For inferential analysis, the independent variable data collected was the environmental attitude of the children in three categories (Apathy, Concern, and Action-Oriented), and the dependent variable was their self-reported frequency of littering using a Likert Scale

Data Collection Procedure

Several schools were selected that had the desired number of pupils within the 6-14 years age group. Having the desired number was important since many schools that start-up begin with lower grade classes, mostly up to Grade 3, and slowly increase grade levels annually till they reach the 8^{th} grade. Such schools could not participate in the study. The school administration offices were approached and requested to allow the students to fill out the questionnaires. The approach was both by use of a formal cover letter and a face-to-face meeting with the researcher.

The National Commission for Science, Technology, and Innovation (NACOSTI) research license and County Education Department and County Commissioners license to conduct research were also presented to each school administration (see Appendix E). Once granted permission, the researcher, with the help of a class teacher, carried out the random sampling per class to select five students per grade, and then gave these students a parental consent form that was to be returned the next day. Only the students who brought back the consent forms were given the questionnaire to fill out. However, students from classes 1-3 answered the questions through a face to face interview with the researcher to elaborate on the

questions where necessary based on the reading and writing challenges observed during the pilot testing of the tool.

Method of Data Analysis

Descriptive data analysis was carried out together with inferential analysis, specifically Ordinal Logistic Regression analysis, to analyze the significance of the relationship between the environmental attitude of the children and the pupil's self-reported rates of littering/ littering behavior. The data was analyzed using PSPPIRE Data Editor version 3.

Ethical Considerations

To protect the identity of the students, parents, and the schools, pupils were requested not to indicate their name anywhere on the questionnaires. The researcher used codes to differentiate the questionnaires from public and private schools. Also, children were not requested to give personal information regarding their parents or guardians. They were only asked to describe their parent's/guardian's littering behavior. Parental consent for the children to participate in the survey was also sought and only those who returned a signed consent form from the parent/guardian were given the questionnaire.

A research permit was also sought from the National Commission for Science, Technology, and Innovation (NACOSTI) verifying that the ethical requirements set out in the research proposal were sound and acceptable. Using the NACOSTI research permit (Appendix D), and following directives from the Ministry of Education, authorization was sought to carry-out research within Kajiado County and within primary schools. Authorizations were granted by the County Director of Education, Kajiado County (Appendix E); the Sub-County Director of Education, Kajiado North

Sub-County (Appendix E); Kajiado County Commissioner (Appendix E); and finally, the Deputy County Commissioner Kajiado North Sub-County (Appendix E).

CHAPTER 4

RESULTS AND DISCUSSION

Response Rate

The sample size to inform the research was 386, and this was rounded off to 400 respondents, i.e. 40 students per school in 10 schools. However, the final number of respondents was 321 representing an 80.25% response rate. The results may, therefore, have limited generalizability. The primary cause of the response deficit was the requirement for parents to give consent to the sampled students before administering the questionnaire.

The sampled students who did not return a parental consent form were not given a questionnaire to fill out, even though the most common reason that students gave for not returning the consent form was that they had forgotten them at home. However, some students indicated that their parents refused to allow them to take part in the study so that they can focus on their studies. The data was collected in the final term of the year just before national examination and end of grade level examinations began. The second cause was physical damage to approximately 10-15 completed questionnaires from one private school while in storage before data entry. The researcher could not re-administer the questionnaire due to resource constraints.

Demographic Characteristics of Respondents

The demographic characteristics of the respondents were analyzed according to their gender, age, and socio-economic status.

Gender

The gender representation of the sample population has 4% more girls participating in the study than boys. The respondents composed of 151 males (47.04%), and 166 females (51.71%) of the population, with 4 respondents not indicating their gender. During the pilot test of the questionnaire, the question was structured as Gender (Male or Female), but it was noted that many students did not understand the terms ‘gender,’ ‘male’ and ‘female.’ The question was therefore revised to state ‘boy’ or ‘girl.’

Age Distribution

The study targeted primary school students from class 1-8 in the Kenyan System of Education 844, even though at the time of the study, a new curriculum was being rolled out and students from class 1-3 had been initiated into a new system called Competency-Based Curriculum (CBC). The average age of a class one student is 7 years and that of a class 8 pupils is 14 years. However, since there is no minimum age requirement for entrance into a grade or a maximum age limit for a certain grade, it was anticipated that the age range would be wide as indicated in Table 2 below.

Table 2. Frequency Distribution of Age Categories

Value	Frequency	Percent
5-10	165	51.40
11-16	151	47.04
Missing	5	1.56
	321	100.00

The youngest respondent was 5 years old and the oldest respondents were 16 years old. Five students did not indicate their ages. The age-class range on average is two age-groups 5-10 (lower primary) and 11-16 (upper primary). Note that data was

collected from students per grade from grade one to eight and the explanation for students aged below age 6 and above age 14 is that some students possibly start school earlier than the average years and some delay starting school or decide to repeat a grade, thus resulting in older pupils in grades 7 and 8.

Socio-economic Status

The study sought an equal representation of public and private schools, even though data from the Ministry of Education shows that the ratio of public to private schools is 2:1. The division between public and private schools was to inform differences in littering behavior between students from different socio-economic backgrounds. Public schools offer free primary education and are attended mostly by students from low-income households, while private schools have students mostly from higher-income households.

There are a relatively equal representation of respondents from public (49.84%) and private (50.16%) schools as in Table 4 below, although the 10-15 questionnaires that were damaged were all from a private school. The results indicate 161 respondents from private schools and 160 from public schools. Each of the five wards in Kajiado-North Sub-County was represented by one public and one private school.

Results and Discussions Based on the Research Questions

The first objective of this study was to profile the solid waste disposal practices among primary school children in Kajiado North Sub-County. This was done by collecting data on the littering behavior of students against various aspects of the students such as their age, gender, socio-economic backgrounds, among other profiles, and these are addressed in this first part of the analysis. The second objective

was to determine the reasons for the solid waste disposal practices by primary school children In Kajiado North Sub-County. This was done by exploring potential factors that may influence the littering frequency of students such as type and size of litter, environmental attitudes, the influence of authoritative figures, and attitude towards public and private spaces among other factors. These are addressed in the second part of this chapter.

The third objective of this study was to identify sustainable approaches to ensure proper disposal of solid waste by primary school children in Kajiado North Sub-County. This was done by collecting the opinions and suggestions of students of what can help them to stop littering. This is covered in the third part of this chapter. The data was analyzed using PSPPIRE Data Editor version 3.

Objective 1: Profile the Solid Waste Disposal Practices among Primary School Children in Kajiado North Sub-County

Gender. Having found that males under the age of 30 litter more than females (KESAB, 2011), a cross-tabulation between self-reported littering behavior and gender in Table 3 below indicates that boys at 4.98%(16) have a higher self-reported littering rate than girls at 3.74%(12) of the total of both genders who indicated that they always throw litter on the ground while walking. Also, for those of both genders who indicated that they never throw litter on the ground while walking, 25.23% (81) were girls while 21.18% (68) were boys, which may either indicate that girls litter less, or that boys are more willing to admit to littering than girls.

Table 3. Cross-Tabulation of Gender and Frequency of Littering

Gender	Throw garbage/takataka on the ground or roadside while walking?						Total
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	
Male	16.00	5.00	36.00	22.00	68.00	4.00	151.00
	4.98%	1.56%	11.21%	6.85%	21.18%	1.25%	47.04%
Female	12.00	7.00	43.00	18.00	81.00	5.00	166.00
	3.74%	2.18%	13.40%	5.61%	25.23%	1.56%	51.71%
Not Identified	.00	.00	2.00	1.00	1.00	.00	4.00
	.00%	.00%	.62%	.31%	.31%	.00%	1.25%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100.00%

Socio-economic status. The study sought an equal representation of public and private schools, even though data from the Ministry of Education shows that the ratio of public to private schools is 2:1. The division between public and private schools was to inform differences in littering behavior between students from different socio-economic backgrounds. Public schools offer free primary education and are attended mostly by students from low-income households, while private schools have students mostly from higher-income households. The results are shown in Table 4.

Table 4. Cross-Tabulation between Type of School and Frequency of Littering

Type of school(Public/Private)	Throw garbage/takataka on the ground or roadside while walking?						Total
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	
Public	9.00	4.00	51.00	19.00	71.00	6.00	160.00
	2.80%	1.25%	15.89%	5.92%	22.12%	1.87%	49.84%
Private	19.00	8.00	30.00	22.00	79.00	3.00	161.00
	5.92%	2.49%	9.35%	6.85%	24.61%	.93%	50.16%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100.00%

There are a relatively equal representation of respondents from the public (49.84%) and private (50.16%) schools as in Table 4 above, although the 10-15 questionnaires that were damaged were all from a private school. The results indicate 161 respondents from private schools and 160 from public schools. Each of the five wards in Kajiado-North Sub-County was represented by one public and one private school.

A cross-tabulation of the type of school and the self-reported littering behavior rates was done to indicate whether socioeconomic status is a significant factor that contributes to the littering behavior of the students. The results in Table 4 above show that out of the 28 students that indicated that they always litter, 19 were from private schools and only nine from public schools. Also, out of the 81 students who indicated that they sometimes litter, 51 were from public schools and 30 from private. Finally, out of the 140 students who indicated that they never litter, 79 were from private schools and 71 from public schools. There does not seem to be a distinction between the littering behavior of students from lower or higher socio-economic backgrounds.

Availability and utilization of waste disposal facilities. The students were asked if they had a dustbin at home and the response was that 95.64% (307) said yes, 3.43% (11) said no, while one pupil said they were not sure. Two students did not answer this question (Table 5).

Table 5. Availability and Utilization of a Dustbin at Home

Value Label	Frequency	Percent
Availability of a dustbin at home		
Yes	307	95.64%
No	11	3.43%
Not sure	1	.31%
Missing	2	.62%
Total	321	
Utilization of the dustbin at home		
5 (Always)	172	53.58%
4 (Often)	42	13.08%
3 (Sometimes)	63	19.63%
2 (Seldom)	15	4.67%
1 (Never)	23	7.17%
Missing	6	1.87%
Total	321	

Out of the 11 students who said they did not have a dustbin at home, eight were from public schools and three from private schools and the students who indicated was not sure was also from a public school as shown in the table below. With the majority indicating that they have dustbins at home, regardless of the socio-economic backgrounds, the next step was to look into the utilization of the dustbins.

Most students demonstrated that they understand what waste disposal facilities are, but upon examining their utilization of these facilities, it emerges that there are factors that hinder the proper use of these facilities. When asked how often they use the dustbin at home using a Likert scale to respond, only about half of the students (53.58%) indicated that they always use the facility, while 7.17% (23 students) indicated that they never use the dustbin at home (Table 5). However, at least 86.29% of students indicate that they use the dustbin sometimes (3 on the Likert scale) to always (5 on the Likert scale).

It is important to indicate that the precision of these results is questionable, considering that this varied distribution of utilization of the dustbin at home could be

attributed to a limited understanding of the Likert scale since most students were participating in such a study for the first time in their lives. This is evidenced by the cross-tabulation between having a dustbin at home and utilizing whereby 7 students who had indicated that they did not have a dustbin at home, also indicated that they periodically utilized the dustbin at home.

The correlation between having a dustbin at home and utilizing that dustbin, in Table 6 below, indicates a Pearson correlation of 0.57 which is closer to a positive +1 and this indicates that there is a strong positive relationship between having a dustbin and utilizing it which may mean that having a dustbin at home can prompt proper garbage disposal and reduce littering at home.

Table 6. Correlation of Dustbin at Home and Frequency of Utilization of the Dustbin

		Do you have a dustbin at home?	6.1-Throw garbage/takataka in the dustbin in your home?
Do you have a dustbin at home?	Pearson correlation Sig. (2-tailed)N	1.00 321	.57 .000 321
Throw garbage/takataka in the dustbin in your home?	Pearson correlation Sig.(2-tailed)N	.57 .000 321	1.00 321

[*] *Correlation is significant at the 0.05 level (2-tailed)*
[**] *Correlation is significant at the 0.01 level (2-tailed)*

Frequency of littering. The study utilized a self-reporting method of measuring the frequency of littering. The students were asked to gauge littering behavior using a Likert scale. When asked about how frequently they litter, Table 7 below shows that 46.73% (150 students) indicated that they never litter (throw garbage on the ground or roadside while walking), while 8.72% (28 students indicated that they always do. Those who indicated sometimes are 25.23% (81 students).

Overall, 62.31% of the students report that they never, seldom, or only sometimes throw litter on the ground while walking.

Table 7. Self-Reported Frequency of Littering

Value Label	Frequency	Percent
5 (Always)	28	8.72
4 (Often)	12	3.74
3 (Sometimes)	81	25.23
2 (Seldom)	41	12.77
1 (Never)	150	46.73
Missing	9	2.80
Total	321	100.0

Age and the frequency of littering. When this self-reporting littering frequency is cross-tabulated with the two age-groups 5-10 (lower primary) and 11-16 (upper primary), in Table 8, cumulatively, of those who indicate that they always, often, sometimes, or seldom litter, 94 are in upper primary and 56 in lower primary, which indicates that older students litter more than younger students.

Table 8. Cross-tabulation of Age and Frequency of Littering

Age	Throw garbage/takataka on the ground or roadside while walking?						Total	Percent
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing		
5-10	11.00	6.00	27.00	12.00	93.00	6.00	165.00	51.40%
11-16	7.00	5.00	53.00	29.00	54.00	3.00	151.00	47.04%
0	.00	1.00	1.00	.00	3.00	.00	5.00	1.56%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00	100.00%

To gauge whether students understand what littering is and to countercheck their self-reported frequency of littering, several other similar questions were posed that should result in similar answers if the respondents understood the questions properly. One of these questions was ‘James has just finished drinking a packet of

yogurt in the matatu (public transport) on his way to town with his father. If you were James, what would you do with the packet?' The findings were as follows (Table 9):

Table 9. Cross-tabulation of the James Yogurt Decision and Frequency of Littering

James Yogurt Decision	Throw garbage/takataka on the ground or roadside while walking?						
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	Total
Open the window and throw it out	5.00	1.00	4.00	2.00	5.00	1.00	18.00
	1.56%	.31%	1.25%	.62%	1.56%	.31%	5.61%
Throw it down on the matatu floor	1.00	2.00	.00	.00	.00	.00	3.00
	.31%	.62%	.00%	.00%	.00%	.00%	.93%
Hold on to it until you find a dustbin	22.00	9.00	76.00	38.00	142.00	6.00	293.00
	6.85%	2.80%	23.68%	11.84%	44.24%	1.87%	91.28%
Other	.00	.00	.00	1.00	2.00	.00	3.00
	.00%	.00%	.00%	.31%	.62%	.00%	.93%
Missing	.00	.00	1.00	.00	1.00	2.00	4.00
	.00%	.00%	.31%	.00%	.31%	.62%	1.25%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100%

Of the 321 respondents, 91.28% (293) stated that they would hold on to it until they found a dustbin. Another 0.93% (3) stated that they would throw it on the matatu floor (public transport floor), and 5.61% (18) indicated that they would throw it out the window. A cross-tabulation of this question with the frequency of littering yielded the following results:

Out of the 293 students who stated that they would hold on the waste until they found a dustbin, 7.5% (22) had also allocated themselves the highest littering rate on the Likert scale. Whereas, the 18 students who indicated that they would throw the waste out the window, had a relatively equal distribution of self-reported littering frequency across the Likert scale. However, all who stated that they would throw it on the matatu floor all had high self-reported littering rates of 4 and 5 on the Likert scale.

Objective 2: Reasons for the Solid Waste Disposal Practices of Primary School Children In Kajiado North Sub-County

The second objective sought to analyze factors that may affect the solid waste disposal practices of children to gauge those that affect them the most, based on factors identified in previous studies (Cialdini et al., 1991; Gifford and Nilsson, 2014) and particularly those that fall under Norms (Personal and Subjective norms), as outlined in the conceptual framework. The factors include:

1. Understanding of what littering is (Knowledge & Education)
2. Norms e.g. Parent's littering behavior, punishment to deter littering, size, and nature of items,
3. Place attachment or proximity to problem sites, etc.

Understanding the meaning of litter. As defined in the introduction section, to litter is to make a place untidy with rubbish or a large number of objects left lying about. This distinguishes litter from garbage whereby garbage can be placed in the right place for disposal whereas litter is waste in the wrong place that results in untidiness. Understanding the act of littering can be important for children, especially when developing campaigns to combat it so that it is not confused with proper disposal.

When asked what littering is, as indicated in Table 10 below, 17.76% (57 students) indicated that it was throwing waste in the dustbin, demonstrating that they do not perceive littering as a negative act, but as a mode of disposal. One hundred and thirty-two students (41.12%) understood what littering is, 11.84% (38 students) indicated that they did not know what littering was, and 27.41% (88 students) had a rough idea. Those in the category of having a rough idea were those in class 4-8 for whom this question was a qualitative one requiring them to write their definition and their answers were coded into the 4 categories. Students from class 1-3 selected one

of the first three options in the list of categories since their ability to express themselves in writing at their age are still very limited.

Table 10. Frequency of Opinion of What Littering Is

Value label	Frequency	Percent
In my opinion, littering is?		
Throwing takataka in the dustbin	57	17.76
Throwing takataka anywhere	132	41.12
I don't know/does not know	38	11.84
Has a rough idea	88	27.41
Missing	6	1.87
Total	321	
Do you think littering is wrong?		
Yes	289	90.03
No	20	6.23
Not sure	6	1.87
Missing	6	1.87
Total	321	100.0

A follow-up question was made to again gauge the student's understanding of the term littering. They were asked 'Do you think littering is wrong?' This question was positioned such that it would be answered after the student has already defined littering. The findings, in Table 10 above, are that 90.03 (289) of the students indicated that it was wrong.

When their answers are cross-tabulated with their age groups, the distribution of the answers yes and no are quite even across the ages, even though most of the no answers are from the lower classes. This however indicated that the term 'littering' is generally understood to be a bad thing or disapproved act.

Parents littering frequency. One of the factors being examined as a contributing factor to children's littering behavior is the influence of their parents/guardians. The students were asked to rate their parents/guardian's littering

frequency and 55.14% (177) indicated that their parents never litter; and 10.59% (34) indicated that their parents always litter (Table 11). Cumulatively, 41.12% (132), by indicating that their parents/guardians always, often, sometimes, or seldom throw garbage on the ground while walking, indicate that they have witnessed their parents/guardians littering.

Table 11. Cross-tabulation of Frequency of Littering of Parents and Students

6.2-Throw garbage/takataka on the ground or roadside while walking?	6.4-How often do your parents/guardians throw garbage/takataka on the ground or roadside?						
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	Total
5 (Always)	16.00	4.00	1.00	2.00	5.00	.00	28.00
	4.98%	1.25%	.31%	.62%	1.56%	.00%	8.72%
4 (Often)	1.00	1.00	3.00	.00	6.00	1.00	12.00
	.31%	.31%	.93%	.00%	1.87%	.31%	3.74%
3 (Sometimes)	7.00	7.00	20.00	9.00	38.00	.00	81.00
	2.18%	2.18%	6.23%	2.80%	11.84%	.00%	25.23%
2 (Seldom)	2.00	2.00	8.00	10.00	17.00	2.00	41.00
	.62%	.62%	2.49%	3.12%	5.30%	.62%	12.77%
1 (Never)	8.00	8.00	9.00	13.00	111.00	1.00	150.00
	2.49%	2.49%	2.80%	4.05%	34.58%	.31%	46.73%
Missing	.00	.00	.00	1.00	.00	8.00	9.00
	.00%	.00%	.00%	.31%	.00%	2.49%	2.80%
Total	34.00	22.00	41.00	35.00	177.00	12.00	321
	10.59%	6.85%	12.77%	10.90%	55.14%	3.74%	100%

When the frequency of students littering is cross-tabulated with that of their parents/guardians, the results are that 57.14% (16) of the 28 students who indicated that they always litter, also indicated that their parents always litter, and this means 57.14% of the students, who always litter, have authoritative figures that litter as much. Also, 17.86% (5) of those who always litter also indicated that their parents never litter.

On the other hand, of the 150 students who indicated that they never litter, 74% (111) of them also indicated that their parents never litter. The remaining 26%

(39 students) indicated reducing rates of the littering frequency of their parents and guardians with the lowest value of 5.3% (8) students who never litter indicating that their parents always do.

An interesting observation is that of the students who indicated that they sometimes litter (Likert scale 3), 46.91% (38) indicated that their parents never litter, and followed by 24.69% (20) who indicated that like them, their parents litter only sometimes. These findings of the littering frequency of authoritative figures such as parents may indicate two things: a) Children are not heavily influenced by their parents littering behavior, and b) Even parents/guardians/authoritative figures waste disposal behavior may be influenced by other factors such as the availability of waste disposal facilities and not just a bad habit.

Punishment at home. The study considered punitive measures as possible factors that influence littering behavior. The students were asked if they have ever been punished by their parents for littering. The term punished was not defined and was therefore left for the students to decide what construed a punishment. It can however be assumed that punishment is a corrective measure for bad behavior that is unpleasant to the recipient. The response of the students (Table 12) was that 66.27% (214) stated that they have received punishment from their parents/guardians for littering, 30.22% (97) said no, and 2.18% (7) were not sure. Three students did not respond to this question (0.93%).

Table 12. Cross-tabulation of Punishment by Parents and Frequency of Littering among Students

Ever been punished for throwing garbage?-parents	6.2-Throw garbage/takataka on the ground or roadside while walking?						
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	Total
Yes	15.00	7.00	58.00	30.00	98.00	6.00	214.00
	4.67%	2.18%	18.07%	9.35%	30.53%	1.87%	66.67%
No	13.00	5.00	19.00	11.00	48.00	1.00	97.00
	4.05%	1.56%	5.92%	3.43%	14.95%	.31%	30.22%
Not sure	.00	.00	.00	.00	2.00	1.00	3.00
	.00%	.00%	.00%	.00%	.62%	.31%	.93%
Missing	.00	.00	.00	.00	2.00	1.00	3.00
	.00%	.00%	.00%	.00%	.62%	.31%	.93%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100.00%

When this question of punishment by parents/guardians is cross-tabulated with the littering frequency question, the findings are that 30.53% (98) of those who said they never litter, also stated that they have been punished for littering by their parents/guardians. This may point to punitive measures as a significant deterrent for littering. On the other hand, 14.95% (48) of those who said they have never been punished, also never litter. Of the 28 students who stated that they always litter, 15 have been punished and 13 have never been punished by their parents/guardians for littering.

Punishment in school. Schools provide a disciplined environment for students and they may be significant training grounds for proper solid waste management practices. If students are not motivated to observe cleanliness and orderliness in the schools, then it may be difficult to enforce cleanliness and orderliness elsewhere. When the students were asked if they are usually punished for littering in school, the findings are that 61.06% (196) answered that they are always punished, 24.92% (80) stated not always, 12.15% (39) stated that they are never punished in school for littering, and 1.87% (6) of the students did not answer this

question. When these responses are cross-tabulated against the class that the students are in, it emerges that most of the students who indicated that they are always punished for littering in school are those in the upper primary classes, and most of those who indicated that they are never punished are those in the lower primary classes.

Table 13. Cross-tabulation of Punishment in School and Student's Frequency of Littering

Ever been punished for throwing garbage?-School	6.2-Throw garbage/takataka on the ground or roadside while walking?						Total
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	
Always	12.00	6.00	48.00	27.00	98.00	5.00	196.00
	3.74%	1.87%	14.95%	8.41%	30.53%	1.56%	61.06%
Not always	7.00	2.00	28.00	8.00	32.00	3.00	80.00
	2.18%	.62%	8.72%	2.49%	9.97%	.93%	24.92%
Never	8.00	2.00	5.00	5.00	19.00	.00	39.00
	2.49%	.62%	1.56%	1.56%	5.92%	.00%	12.15%
Missing	1.00	2.00	.00	1.00	1.00	1.00	6.00
	.31%	.62%	.00%	.31%	.31%	.31%	1.87%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100.00%

Another important comparison is that of punishment in school for littering, and the self-reported rates of littering. The findings are that again 30.53% (98) of those who said they never litter, also stated that they are always punished in school for littering. This is the exact number of students who indicated that they've been punished by parents and never litter. These questions may be biased and so the students may be indicating what they term as the 'correct' answer. However, the findings also show that of the students who indicated that they are never punished in school for littering, 48.72% (19) also indicated that they never litter. This might

indicate that punitive measures are not necessarily motivators of good habits and other factors may influence their choices not to litter even without punishment.

Size and nature of littered items. Other possible factors worth studying as contributing factors towards littering behavior are the size and nature of discarded items. From the literature review in Chapter 2, large objects such as discarded pieces of furniture or abandoned cars are not considered as litter. Also, a key aspect of littering, aside from being potential breeding grounds for pests, is the untidiness litter causes in an area that thereby makes the litter a cue to litter more.

The students were questioned about what they would consider as litter by way of 3 questions: If you throw orange peels or banana peels in the bush, is that littering? If you throw a small piece of chewing gum on the side of the road, is that littering? and If you throw a biscuit wrapper in the bush, is that littering? The first question is to gauge whether they consider organic waste as acceptable to litter. The second question is to gauge whether they consider very small and seemingly insignificant items as acceptable to litter. The third question gauges whether they can differentiate between an organic and inorganic substance and the acceptability of an inorganic substance, though small, to be littered.

Table 14. Frequency of Opinion of Organic Litter and Small Size Litter

If you throw orange peels or banana peels in the bush, is that littering?		
Value Label	Frequency	Percent
Yes	214	66.67
No	89	27.73
Not sure	15	4.67
Missing	3	.93
Total	321	100.0
If you throw a small piece of chewing gum on the side of the road, is that littering?		
Yes	221	68.85
No	74	23.05
Not sure	23	7.17
N/A	3	.93
Total	321	100.0

Organic waste. Common organic wastes handled by school-going children are orange and banana peels and these are often thrown down in the assumption that they will degrade quickly and therefore not cause harm to the environment. However, unsightliness and the tendency of visible litter being a cue to litter more makes improperly discarded items to be litter. The findings in this study of the students' perception of organic waste is that 66.67% (214) believe that organic waste can be littered, 27.73%(89) don't believe that organic waste can be littered, and 4.67% (15) are not sure. Three students did not respond to this question (Table 14).

When the organic waste question is cross-tabulated with the age of the students, the findings are that of the 89 students who stated that organic waste does not constitute litter, 51.69% (46) are in the lower classes (class 1-3), while 66.67% (10) of those who stated that they are not sure, are in the higher classes (class 4-8). This may indicate that younger children have a grasp of the difference between organic and inorganic waste and by littering organic waste, they do not believe that it is harmful to the environment and it may, therefore, be acceptable to them to litter organic waste. However, there is a relatively even distribution of the students who

believe that even the littering of organic material is wrong across all the classes, and this is a strong indicator of the understanding of school-going children about littering.

Small size waste. Chewing gum improperly disposed of is a nuisance and causes damage to property and personal items. However, being a very small item that can barely be seen when discarded unless one looks very closely, it is a good gauge of whether the size of a discarded item matters when deciding to litter or not. The findings (Table 14) were that 68.85% (221) of the students consider chewing gum that is thrown on the side of the road as litter, 23.05% (74) do not, and 7.17% (23) are not sure. Three students did not answer this question.

When the chewing gum response is cross-tabulated with the class the students are in, the finding is that 62.12% of those who said that chewing gum is not litter is in the lower classes (class 1-3), while 86.96% (20) of those who said they were not sure, are in the higher classes (class 4-8). This may indicate that the younger children judge litter based on its size and that those who are not sure are grappling with the size factor such that though they may know that improper disposal is wrong, the insignificance of its size creates a conflict. The significance of this size factor in littering behavior is that often, even a larger object is crumpled down to a smaller size before it being littered or even being disposed-off properly. Therefore, if a person can subconsciously reduce the size of a piece of waste material, its small size can be a cue to litter, and this only proliferates littering.

Inorganic waste. Finally, in response to the question 'If you throw a biscuit wrapper in the bush, is that littering?' 82.87% (266) of the students stated yes, 13.4% (43) said no, and 2.8% (9) stated that they were not sure (Table 15). Three students did not answer this question. This resounding yes is a strong indicator that most school-going children relate litter to inorganic waste of significant size since a biscuit

wrapper is larger than chewing gum and is usually made of a non-biodegradable material.

Table 15. Cross-tabulation of Opinion of Medium-Sized Litter and Frequency of Littering

If you throw a biscuit wrapper in the bush, is that littering?	6.2-Throw garbage/takataka on the ground or roadside while walking?						
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	Total
Yes	21.000	12.00	69.00	35.00	125.00	4.00	266.00
	6.54%	3.74%	21.50%	10.90%	38.94%	1.25%	82.87%
No	6.00	.00	7.00	5.00	22.00	3.00	43.00
	1.87%	.00%	2.18%	1.56%	6.85%	.93%	13.40%
Not sure	1.00	.00	4.00	1.00	2.00	1.00	9.00
	.31%	.00%	1.25%	.31%	.62%	.31%	2.80%
Missing	.00	.00	1.00	.00	1.00	1.00	3.00
	.00%	.00%	.31%	.00%	.31%	.31%	.93%
Total	28.00	12.00	81.00	41.00	150.00	9.00	321.00
	8.72%	3.74%	25.23%	12.77%	46.73%	2.80%	100.00%

When the class the students are in is compared to their responses, 65.12% (28) of the students who answered no to this question (43), are in the lower primary classes (class 1-3), while 66.67% (6) of those who stated that they are not sure are in the upper primary classes (class 4-8). Nonetheless, 13.4% (43) students said that it is not wrong, another indicator of the need for proper awareness creation among children on what littering is. Interestingly, 63.55% (204) of the respondents seem to have strong convictions on littering since when these three questions are compared in cross-tabulation, the 204 students stated that all these different types of objects, if improperly disposed of, constitute litter.

When the self-reported frequency of littering is compared to the students' opinion of a biscuit wrapper, the finding is that 6.25% (22) of the students who indicated that they never litter, also indicated that throwing a biscuit wrapper in the

bush is not littering. This raises the question again of whether school-going children understand what littering is. However, the majority, 82.87% (266) indicated that throwing a biscuit wrapper in the bush is littering, and they have different self-reported frequencies of littering. This may indicate that school-going children have an awareness of what constitutes litter, but they are either unwilling or unable to dispose of solid waste properly.

Place of littering. Another factor that the study looked into was the location that a person is in when they litter. Do school-going children feel permitted or able to litter in someplace more than others? This is the question that the study sought to answer when the following questions were asked. Would you throw down garbage/takataka on the ground if you were in the following places: a) Playing at home; b) In the market (public space); c) In class; d) In a matatu (public transport); e) Playing in the church, and f) In the shamba (garden). The different places mentioned reflect public and private spaces, places of religious values, or places where discipline is effectively instilled. The responses were as follows (refer to Appendix A for Tables 17a-f).

Would you throw down garbage/takataka on the ground if you were playing at home? While playing at home (17a), 18.69% (60) stated that they would litter, 76.32% (245) stated that they would not litter at home, 2.18% stated that they were not sure, and 9 students did not respond to this question. The high number of students who answered yes can either indicate that littering is permitted in their homes or that the students may not have understood the question.

Would you throw down garbage/takataka on the ground if you were in the market? While in the market (17b), 17.76% (57) of the students said yes. This is 3 students less than while playing at home, but still within the same range. Those who

said no were 73.21% (235), 4.36% (14) were not sure, and 15 students did not answer this question. Seven more students were unsure about this question and 6 more skipped this question.

Would you throw down garbage/takataka on the ground if you were in class? Surprisingly (17c), 4.05% (13) students said yes to littering in class, but the majority said no 87.85% (282), 6 students (1.87) were unsure, and 20 students declined to answer this question. Another surprising result is that 84.61% (11) of those who said yes are in the upper primary classes (class 4-8). This group also takes up the majority of those who said they were not sure. Considering that the classroom is the ideal site for discipline and order, this could indicate a rebellious attitude towards authority which is a known factor that contributes towards littering behavior.

Would you throw down garbage/takataka on the floor in a matatu? This is another measure of the student's attitude towards public space (17d) and 7.48% (24) said they would litter inside a matatu, 84.42% (271) said they would not, 3.12% (10) were not sure, and 4.98% (16) declined to answer this question. This indicates that the majority of the students understand that littering is a wrong thing to do regardless of where one is, but there is still a significant number (50) of students who have not grasped this aspect.

Would you throw down garbage/takataka on the ground if you were playing in church? This question was to gauge whether students hold religious or places of sanctity with any special respect with regards to their waste disposal behavior. The findings (17e) were that 4.36% (14) said they would litter in church, 87.23% (280) stated they would not, 1.25% (4) were not sure, and 7.17% (23) declined to answer this question. This indicates that most students regard littering as being wrong irrespective of where they are. It is interesting to note that the results show that the

classroom is less likely to be littered than the place of worship. This may indicate that discipline or punitive measures can deter littering more than attitudes.

Would you throw down garbage/takataka on the ground if you were in the shamba (garden)? This question sought to find out if students considered space that is not frequently inspected to be acceptable to litter in. The results (17f) show that 17.76% (57) stated that they would litter in the shamba (garden), 66.67% (214) stated that they would not, 9.97% (32) indicated that they were not sure, and 5.61%(18) declined to answer this question. The shamba is a place that is not frequently inspected, and one that can presumably absorb some litter by covering with soil. These results demonstrate that littering increases where there is a lower chance of inspection.

Overall, this group of questions brought out the fact that whereas most students consider littering to be wrong regardless of where a person is or the nature of the space around them, there is still a significant number of students who do not believe this or are unsure of this fact, judging from the number of yes, not sure and declined answers in each question. However, the classroom and religious sites are the most respected spaces that are least likely to be littered.

Is littering wrong? When the direct question was posed 'Do you think littering is wrong?', Out of the 321 respondents, 90.03% (289) said that they think littering is wrong, 6.23% (20) said they don't think it' s wrong, 1.87% (6) were not sure, and another 1.87% (6) declined to answer the question as per Table 10 above. The next question requested the students to give a reason for their answers. The answers were coded based on the researcher's judgment of whether the reason given shows that the respondent knows, has a rough idea, or does not know or indicated that they did not know. The results were that 84.42% (271) of the students know why

littering is wrong, 3.21% (10) have a rough idea, and 8.72% (28) indicated that they do not know, or their reasons indicated that they do not know. Twelve (12) students did not provide a reason.

Objective 3: Relationship between Environmental Attitude of Primary School Children and Their Littering Frequency

This third objective first categorized the children and their environmental attitudes, then analyzed their attitudes against their frequency of littering. The three attitudes measured were based on the Theory of Ecological Attitudes (Wiseman and Bogner, 2003 as cited in Le Hebel et al., 2014) and they are Apathy, Concern, and Action-Oriented. Those that selected the statement 'I don't think human beings can destroy the earth while getting their resources. It's too big' can be described as apathetic towards the environment. Those that selected the statement 'I think that humans should use the earth's resources, but we should not pollute too much' can be described as being Concerned about the environment; and those that selected the statement 'Human beings should not harm the earth in any way. They should preserve it as it is' can be described as being Action Oriented (Wiseman and Bogner, 2003 as cited in Le Hebel et al., 2014)

From the study, as in Table 16 below, 9.03% (29) are apathetic to the environment and it can be hypothesized that they are more likely to do harmful things to the environment such as littering. The second group of 21.5% (69) is concerned about the environment and should hypothetically litterless. The third group, making up 66.98% (215), is action-oriented towards the environment and should also hypothetically have the lowest littering frequency. However, when these environmental attitudes are cross-tabulated to the self-reported littering frequency (Table 16), the findings are that 31.15% of all students are action-oriented with the

least littering rate (scale 1 on the Likert scale). This makes up 66.66% of all students who stated that they never litter. On the other hand, of the 28 students who indicated that they always litter, 17.86% (5) are apathetic, 14.29% (4) are concerned, and 64.29% (18) are action-oriented. With a larger proportion of the heavy litterers having an action-oriented ecological attitude, there are likely more factors that contribute towards children's littering behavior than just their attitudes towards the environment.

Looking further at this attitude factor, the next highest values fall in the category of the action-oriented group of students with 25.58% (55) indicating that they sometimes litter, and 49.27% (34) of those who are only concerned with the environment indicating that they never litter.

Table 16. Cross-tabulation of Environmental Attitude and Frequency of Littering

Which of the following statements best describes you?	6.2-Throw garbage/takataka on the ground or roadside while walking?						
	5 Always	4 Often	3 Sometimes	2 Seldom	1 Never	Missing	Total
Humans can't destroy, too big	5.00 1.56%	1.00 .31%	6.00 1.87%	4.00 1.25%	12.00 3.74%	1.00 .31%	29.00 9.03%
Humans don't pollute much	4.00 1.25%	2.00 .62%	18.00 5.61%	11.00 3.43%	34.00 10.59%	.00 .00%	69.00 21.50%
Humans should not harm the earth, should preserve it	18.00 5.61%	9.00 2.80%	55.00 17.13%	26.00 8.10%	100.00 31.15%	7.00 2.18%	215.00 66.98%
Missing	1.00 .31%	.00 .00%	2.00 .62%	.00 .00%	4.00 1.25%	1.00 .31%	8.00 2.49%
Total	28 8.72%	12 3.74%	81 25.23%	41 12.77%	150 46.73%	9 2.80%	321 100%

An ordinal logistic regression analysis will point to the significance of the relationship between environmental attitudes and the frequency of littering. This is examined in the following discussion of the research hypothesis.

Research hypothesis. The hypothesis for this research was that there is no significant relationship between environmental attitude and the frequency of littering of the school children in Kajiado North Sub-County. With the alpha level for this study set at p=0.05, an ordinal logistic regression analysis was carried out to test this hypothesis. As outlined in Table 17 below, the environmental attitude categories 'Action Oriented,' 'Çoncern,' and 'Apathy' can significantly explain the outcome of frequency of littering, each with a p-value of p=0.30, p=0.49, and p=0.453 respectively. This analysis shows that there is no significant relationship between the environmental attitude of students and their frequency of littering, and I fail to reject the null hypothesis.

Table 17. Ordinal Regression Model Results for Attitude and Frequency of Littering

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	68.790			
Final	67.696	1.094	3	.779

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	8.861	12	.715
Deviance	11.277	12	.505

Pseudo R-Square

Cox and Snell	.003
Nagelkerke	.004
McFadden	.001

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[throw_garbage_while_walking = 1]	-2.881	.709	16.496	1	.000
	[throw_garbage_while_walking = 2]	-2.482	.702	12.511	1	.000
	[throw_garbage_while_walking = 3]	-1.033	.689	2.251	1	.134
	[throw_garbage_while_walking = 4]	-.511	.687	.554	1	.457
	[throw_garbage_while_walking = 5]	3.023	.749	16.284	1	.000
Location	[best_describes_you=1]	-.794	.765	1.076	1	.300
	[best_describes_you=2]	-.497	.721	.476	1	.490
	[best_describes_you=3]	-.523	.697	.562	1	.453
	[best_describes_you=99]	0[a]	.	.	0	.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	67.696			
General	50.873	16.823	12	.156

** Correlation is significant at the 0.05 level (2-tailed)*
*** Correlation is significant at the 0.01 level (2-tailed)*

Given that the null hypothesis is true, there should be other factors that affect the solid waste disposal practices of school-going children. The study also considered parental littering behavior, different types of spaces, and punitive measures among others as discussed in the previous objectives. The deduction is that majority of the students (88.48%) have a positive attitude towards the environment, 'Action-Oriented' and 'Concern,' and though there is a slightly positive correlation between

their attitude and behavior, the relationship is not statistically significant to make environmental attitude an explanatory variable of littering behavior.

Objective Four: The Sustainable Approaches to Ensure Proper Disposal of Solid Waste by Primary School Children in Kajiado North Sub-County.

The approach under this fourth objective was to first get the views of the children of why there is a littering problem on a macro-scale in Kajiado North Sub-county as this can also point towards their attitudes and what they would like to see as a social norm.

Cause of much litter in Kajiado North. In an attempt to identify what primary school children perceive to be the reason for so much garbage/litter in Kajiado North, which can point to what they may perceive as the solution, the students were asked what they thought is the most important reason for so much garbage/litter in Kajiado North. Six options were given to choose from, some more reasonable than others, but all touching on common reasons from previous studies.

Table 18 below shows the results whereby 28% (92) believe that the most important reason is that people don't care about cleanliness, and this is closely followed by 22.74% (73) who believe that people do not know that it is wrong to litter. The third group at 21.18% (68) believes that for most people it is just a bad habit that many people have. These may indicate that students perceive wrong environmental or hygiene attitudes as the leading cause, followed by challenges in behavioral control.

Table 18. Frequency of reason for So Much Garbage in Kajiado

Value Label	Frequency	Percent
There are not enough dustbins to use	57	17.76%
There are too many people	14	4.36%
People don't know if it is wrong to litter	73	22.74%
There are no police to jail people who litter	9	2.80%
It is just a bad habit that many people have	68	21.18%
People don't care about cleanliness	92	28.66%
Missing	8	2.49%
Total	321	100%

The structural issue came in at fourth place with 17.76% (57) believing that the reason is that there are not enough dustbins (disposal facilities to use). Another 4.36% (14) believe that the reason is that there are just too many people and the next lot of 2.8% (9) believe that it's because there are no police to jail people who litter, bringing out the aspect of punitive measures to deter wrong behavior. Finally, 2.49% (8) declined to answer this question.

These results reveal that primary school children attribute littering first of all to wrong attitudes, followed by lack of knowledge, then lack of adequate infrastructure for proper waste disposal, and finally lack of enforcement of laws and rapid population growth which puts a strain on the available infrastructure. This is an interesting contrast to the suggestions that students made that can help them to stop littering which placed the availability of proper infrastructure as the greatest enabler for proper waste disposal, followed by attitude/habit change, then increased awareness on cleanliness and then punitive measures. These are further analyzed in Table 19 below.

Observing others littering. Another question that was asked to gauge the action that primary school children would take to minimize littering by other people was what they would do if they observed their friends littering. The results, as shown

in Table 19 below, are that 74.45% (239) indicated that they would tell their friend to pick up the litter and dispose of it properly, 15.89% (51) stated they would pick up the litter themselves to dispose of it, 4.67% (15) would report them to an authority such as a teacher or police officer, and 1.87% (6) would do nothing. Another 1.25% (5) were not sure what they would do and 1.87% (6) did not answer this question.

This question also addressed the possible factor of peer pressure in littering behavior and, interestingly, 15.89% would rather pick up their friends' litter than tell them that they have done something wrong. This may indicate that primary school students are not prepared to campaign against littering behavior in their social circles and this can inform the types of anti-litter campaigns that are developed to ensure they do not pit friends against each other e.g. making proper disposal a 'cool' thing rather than branding littering a bad thing.

However, with the majority (74.45%) indicating that they would tell their friend to collect the litter, this may mean that primary school children are willing to participate in sensitization campaigns to address littering behavior. On the other hand, perhaps only observational studies can point to what the students would do if they saw others littering.

Table 19. Frequency of 'If You Saw Your Friend Littering'

If you saw your friend littering, what would you do?		
Value Label	Frequency	Percent
Tell him /her to stop or to pick up the litter	239	74.45%
Pick up the litter yourself	51	15.89%
Tell someone(like a teacher or a police officer)	15	4.67%
Do nothing	6	1.87%
Not sure	4	1.25%
Missing	6	1.87%
Total	321	100%

Who collects litter that is thrown on the road? This question was asked to gauge the children's understanding of who bears responsibility for litter. The findings, in Table 20 below, are that 41.43% (133) believe that litter is collected by the local county council, followed by 31.15% who believe it's by street sweepers. Cumulatively, 72.59% believe that there are people who are appointed and paid to collect litter in public spaces.

Table 20. Frequency for Who Collects Litter that is thrown by the Roadside

Who collects garbage/litter/takataka that is thrown on the side of the road?		
Value Label	Frequency	Percent
County council	133	41.43%
Street sweepers	100	31.15%
Good people	27	8.41%
Nobody	13	4.05%
I don't know	45	14.02%
Missing	3	.93%
Total	321	100%

These are followed by 14.02% (45) who do not know who collects litter in public spaces, and then 8.41% who state that litter is collected by good people. Finally, 4.05% (13) stated that nobody collects litter and 0.93% (3) who did not answer this question. When these answers are cross-tabulated to their respective age groups, it emerges that majority of those who indicate that litter is collected by the county council is in the upper primary classes and those who said street sweepers and good people are in the lower primary classes.

This is an indication that the students in the upper primary classes are somewhat aware of the administrative matters concerning waste management. It may also point to one reason why littering is proliferated since even children may have a

low locus of control by believing that even if they litter, there is someone who will clean it up, even though this is not the case in most counties in Kenya.

What can help you stop littering? Finally, a direct attempt was made to identify what the students believe can help them to stop littering. This was an open question requiring them to list at least two suggestions that can help them to stop littering and their responses were coded (since it was an open-ended question) and the results are as follows:

Table 21. Ranked Order of Two Things that can help Students to Stop Littering: List A

Value Label	Value	Frequency	Percent
Avail more dustbins everywhere	1	82	25.55%
Being taught how to break the habit of littering	8	59	18.38%
Use punishment to deter littering, especially making the culprits collect the litter	3	52	16.20%
Carry out environmental, anti-littering, and cleanliness campaigns	6	41	12.77%
I don't know	11	23	7.17%
Maintain cleanliness everywhere	2	14	4.36%
Missing	99	13	4.05%
Put up more signs and warnings against littering	5	12	3.74%
Carrying a bag to put trash in before finding a dustbin	10	11	3.43%
Take away trash and burn it	4	9	2.80%
Having role models who care for the environment	9	4	1.25%
Banning harmful trash and being taught how to recycle	7	1	0.31%

In the list of first suggestions, the suggestion with the highest frequency was 'Avail more dustbins everywhere' with 25.55% (82) indicating it as their first answer. This was followed by 'Being taught how to break the habit of littering' with 18.38% (59), and then 'Using punishment to deter littering especially making the culprits collect the litter' with 16.2% (52), and at fourth place 'Carry out environmental, anti-littering, and cleanliness campaigns' with 12.77% (41) respondents.

For the second suggestion given by students in Table 22 below, 29.6% (95) students left it blank, 13.71% (44) indicated its 'Carry out environmental, anti-littering, and cleanliness campaigns,' followed by 11.21% (36) who stated that its 'Being taught how to break the habit of littering.'

Table 22. Ranked Order of Two Things that can help Students to Stop Littering - List B

Value Label	Value	Frequency	Percent
Missing	99	95	29.60%
Carry out environmental, anti-littering, and cleanliness campaigns	6	44	13.71%
Being taught how to break the habit of littering	8	36	11.21%
Use punishment to deter littering, especially making the culprits collect the litter	3	30	9.35%
Avail more dustbins everywhere	1	28	8.72%
Take away trash and burn it	4	23	7.17%
Carrying a bag to put trash in before finding a dustbin	10	17	5.30%
Put up more signs and warnings against littering	5	17	5.30%
Maintain cleanliness everywhere	2	12	3.74%
I don't know	11	12	3.74%
Banning harmful trash and being taught how to recycle	7	6	1.87%
Having role models who care for the environment	9	4	1.25%

These suggestions point toward the approaches that can be taken to reduce the frequency of littering of primary school children and these are further discussed in Chapter five. However, the contrast between what they perceive to be the cause of the problem and the possible solutions is interesting. Primary school children seem to attribute the problem of prolific littering to wrong environmental attitudes and lack of behavioral control, but they suggest structural changes to empower them to act in more responsible ways first before even addressing the challenges of wrong attitudes. It can be concluded therefore that students are aware that littering is wrong, and they admit to having wrong attitudes towards the environment and cleanliness, but they

would like ‘society’ to make it easier for them to act in more responsible ways by providing proper disposal facilities when and where needed.

CHAPTER 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The self-reported littering frequency shows that 46.73% of primary school children never litter (throw garbage on the ground or roadside while walking), while 8.72% always litter and 25.23% litter sometimes. The majority of those who always litter is in private schools and the majority of those who litter sometimes are in public schools, but there is relatively even distribution from both types of schools for those who never litter. These two findings may indicate that socio-economic status does not have a significant impact on the littering habits of primary school children, even though the results indicate that there is a strong positive correlation between having a dustbin at home and utilizing it, which may mean that availability of disposal facilities prompt its use.

The findings also show that boys litter slightly more than girls, although as observed from other studies, it may be that boys are more willing to admit to bad behavior than girls. When it comes to age, the younger children (aged 10 and below) are the majority who indicated that they always litter.

The reasons that were considered by the researcher were as listed below, and they do not exhaust the possible factors that can influence the waste disposal practices of primary school children in Kajiado North Sub-County.

1. Understanding of what litter is
2. Parental behavior

3. Lack or presence of punitive measures
4. Size and nature of litter
5. Place of littering
6. Environmental attitude

The study first had to establish whether the students understand what littering is and the results indicate that 41.12% understood what littering is and 27.41% had a rough idea and this makes a majority who understand what it is, but an alarming 17.76% stated that it is the disposal of waste in the dustbin, thereby associating the term littering with proper waste disposal. However, even though this was a direct question of the term litter, the study controlled for this by using the descriptive phrase 'throwing takataka on the ground' in place of littering in the questionnaire. Overall, with 90.03% of the students indicating that littering is wrong, the term 'littering' is generally understood to be a bad thing or disapproved act.

Whereas 55.14% (177) indicated that their parents never litter; and 10.59% (34) indicated that their parents always litter, the cross-tabulation of children and parents littering frequency shows an inconsistency that may indicate that children are not heavily influenced by their parents littering behavior. On the other hand, 16 of the 28 students who indicated that they always litter, also indicated that their parents always litter. This means that 57.14 of the students, who always litter, have authoritative figures that litter as much. However, cumulatively, 41.12% (132) indicated that their parents/guardians always, often, sometimes, or seldom throw garbage on the ground while walking, meaning that they have witnessed their parents/guardians littering.

About a third (30.53%) of the children who said they never litter also stated that they have ever been punished for littering by their parents/guardians and this may point to punitive measures as a significant deterrent for littering. However, of the

students who indicated that they are never punished in school for littering, 48.72% also indicated that they never litter. This might indicate that punitive measures are not necessarily motivators of good habits and other factors may influence their choices not to litter even without punishment.

Students were asked whether they think that organic waste disposed of improperly is litter and 27.73% don't believe that organic waste can be littered. In terms of the size of littered items, the findings were that 68.85% of the students consider very small items such as chewing gum that is thrown on the side of the road as litter, and an alarming 23.05% do not, and 7.17% (23) are not sure. In terms of inorganic waste of larger size, 82.87% of the students voted it as litter, 13.4% said no, and 2.8% (9) stated that they were not sure. The conclusion is that primary school children associate litter with inorganic waste of significantly larger size and this is an indication of the need for awareness campaigns on what constitutes litter.

The study sought to understand whether certain spaces are perceived as being acceptable to litter, especially comparing public, private, and sacred places. The findings are that out of the six spaces highlighted in the study (Playing at home; In the market (public space); In-class; In a matatu (public transport); Playing in a church; and In the shamba/garden), the classroom and religious sites are the most respected spaces that are least likely to be littered, and that the classroom is less likely to be littered than the place of worship. This may indicate that discipline or punitive measures, such as those enforced in classrooms, can deter littering more than environmental attitudes.

The study sought to identify the relationship between the environmental attitudes of the children and their littering frequency, and the results show that a larger proportion of the heavy litterers were found to have an action-oriented ecological

attitude, and it is, therefore, likely that more factors contribute towards children's littering behavior than just their attitudes towards the environment. This relationship is explained by the research hypothesis that stated that there is no significant relationship between environmental attitude and solid waste disposal behavior of the school children in Kajiado North Sub-County using ordinal logistic regression analysis.

The finding was that there is no significant relationship between the environmental attitude of students and their frequency of littering. Other factors affect the solid waste disposal practices of school-going children. Majority of the students (88.48%) have a positive attitude towards the environment, 'Action-Oriented' and 'Concern,' and though there is a slightly positive correlation between their attitude and behavior, the relationship is not statistically significant to make environmental attitude an explanatory reason for littering behavior. Therefore efforts to change environmental attitudes in children should be done in consideration of other factors that affect their solid waste disposal behavior.

When primary school children were asked what they thought were the reasons for so much litter in Kajiado North Sub-County, they were indirectly indicating the possible challenges that other people might face and therefore the points of intervention. The results show that primary school children attribute littering first of all to wrong attitudes, followed by lack of knowledge, then lack of adequate infrastructure for proper waste disposal, and finally lack of enforcement of laws and rapid population growth which puts a strain on the available infrastructure. This is in contrast to the suggestions that students made that can help them to stop littering, placing the availability of proper infrastructure as the greatest enabler for proper

waste disposal, followed by attitude and behavior change, then increased awareness on cleanliness, followed by punitive measures.

Primary school children, therefore, seem to attribute the problem of prolific littering to wrong environmental attitudes and lack of behavioral control, but they suggest structural changes to empower them to act in more responsible ways first before even addressing the challenges of wrong attitudes. It can be concluded therefore that students are aware that littering is wrong, and they admit to having wrong attitudes towards the environment and cleanliness, but they would like 'society' to make it easier for them to act in more responsible ways by providing proper disposal facilities when an were needed.

While addressing the question of how they would respond if they see their friends littering, majority of the students indicated that they would tell their friends to collect the litter, but an interesting 15.89% indicated that they would collect the litter themselves which points to their perception of pointing out environmental health crimes within their social circles, and the need to structure anti-littering campaigns to make the recommendations more acceptable to children.

Finally, when asked who they believe collects the litter that is thrown on the ground, cumulatively, 72.59% of the children believe that there are people who are appointed and paid to collect litter in public spaces and this may point to one reason why littering is proliferated since even children may have a low locus of control by believing that even if they litter, there is someone who will clean it up, and so littering can be justified to them. The challenge is that in most counties and cities in Kenya, there are no litter collectors, only garbage collectors who collect from waste bins and do not pick-up litter.

Conclusion

The majority of the students in the study understand what litter is and its impact and that littering is wrong, but even though they understand this, they still litter periodically and this points to the possibility that though students understand what littering is, they may be disempowered to dispose of litter properly. This tallied with the findings of what students propose to enable them to stop littering, which is the availability of more dustbins for disposal.

Therefore, the theory of behavior change, in this case, shows that although students may be aware of the harm caused by littering, and may be willing to stop littering, they do not feel empowered to do so. This conclusion is supported by the contrast of responses on the reasons students attribute littering to and the suggestions they make to help them to stop littering whereby Primary school children seem to attribute the problem of prolific littering to wrong environmental attitudes and lack of behavioral control, but they suggest structural changes to empower them to act in more responsible ways first before even addressing the challenges of wrong attitudes.

It can be concluded therefore that students are aware that littering is wrong, and they admit to having wrong attitudes towards the environment and cleanliness, but they would like 'society' to make it easier for them to act in more responsible ways by providing proper disposal facilities when and where needed. Therefore, even though environmental attitudes and other contributing factors can be addressed over the long-run, the infrastructure to enable proper disposal should be the first intervention that creates immediate impact.

Recommendations

Institutions and organizations such as county government, national government, schools, and companies, can enable primary school children to dispose of litter properly by doing the following and prioritize in the order presented:

1. Availing the infrastructure for proper disposal (etc), then take away the garbage to reduce littering and to demonstrate to people that their proper disposal is valued. The ratio of dustbins to people can be advised by other studies. It is critical to note that students indicated the importance of taking away the garbage and maintaining cleanliness as a demonstration of a social norm that cleanliness is valued.

2. Empowering primary school children to dispose of garbage properly by educating them on its negative impact on society, and on how to properly dispose of it. This can be done through formal education curriculum or social clubs. The education campaigns can cover topics such as what constitutes litter, to reduce the confusion amongst students, what can be recycled, what can be done about organic waste, how to reduce waste, and many other topics.

3. Carrying out environmental awareness campaigns and anti-littering campaigns. These are campaigns that build the population's general awareness of the environment and people's or children's impact on it to increase their locus of control over waste disposal. These can be done in various ways and informed by behavior change studies. They can include pride campaigns, such as 'Keep Kajiado Beautiful' campaigns, similar to what has been done in many countries, or they can be campaigns to show people the economic impact of littering against the national or local economy such as those carried out to minimize wild-life poaching in Kenya.

4. Do not over-relying on punitive measures. As this study has shown, most students do not respond as well to punitive measures as they do others and some open rebel to such measures. Punitive measures should be in place and action was taken against offenders, but this study has shown that it is better to invest in showing people the right thing to do rather than punishing them for the wrongdoing. Perhaps eventually when the populace has been educated, there will be less resistance to punitive measures to reduce rebellion.

Suggestions for Future Research

1. The bias caused by self-reporting is likely significant especially amongst students who tend to want to give pleasing answers. This was more so because the participants in this study were participating in a study for the first time in their lives. An observational study of littering behavior to get data that is not as biased as self-reporting is therefore recommended for more precise data.

2. A similar study should be carried out on adults to identify the factors that most affect their solid waste disposal practices and what they feel can enable them to properly dispose of the litter.

APPENDICES

APPENDIX A

PLACE OF LITTERING

17-a: Likelihood of littering while at home

Value Label	Frequency	Percent
Yes	60	18.69
No	245	76.32
Not sure	7	2.18
N/A	9	2.80
Total	321	100.0

17-b: Likelihood of littering while in a market

Value Label	Frequency	Percent
Yes	57	17.76
No	235	73.21
Not sure	14	4.36
N/A	15	4.67
Total	321	100.0

17-c: Likelihood of littering while in class

Value Label	Frequency	Percent
Yes	13	4.05
No	282	87.85
Not sure	6	1.87
N/A	20	6.23
Total	321	100.0

17-d: Likelihood of littering while inside public transport

Value Label	Frequency	Percent
Yes	24	7.48
No	271	84.42
Not sure	10	3.12
N/A	16	4.98
Total	321	100.0

17-e: Likelihood of littering while in church

Value Label	Frequency	Percent
Yes	14	4.36
No	280	87.23
Not sure	4	1.25
N/A	23	7.17
Total	321	100.0

17-f: Likelihood of littering while in the shamba (garden)

Value Label	Frequency	Percent
Yes	57	17.76
No	214	66.67
Not sure	32	9.97
N/A	18	5.61
Total	321	100.0

APPENDIX B

QUESTIONNAIRE

(Class 1 - 3)

This questionnaire is to collect data for purely academic purposes. All information will be treated with strict confidence. Do not put your name or identification anywhere on this questionnaire.

Answer all questions as indicated by either filling in the blank or ticking or circling the option that applies.

1. Name of your school

   _____

2. Gender (tick one): Boy [ ] Girl [ ]

3. Age _____

One	Two	Three	Four	Five	Six	Seven	Eight

4. Class (*tick*)

5. Do you have a dustbin at home? (tick one)

   ☐ Yes ☐ No ☐ Not Sure

6. Please answer the following questions by ***circling*** the number that best represents your choice whereby

   5=Always 4=Often 3=Sometimes 2=Seldom 1=Never

How often do you do the following?

Throw garbage/takataka in the dustbin in your home?	**5**	**4**	**3**	**2**	**1**
Throw garbage/takataka on the ground or roadside while walking?	**5**	**4**	**3**	**2**	**1**
Carry trash/takataka in your hand/pocket/bag to throw it in a dustbin when you find one?	**5**	**4**	**3**	**2**	**1**
How often do your parents/guardians throw garbage/takataka on the ground or roadside?	**5**	**4**	**3**	**2**	**1**

10. Who collects garbage/litter/takataka that is thrown on the side of the road?

	County Council
	Street Sweepers
	Good People
	Nobody
	I don't Know

11. In my opinion, littering is?

	Throwing takataka in the dustbin
	Throwing takataka anywhere
	I don't know

12. If you throw orange peels or banana peels in the bush, is that littering?

    ☐ Yes ☐ No ☐ Not Sure

13. If you throw a small piece of chewing gum on the side of the road, is that littering?

☐ Yes ☐ No ☐ Not Sure

14. If you throw a biscuit wrapper in the bush, is that littering?

☐ Yes ☐ No ☐ Not Sure

15. James has just finished drinking a packet of yogurt in the matatu on his way to town with his father. If you were James, what would you do with the packet? (*tick one or state*)

☐ Open the window and throw it out
☐ Throw it down on the matatu floor
☐ Hold on to it until you find a dustbin
☐ If you would do something else, state it here
_____
_____
_____

16. Which of the following statements best describes you? (tick one)

	I don't think human beings can destroy the earth while getting their resources. It's too big.
	I think that humans should use the earth's resources, but we should not pollute too much.
	Human beings should not harm the earth in any way. They should preserve it as it is.

17. Would you throw down garbage/takataka on the ground if you were in the following places:
*(for each of the **six** places named, please tick one option: either yes, or no, or not sure)*

	Yes	**No**	**Not Sure**
a) Playing at home			
b) In the market			
c) In class			
d) In a matatu			
e) Playing in church			
f) In the shamba (garden)			

18. Have your parents or guardians ever punished you for throwing garbage/takataka on the ground in your home compound?

☐ Yes ☐ No ☐ Not Sure

19. In school, are you punished if you are found littering?

☐ Always ☐ Not always ☐ Never

20. Do you think littering is wrong?

☐ Yes ☐ No ☐ Not Sure

21. Please give a reason for your answer to question no.20?_____
_____
_____

22. I think that the two things that can help me to stop littering are:
_____
_____

If you saw your friend littering, what would you do? (*tick one*)

	Tell him/her to stop or to pick up the litter
	Pick up the litter yourself
	Tell someone (like a teacher or a police officer)
	Do nothing
	Not Sure

23. What do you think is the most important reason for so much garbage/takataka in Kajiado? (*tick one*)

	There are not enough dustbins to use
	There are too many people
	People don't know if it is wrong to litter
	There are no police to jail people who litter
	It is just a bad habit that many people have
	People don't care about cleanliness

Thank you for taking part in this survey.

QUESTIONNAIRE (Class 4-8)

This questionnaire is to collect data for purely academic purposes. All information will be treated with strict confidence. Do not put any name or identification on this questionnaire.

Answer all questions as indicated by either filling in the blank or ticking or circling the option that applies.

SECTION A: PERSONAL INFORMATION

7. Name of your school

_____

8. Gender Boy [ ] Girl [ ]

9. Age _____

One	Two	Three	Four	Five	Six	Seven	Eight

10. Class

SECTION B: OBJECTIVE QUESTIONS

11. Do you have a dustbin at home? Yes [ ] No [ ] Not Sure [ ]

12. Please answer the following questions by ***circling*** the number that best represents your choice whereby

5=Always 4=Often 3=Sometimes 2=Seldom 1=Never

How often do you do the following?

Throw garbage/takataka in the dustbin in your home?	**5**	**4**	**3**	**2**	**1**
Throw garbage/takataka on the ground or roadside while walking?	**5**	**4**	**3**	**2**	**1**
Carry trash/takataka in your hand/pocket/bag to throw it in a dustbin when you find one?	**5**	**4**	**3**	**2**	**1**
How often do your parents/guardians throw garbage/takataka on the ground or roadside?	**5**	**4**	**3**	**2**	**1**

10. Who collects garbage/litter/takataka that is thrown on the side of the road?

	County Council
	Street Sweepers
	Good People
	Nobody
	I don't Know

11.

12. In my opinion, littering is?

_____

_____

_____

13. If you throw orange peels or banana peels in the bush, is that littering?

☐ Yes ☐ No ☐ Not Sure

14. If you throw a small piece of chewing gum on the side of the road, is that littering?

☐ Yes ☐ No ☐ Not Sure

15. If you throw a biscuit wrapper in the bush, is that littering?

☐ Yes ☐ No ☐ Not Sure

16. James has just finished drinking a packet of yogurt in the matatu on his way to town with his father. If you were James, what would you do with the packet?

☐ Open the window and throw it out
☐ Throw it down on the matatu floor
☐ Hold on to it until you find a dustbin
☐ Other (state what else you would do here_____

_____

17. Would you throw down garbage/takataka on the ground if you were in the following places:

*(for each of the **six** places named, please tick one option: either yes, or no, or not sure)*

	Yes	**No**	**Not Sure**
g) Playing at home			
h) In the market			
i) In class			
j) In a matatu			
k) Playing in church			
l) In the shamba (garden)			

18. Which of the following statements best describes you? (choose one)

	I don't think human beings can destroy the earth while getting their resources. It's too big.
	I think that humans should use the earth's resources, but we should not pollute too much.
	Human beings should not harm the earth in any way. They should preserve it as it is.

19. Have your parents or guardians ever punished you for throwing garbage/takataka on the ground in your home compound?

☐ Yes ☐ No ☐ Not Sure

20. In school, are you punished if you are found littering?

☐ Always ☐ Not always ☐ Never

21. Do you think littering is wrong?

☐ Yes ☐ No ☐ Not Sure

22. Please give a reason for your answer to question no.20?_____

_____

_____

23. I think that the two things that can help me to stop littering are:

_____

_____

_____

24. If you saw your friend littering, what would you do?

	Tell him/her to stop or to pick up the litter
	Pick up the litter yourself
	Tell someone (like a teacher or a police officer)
	Do nothing
	Not Sure

25. What do you think is the most important reason for so much garbage/takataka in Kajiado? (Tick only one)

	There are not enough dustbins to use
	There are too many people
	People don't know if it is wrong to litter
	There are no police to jail people who litter
	It is just a bad habit that many people have
	People don't care about cleanliness

Thank you for taking part in this survey.

APPENDIX C

MAP OF KAJIADO COUNTY

Retrieved from: www.kajiado.go.ke

APPENDIX D

NACOSTI RESEARCH LICENSE

THIS IS TO CERTIFY THAT:
MISS. DORCAS WANJIKU MUGO
of ADVENTIST UNIVERSITY OF AFRICA,
0-206 Kiserian,has been permitted to
conduct research in *Kajiado County*

on the topic: *THE UNDERLYING REASONS FOR SOLID WASTE DISPOSAL PRACTICES AMONG PRIMARY SCHOOL CHILDREN IN KAJIADO NORTH SUB-COUNTY, KENYA*

for the period ending:
31st January,2019

Applicant's
Signature

Permit No : NACOSTI/P/18/22943/21007
Date Of Issue : 31st January,2018
Fee Recieved :Ksh 1000

Director General
National Commission for Science,
Technology & Innovation

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CONDITIONS: see back page

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Ref No **NACOSTI/P/18/22943/21007** Date: **31st January,2018**

Dorcas Wanjiku Mugo
Adventist University Of Africa
KENYA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"The underlying reasons for solid waste disposal practices among primary school children in Kajiado North Sub-County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Kajiado County** for the period ending **31st January, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Kajiado County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System

GP Kalerwa
GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:
The County Commissioner
Kajiado County.

The County Director of Education
Kajiado County.

APPENDIX E

CORRESPONDENCE

KAJIADO COUNTY AND SUB-COUNTY EDUCATION DEPARTMENT AUTHORIZATION TO COLLECT DATA FROM SCHOOLS IN KAJIADO NORTH SUB-COUNTY

MINISTRY OF EDUCATION
State Department of Early Learning and Basic Education

Email: kajiadocde@gmail.com
When replying please quote

COUNTY DIRECTOR OF EDUCATION
KAJIADO COUNTY
P.O. BOX 33-01100
KAJIADO

Ref: KJD/C/R.3/VOL.II/72 **10th September, 2018**

Dorcas Wanjiku Mugo
Adventist University of Africa
KENYA

RE: RESEARCH AUTHORIZATION

The letter from National Commission for Science, Technology and Innovation **Ref. NACOSTI/P/18/22943/21007** dated 31st January, 2018 refers.

This is to confirm to you that, you have been authorized to conduct your research on **"The underlying reasons for solid waste disposal practices among primary school children in Kajiado North Sub-County"** in Kajiado County for a period ending **31st January, 2019.**

On completion of the research, you are expected to submit **a copy** of the research report/thesis to our office.

COUNTY DIRECTOR OF EDUCATION
KAJIADO COUNTY

NAOMI P. PARINKOI
FOR: COUNTY DIRECTOR OF EDUCATION
KAJIADO COUNTY

MINISTRY OF EDUCATION
STATE DEPARTMENT FOR EARLY LEARNING AND BASIC EDUCATION

Email: deokjdnorth@mail.com
When replying please quote
Ref: KJD/N/RESEARCH/10/9/18

SUB COUNTY DIRECTOR OF EDUCATION
KAJIADO NORTH,
P.O. Box 88 – 00208,
NGONG HILLS
10/09/2018

DORCAS WANJIKU MUGO
ADVENTIST UNIVERSITY OF AFRICA
KENYA

RE: AUTHORITY TO CARRY OUT RESEARCH:

Following your request to conduct a research in the Sub County vide your letter Ref **NACOSTI/P/18/22943/21007 dated 31ST September 2018** on **"The underlying reasons for solid waste disposal practices among primary school children in Kajiado North Sub County in Kajiado County"** for a period ending **31st January, 2019**. You are hereby granted permission to embark on the research.

The administrators of schools are therefore requested to provide you with the relevant information for the research exercise. This office will expect to get a hard copy and soft copy of the research report / thesis.

It is expected that you adhere to research ethics in doing your study.

FOR SUB-COUNTY DIRECTOR OF EDUCATION
10 SEP 2018
KAJIADO NORTH

HELLEN N. PUNDO
For SUB COUNTY DIRECTOR OF EDUCATION
KAJIADO NORTH

THE REPUBLIC OF KENYA

THE PRESIDENCY

Telegrams: "DISTRICTER", Kajiado
Telephone: 0203070295
Fax: 0202064416
E-mail: kajadocc2012@yahoo.com
Kajiadocc2012@gmail.com
When replying please quote

MINISTRY OF INTERIOR
AND COORDINATION
OF
NATIONAL GOVERNMENT

OFFICE OF THE COUNTY
COMMISSIONER
KAJIADO COUNTY
P.O BOX 1-01100
KAJIADO

Ref. KJD/CC/ADM/45VOL.1/(9

9th February, 2018

Dorcas Wanjiku Mugo
Adventist University
KENYA.

RE: RESEARCH AUTHORIZATION: DORCAS WANJIKU MUGO

Following the request made on your behalf by National Commission for Science, Technology and Innovation Ref. No. NACOSTI/P/18/22943/21007 dated 31st January, 2018 you are authorized to undertake your research on ***"The underlying reason for solid waste disposal practices among Primary School children in Kajiado North Sub-County, Kenya"***, for the period ending ***31st January, 2019.***

You are advised to carry your research in line with laid down research ethics.

JACK MBISO
FOR: COUNTY COMMISSIONER
KAJIADO COUNTY.

CC:
Deputy County Commissioner
KAJIADO NORTH SUB- COUNTY.

The County Director of Education
KAJIADO COUNTY.

THE REPUBLIC OF KENYA

THE PRESIDENCY

Telephone: 020 – 8040911
Fax: 020 - 8040911
Email– dckajadonorth@gmail.com
When replying please quote

MINISTRY OF INTERIOR AND COORDINATION
OF NATIONAL GOVERNMENT

Deputy County Commissioner,
Kajiado North Sub-County,
P.O Box 78-00208,
NGONG HILLS.

9th February, 2018

REF: EDU.12/23/VOL.I/163

All Assistant County Commissioners,
KAJIADO NORTH SUB-COUNTY.

RE: RESEARCH AUTHORIZATION – DORCAS WANJIKU MUGO.

The above named person has been authorized to carry out research in Kajiado North Sub-County on **"The underlying reason for solid waste disposal practices among Primary School,"** in Kajiado North Sub-County, for the period ending 31st January, 2019.

Kindly accord her the necessary assistance.

Deputy County Commissioner
KAJIADO NORTH SUB-COUNTY

A.R LAIKERA,
FOR: DEPUTY COUNTY COMMISSIONER,
KAJIADO NORTH SUB-COUNTY.

Cc:

Dorcas Wanjiku Mugo

AUA
Adventist University of Africa

Private Bag Mbagathi
[illegible] Nairobi, Kenya
Tel [illegible]
Fax [illegible]
Email: [illegible]
WEB: [illegible]

Location:
Adventist Hill, Magadi Road, Ongata Rongai

January 16, 2018

National Commission for Science Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100, Nairobi Kenya

Dear Sir/Madam:

RE: Introduction of Dorcas Wanjiku Mugo

Greetings from Adventist University of Africa (AUA), Kenya! This letter is to introduce to you **Madam Dorcas Wanjiku Mugo** who is a student in the Adventist University of Africa, School of Postgraduate Studies located in Ongata Rongai with student identification number S2016011offering Master of Public Health at AUA.

Dorcas is currently undertaking a research leading to the production of a thesis on the subject: ***"The Underlying Reasons for Solid Waste Disposal Practices among Primary School Children in Kajiado North Sub-County, Kenya".*** As part of the research process, she needs to conduct a survey by distributing questionnaires to school children in some selected Public and Private Schools in Kajiado North Sub-County.

May I therefore request your kind assistance in granting Dorcas authorization to distribute her questionnaires to the school children in the Kajiado North Sub-County. Be assured that any information delivered to Dorcas will be treated in the strictest confidence and none of the participants/data will be individually identifiable in the resulting study.

Thanking you in advance for your assistance and support in furthering this research endeavor.

Yours faithfully,

Dr. Daniel Ganu
Dean, School of Postgraduate Studies

Email: ganud@aua.ac.ke
Mobile: +254 736656843

AUA

Adventist University of Africa

Private Bag Mbagathi
00503 Nairobi, Kenya
Tel (254) 20660307/660330
Fax: (254) 20 660 3150
Email: info@aua.ac.ke
WEB: www.aua.ac.ke

Location:
Advent Hill, Magadi Road, Ongata Rongai

January 18, 2018

Dear

RE: Introduction of Dorcas Wanjiku Mugo

Greetings from Adventist University of Africa (AUA), Kenya! This letter is to introduce to you **Madam Dorcas Wanjiku Mugo** who is a student in the Adventist University of Africa, School of Postgraduate Studies located in Ongata Rongai with student identification number S2016011offering Master of Public Health at AUA.

Dorcas is currently undertaking a research leading to the production of a thesis on the subject: ***"The Underlying Reasons for Solid Waste Disposal Practices among Primary School Children in Kajiado North Sub-County, Kenya"***. As part of the research process, she needs to conduct a survey by distributing questionnaires to primary school children in some Schools in Kajiado North Sub-County.

May I therefore request your kind assistance in granting Dorcas the permission to distribute her questionnaires to the school children. Be assured that any information delivered to Dorcas will be treated in the strictest confidence and none of the participants/data will be individually identifiable in the resulting study.

Thanking you in advance for your assistance and support in furthering this research endeavor.

Yours faithfully,

Dr. Daniel Ganu
Dean, School of Postgraduate Studies

Email: ganud@aua.ac.ke
Mobile: +254 736656843

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VITA

Personal Identification:

Name: Dorcas Wanjiku Mugo

Date of birth: September 3, 1985

Place of birth: Machakos, Kenya

Marital status: Married

Children: Lawrence Mshindi Babu and Olivia Mema Babu

Education:

Bachelor of Science in Agribusiness Management, 2008

University of Nairobi

Work Experience:

Program Manager (Livestock Market Systems Activity): 2018 – present

Smart Regional Consultants Ltd

Project Officer (Finance and Administration): 2009-2015

Syngenta Foundation for Sustainable Agriculture (Smallholder Development Project – Kenya)