UNIVERSITY OF EDUCATION, WINNEBA

ENVIRONMENTAL SUSTAINABILITY: AN ASSESSMENT OF WASTE MANAGEMENT BEHAVIOUR AND PRACTICES ON SOME CAMPUSES OF UNIVERSITY OF EDUCATION, WINNEBA

MUNKAILA MUSAH

2015

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ENVIRONMENTAL SUSTAINABILITY: AN ASSESSMENT OF WASTE MANAGEMENT BEHAVIOUR AND PRACTICES IN SOME CAMPUSES OF

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A thesis in the Department of Science Education, Faculty of Science Education submitted to the School of Graduate Studies, University of Education, Winneba, in partial fulfillment of the requirements for the award of the degree of MASTER OF PHILOSOPHY in Science Education

JUNE, 2015

DECLARATION

Student's Declaration

I, **MUNKAILA MUSAH** declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature…… Date……

Munkaila Musah

Student

Supervisor's Declaration

I, hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision laid down by the University of Education, Winneba.

Signature……. Date ……

Prof. Kolawole Raheem

Supervisor

ACKNOWLEDGEMENTS

I begin in the Name of Allah Most Gracious, Most Merciful, Praise be to Allah the Lord of the worlds, Thee alone we worship and thee alone we seek for help, guidance, wisdom and favours. I am grateful to Him for his directions and protection throughout the study of this programme.

I wish to acknowledge the contributions of all who have supported me in diverse ways in my academic endeavours. God will reward you bountifully. For lack of space, I wish specifically to express my sincere gratitude to the following; Professor Kolawole Raheem and Professor Stella Y. Erinosho (my supervisors) who did not just consider me a mentee but a son. Their enormous care, support and guidance before and during this programme brought me to where I am today – indeed I am deeply indebted to them for their inspiration, assistance and guidance. Prof. John K. Eminah, I am greatly thankful for your corrections, fatherly advice, and mentoring role throughout this study, also the papers you gave to me at the beginning of the study were very helpful. My sincere thanks goes to Dr. K. A. Monney of the Department of Biodiversity, University of Cape Coast, for expressing interest in my work and the support given there-in, I say God bless you. Professor Lai Erinosho, your fatherly advice and encouragement inspired me to complete this work on time. Also, the explanation given to me on behaviour characterization (i.e. Knowledge, Attitude and Practice/Perception) formed the citadel for this study. Dr. T. Young your steadfast support to see that this work is a success cannot be over emphasized, I thank you dearly. Dr. E. I. N. D. Ngman-wara and Dr. Victor Antwi I am grateful for your support. Dr. John A. Azure your encouragement saw me through the period of the study thank you. Thank you Mr. Kenneth Kona your assistance to me on this research is unquantifiable I appreciate every bit of it. Miss Anasthesia Ansah Amoonu, Magdalene Tettey and

Benedictor Amfo of Yabiw Methodist, Takoradi, I appreciate your effort of reading through the initial draft and typesetting of the references. I cannot end this without mentioning Mr. Stephen Dennis for his financial support; I eventually lost hope when it was left with one week for the deadline of payment for school fees, and like an angel, saved me through. I also, thank Mr. Kennedy Aboagye, Ms. Sedem Agbemafle, Mr. Paul Ali Bruno, Raymond A. Kaburi, and Mohammed Gali for helping me in the collection of Winneba Campus data, Samuel K. Lartey for Kumasi Campus and Alhassan Andani for Mampong Campus. I say thanks to any one whose name has not been captured but helped me in various ways in life and through this programme.

DEDICATION

This thesis is dedicated to all who struggle for success.

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ABSTRACT

The purpose of this study was to assess the environmental issues on some campuses of the University of Education, Winneba, particularly, on areas pertaining to waste management behaviour and practices. The study was carried out in Kumasi, Winneba and Mampong Campuses of the University. All staff and students of University of Education were the target populations but 734 participants were sampled from the accessible population. Questionnaires, Focus Group Discussions and Document Analysis were used as instruments for data collection. Data collected were subjected to descriptive analysis using SPSS Version 16.0. Data analysed were converted into cross tabulation, frequencies, percentages, means and standard deviations. Again, Chi-square, t-test, ANOVA and multiple comparison tests were employed to examine the hypothesis and Focus Group Discussion (FGD). The results revealed that the staff and students of University of Education, Winneba had knowledge, and were aware of the waste problems on their various campuses. This was confirmed by 70% of the respondents who agreed to the waste problems as well as the poor waste management practices on their campuses. The major contributors to pollution and waste on the campuses as identified by the study were open burning (Mean, 2.40) and falling off posters (Mean, 2.42). Land filling (Frequency, 134.7) was indicated to be the main waste disposal method. Also, the study showed that propensity of waste management contrasts by sex, class and level of awareness, knowledge and practices regarding waste. These findings have great implications for waste management practices, not only in the educational institutions but the country at large. It highlighted on the need to increase awareness and re-echo the need for behavioural and attitudinal change which is a catalyst to waste reduction, reuse and recycling.

CHAPTER ONE

INTRODUCTION

1.1 Overview

The chapter deals with introduction of the study. The background to the statement of the problem and the purpose of the study were discussed in this chapter. It also outlines the objectives and the research questions. Furthermore, the chapter addresses the research hypotheses, assumptions of the study, significance of the research and the intended outcomes, delimitation as well as the limitations of the study. Lastly, the chapter defines the important terms used in the study and the organization of the study.

1.2 Background to the study

Increase in human population and modern demands in communities, towns as well as cities all over the world had made it difficult to create a better and sustainable environment (Asare-Donkor, Wemegah, & Adimado, 2013). This population increase has resulted in ceaseless exploitation of natural resources to meet the legitimate developmental needs of the people; for this reason, adequate care has often not been taken to guard against the mismanagement of the resources and the environment at large (UNEP, 2002). Consequently, this process of unsustainable development has caused irreparable damage to the environment especially in the aspect of waste management. The generation of waste is a concern for basic sanitation (Awuah & Fiakuma, 2007).

The erroneous perceptions of the masses about waste in most developing countries have pushed them deeper into the void (Monney, 2014). While some countries like Singapore, Philippines, Sweden and others are making money out of waste, other countries like Ghana regard all forms of waste materials to be fated for the landfill site. It is gloomier

to know that most waste management companies in the developing countries, which are supposed to benefit from converting useful resources in the waste stream into valuable products, have just become waste collection companies (Monney, 2014).

Waste is more easily acknowledged than defined (Boadi & Kuitunen, 2002). When an item or something is no longer useful to the owner or when it is used and fails to fulfill its purpose then it is classified as waste (Gourlay, 1992). Waste, according to Miller (1988), is any useless, unwanted, or discarded material that is solid, liquid or gas. A great mixture of substances including fine dust, cinder, metal, glass, paper and cardboard, textiles, putrescible vegetable materials and plastic are considered solid waste (Simmens, 1981). Liquid and gas waste include dirty water, liquid from kitchen, bathrooms and industries, carbon dioxide gases and methane. These gases, mostly at landfill sites, are produced when organic waste breaks down anaerobically. This can create odour, kill surface vegetation, and is a good contribution to greenhouse problems (Fakayode, 2005).

Waste managements in developing countries are most often left to either burning, throwing into rivers and oceans or being buried (Monney, 2014). The environment is subjected to changes caused by the organisms that dwell in it.These changes on the average can be taken care of by the environment but when these changes stretch beyond the natural thresh-hold it then leads to pollution and a threat to environmental sustainability. Humans cause more pollution than any other species. Most of these environmental changes are intentional, although most humans, if not all, are aware of its devastating effect yet actively involve themselves in it, in the name of modernization

and trying to improve standard of living (Asabere-Ameyaw, Anamuah-Mensah & Raheem, 2008).

As waste is being continuously generated, if not well managed, one can be certain to say that accumulation of waste will outstrip its control. Currently, throughout the Western world, there are no longer enough convenient holes in the grounds into which to tip unwanted matter (Gourlay, 1992). The Third world, also lacks appropriate storage facilities, treatment technologies, and good methods of disposal for its waste. Not discounting the above factors, other factors might have compounded the problem. Inadequate waste management systems in developing countries have become a major issue in developmental discourses. Developmental initiatives and plans can only be meaningful and sustainable when they are founded on a well-managed and healthy environment. Higher institutions, such as the Universities, involvement could be a means to finding solutions to the environmental problems.

In Ghana, it is a constitutional responsibility to protect the environment as captured in the national environmental policy statement contained in Chapter 6 Article 36(9) of the 1992 Fourth Republican Constitution and stated as follows:

> *"The State shall take appropriate measures needed to protect and safeguard the national environment for posterity, and shall seek co-operation with other states and bodies for purposes of protecting the wider international environment for mankind".*

However, the country is still challenged in the environmental protection and management because it has not been given holistic operational urgency (Dalal-Clayton & Bass, 2009). Recently, environmental sustainability has been receiving more attention from the media and from different governmental departments in Ghana. This is as a

result of the amount of research going into assessing the impact that human activity can have on the environment. Although the long-term implications of this serious issue are not yet fully understood, it is generally agreed that the risk is high enough to merit an immediate response (Monney, 2014).

Higher institutions and cooperate bodies, like the churches and other social groups in various communities, are expected to lead in the area of environmental sustainability as they are considered to be the biggest contributors in the societies and are also in a position where they can make a significant difference within their sectors and the surrounding communities (EPA, 2002). However, it is yet to be seen that higher institutions in Ghana are well-placed to show their expertise.

For the past decades, most communities and institutions have acted with little regard or concern for the negative impact they have on the environment (Filho, 1999). Many large and small organizations are guilty of significantly polluting the environment and engaging in practices that are simply not sustainable (Wright, 2002). Filho (1999) also indicated that, university campuses are not exception to the waste problem. When there is no efficient campus environmental programme directed at sensitizing members of the university community about the quality of their environment then there is a problem.

To promote sustainable waste management practices requires programmes that do not only increase people's environmental knowledge, but also develop the attitudes and behaviour as well as equip target beneficiaries with environmental management skills (Creighton, 1999). The knowledge that is imparted to students of higher institution should not only be for academic endeavours but a training process that will lead them to

manage themselves, their families and communities in all facets of life. For this reason, it is necessary to assess the waste management behaviour and practices in the University of Education, Winneba that would help create the awareness of Universities to be part of the solution-finding institutions to the poor waste management in the country.

1.3 Statement of the Problem

Waste management problems are critical global issues which are very pertinent to every continent, including Africa (UNDP, 2012). Ghana is among the host of African countries trying very hard in fighting sanitation and waste issues (Daily Graphic, 2011). Waste management is a problem in Ghana as indicated in the environmental performance index where Ghana was ranked 151 out of 178 countries in 2014 (Yale, 2014). Also, the recurrent outbreaks of cholera in Ghana (My joy online, 2014) and the inability of the country to achieve the Millennium Development Goal 7 on sanitation by the target year of 2015 (Oduro-Kwarteng, Monney, & Braimah, 2015) indicate a problem of sanitation in Ghana. Again, the consistently exposed filthy areas, particularly, in the regional capitals as well as the foul smell of rubbish that assails the air as waste sat by road sides and remained uncollected for days within the communities in Ghana establish the fact that the country has a problem with waste management. The problem of waste in Ghana cut across all the strata of the communities, including the university environment. These waste menaces are not only tied to management but by the behavior of the citizenry which includes their knowledge, attitudes and perceptions.

Filho (1999) stated that, universities are expected to carry out responsibilities of increasing the awareness, knowledge, technologies, and tools to create an environmentally sustainable future. There is yet to be comprehensive studies informing

the public of the involvement and impact of higher institutions in environmentally sustainable solutions in a developing country like Ghana. However, a cursory look at the universities and their surroundings in Ghana, suggests that these higher institutions are lacking in carrying out this responsibility.

Behavioral instruments play critical role in managing waste. The knowledge we have about the waste we generate, how and where we dump them are very important in managing waste. During my two years of observing environmental conditions in the University of Education, Winneba (UEW), I noticed that washrooms were often messed up during the early weeks of the first semester. The strike (June to September 2013) of Teachers and Workers Union (TEWU), whose members included waste managers, exposed more about the waste management behaviour and practices of students and staff on the campuses of UEW. During their strike action, students knew that the cleaners were on strike but they still ate, drank and left the rubbish at places where they normally sat for group discussions; sometimes on the pathways, corridors, lecture halls or entertainment grounds, which they could have easily conveyed to the rubbish bin. The condition of bathrooms and toilets of students in the halls and lecture outlets were very bad and they even became worse when the water taps were not running. Also, during the strike, waste bins around the staff residential areas were full of waste spilling over and remained uncollected. These and several other observations indicated that the problem of staff and students behaviour and practices on waste management on the university campuses needed to be examined, thus prompting this study.

1.4 Purpose of the study

The purpose of this study was to assess the environmental issues in the University of Education, Winneba, particularly, in the area of waste management behaviour and practices on the three of the four campuses of the University.

1.5 Objectives of the study

The objectives of this study were to:

- assess the knowledge, attitudes and practices of staff and students of the University of Education, Winneba regarding waste and waste management on their campuses;
- identify the major factors that contribute to the environmental waste problems in the University of Education, Winneba;
- assess the facilities that exist for disposal of waste materials in the University;
- find out how the University treats its waste in terms of separating waste, re-use or recycling used materials;
- identify the needs and gaps in current policies and programmes on waste management on the University campuses

1.6 Research Questions

The following research questions were asked:

1. What are the knowledge, attitudes and practices of staff and students of the University of Education, Winneba regarding waste and waste management on campus?
2. What major factors, if any contribute to the environmental waste problems in the University of Education, Winneba?

3. How adequate are the facilities for disposal of waste materials in the University?
4. How does the University treat the wastes on campus with respect to waste separation, re-use or recycling of used materials?
5. What are the needs and gaps in current policies and programmes on waste management on the University campuses?

1.7 Hypotheses

Three research null hypotheses were also formulated. They are:

1. (H_0): There will be no significant differences in the issues regarding knowledge about waste of students in Winneba, Mampong and Kumasi Campuses.
2. (H_0): There will be no significant difference between the background (Sex, age, and parental education) and level of awareness, knowledge and practices of students of the University of Education, Winneba on waste management.
3. (H_0): There will be no significant difference in the attitudes of students and staff in the University of Education, Winneba regarding waste management.

1.8 Assumptions of the study

The following assumptions guided the study:

1. The Ghanaian curriculum from the lower primary up to the secondary level has been structured in such a way that it creates awareness of the environment and sanitation. If students in the University have passed through these cycles then, it will be assumed that they have basic knowledge about the environment.
2. It was assumed that students have varied knowledge on waste management
3. It was also assumed that students' knowledge level about the environment affects their behaviour and practices.

1.9 Significance of the study and intended outcome

The issue of waste management has been a major issue in Ghana based on challenges of attitude and perception of the populace towards waste and environmental sanitation. Also, lack of appropriate dumping/sanitary landfill sites and inadequate knowledge and skills of waste management practices have been indicated to be contributing to the poor sanitation in Ghana. This study will assist in increasing awareness on waste management and the need to move away from the conventional practices of heaping waste at one point to a more modern system of waste management that integrates waste reduction. The findings will also indicate how students and staff need to manage waste by separating them into biodegradable (papers and food waste), non-biodegradable like plastics, polythene, metal scrap etc.

In addition, dissemination of findings of this study will encourage recycling of waste materials in different beneficial ways among staff and students.

The modern system of separating waste, reducing, recycling and reusing waste materials (the three R's) has been established to be more sustainable, economically prudent and environmentally acceptable for many who practiced them (Seadon, 2006; El-Hagar, 2007; Suttibak & Nitivattananon, 2008). This study intends to remindstudents and staff of U.E.W. the direction for contributing to the development and establishment of waste management education in Ghana. What made this study very important was that it shall;

- Bring forth the inclusion of higher institutions in the discussions of waste issues in the country in the event of revisiting issues regarding the Talloires Declaration on waste management. The study will seek respondents' knowledge on the

Talloires declaration, those who do not know will be prompted to find out what it entails and those who already know shall be reminded.

- Challenge higher institutions to live by example on issues regarding waste. This would be through the suggestions and recommendations that had been made regarding changes in behaviour and practices by students and staff of UEW with regard to waste management.
- Encourage higher institutions to formulate "contextualized on-campus environmental policies" and implement them.

1.10 Delimitation

The scope of the study covered seven hundred and forty-three (743) respondents from three campuses (Winneba, Mampong and Kumasi). All the students in this study offered courses in some aspect of educational teaching (content and pedagogy) irrespective of their area of specialization.

The concept of waste separation, waste reduction and re-use of waste is not very popular among most of the students but some waste treatments like incineration are known by some of them. Most of the ground workers had less educational background and could either not read or do not understand most of the items in the questionnaire. To minimize the effect of these factors on the findings, I made myself available to explain the questionnaire and sometimes read through some of the items on the questionnaire with them. Also, the questionnaire was translated into the local language (Twi) for the understanding of the ground officers with difficulties in understanding the items, even if it was read to them in English.

1.11 Limitations of the Study

The researcher was not able to involve all higher institutions, although the problem of waste management behaviour is a global menace and a major problem in Ghana. This study targeted Universities in the country excluding other tertiary or higher institutions. Also, the study was limited only to the teacher-training universities. One of the main teacher-training universities in Ghana is University of Education, Winneba with four main campuses, Kumasi, Winneba, Ajumako and Mampong Campuses. However, Ajumako Campus was also excluded in the study, because it was a newly created campus with relatively few students and staff.

Other constraints include lack of sufficient finances and logistics which hampered travels of the researcher to other areas to conduct the study.

The results/findings from this study cannot be generalized.

1.11 Important terms used in the study

1.12.1 Sustainability

There is no simple definition of 'sustainability'. It can be an idea, a property of living systems, a manufacturing method or a way of life. In fact, there may be as many definitions of sustainability as there are people trying to define it.

However, most definitions, according to USEPA (2008), mentioned that sustainability includes:

- living within the limits of what the environment can provide;
- understanding the many interconnections between economy, society and the environment; and

- the equal distribution of resources and opportunities.

Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations (USEPA, 2008). In 2005, the World Summit on Social Development identified three core areas that contribute to the philosophy and social science of sustainable development. These "pillars" in many national standards and certification schemes, form the backbone of tackling the core areas that the world now faces. These "pillars" as described by USEPA (2008) has been indicated in Table 1.2.

Table 1: Sustainability connections

Economic	Environmental	Social
Economic development	Resource use e.g. water	Human and worker rights
Local industry participation	Waste generation	Paying appropriate wages
Jobs created	Material sourcing	Working conditions
Corporate governance	Atmospheric pollution	Freedom of association
Public reporting	Toxic material disposal	Workforce diversity

Source: USEPA (2008)

Diamond (2005) indicated that sustainability is directly connected to three strong issues relating to economic, environmental and social perspectives. Any one issue in a particular category has a connection with or influence on the other two groups like

Economic development in the economic sector will affect resources in use like water, land etc. in the environmental sector, which will subsequently affect the human and worker rights in the social category. This applies to each unit under the various categories or sectors.

Diamond (2005) further stressed that, in the system of waste management sustainability, the economic section constitutes economic development, local industry participation, jobs creation, corporate governance and public reporting. Also, under the environment, we have resource use, waste generation, material sourcing, atmospheric pollution and toxic material disposal. The last issue being the social consists of human and worker rights, paying appropriate wages, working conditions, freedom of association and workforce diversity. Judging from above, sustainability simply means the best way we live and interact with our environment and not causing harm to it.

1.12.2 Environmental Sustainability

Environmental sustainability refers to the long-term maintenance of ecosystem components and functions for future generations. It means ensuring that the overall productivity of accumulated human and physical capital resulting from development actions more than compensates for the direct or indirect loss or degradation of the environment (Diamond, 2005).

1.11.4 Waste Management

It is the collection, transportation, processing, disposal, managing and monitoring of waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or

aesthetics (USEPA, 2008). Waste management is a distinct practice from resource recovery which focuses on delaying the rate of consumption of natural resources. All waste materials, whether they are solid, liquid, gaseous or radioactive fall within the remit of waste management and it also aims at recovering valuable resources and creating clean, renewable energy.

1.11.5 Hazardous Waste

Products which due to their nature and quantity, are potentially hazardous to human health and/or the environment and which require special disposal techniques to eliminate or reduce the hazard (Meakin, 1992).

1.11.6 Recovery

It is the conversion of waste to energy, generally through the combustion of processed or raw refuse to produce steam (USEPA, 1995).

1.11.7 Recycling

The process by which materials otherwise destined for disposal are collected, reprocessed, or remanufactured, and are reused (USEPA, 1995).

1.11.8 Reuse

The use of a product more than once in its same form for the same purpose; e.g., a soft drink bottle is reused when it is returned to the bottling company for refilling (USEPA, 1995).

1.11.9 Behaviour

The actions or reactions of a person or animal in response to external or internal stimuli; conduct; manners or deportment, especially good manners; general course of life; treatment of others; manner of action; the activity of an organism, especially as measurable for its effects; response to stimulus; the functioning, response or activity of an object or substance (Sheldon, 2005).

1.12 Organization of the Study

This study is organized in five chapters. The first chapter describes the background to the study, statement of the problem as well as the research purpose. It also describes the research objectives, the research questions and significance of the study. The chapter further describes the limitations of the study, delimitation of the study and definition of terms used.

The second chapter provides the review of literature related to the study. Through this the theoretical framework and conceptual framework for the study are presented. It further deals with the systematic identification, location and analysis of documents containing information related to waste management both in the global and local perspective. These include periodicals, abstracts, reviews, books, and research reports.

Chapter three presents information about the methodology employed in the study which includes research design, research population, sample and sampling techniques. The chapter also describes research instruments, validity and reliability of the instruments. It further defines the data collection procedures and data analyses procedures.

Chapter four focuses on the presentations and analysis of data as well as its findings therein and Chapter five discusses the research findings and provides a summary of the

study, major findings, conclusions and recommendations. Suggestions, further studies have also been made.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter deals with review of related literature relevant to the study. It encompasses the conceptual, theoretical and legal framework, waste management problems that have been identified by others and the Talloires declaration. Again, it discusses some behavioural elements identified by the University of Dalhausie on waste management practices and deliberates on Ghana Government law and policy, municipal law and policy on the environment and the analysis of environmental policy of University of Education, Winneba. Finally, it relates some literature on economic instruments and institutional innovation, some incentive policies as well as education and monitoring.

2.2 Conceptual Framework

Dealing with waste has become a major challenge in most countries in the sub-region. Improper management of waste, collection and disposal has continually increased the rate of environmental degradation and pollution. Anything useless that a person throws away or intends to throw away may be termed waste. The 'holder' of the waste can either be the producer of the waste or be in possession of the waste (William, 2005). Waste however, is very subjective; one person may deem an item to be waste whilst another might see it as a resource (Agwu, 2012).

Management of waste in institutions, communities and industries is very important, although waste management varies per sector since different wastes are generated as the nature of waste production varies. Most of the waste generated in academic institutions like the case of University of Education, Winneba includes paper waste from the offices, food and domestic waste from halls, canteens and staff bungalows, electronic waste from machines and computers in the offices and other organic waste from bushes and trimmed hedges on the campuses. The dynamic nature of consumer or final user of products, packaging materials, environmental regulations, public behaviour and practices have made the development of waste management strategies an increasingly complex task (Sakai, Sawel, Chandler, Eighmy, Kosson, & Vehloew, 1996).

In tackling waste, a controlling order is mostly designed and this determines the actual concept by which waste is controlled. If the hierarchy is well placed, it will express the order of application with regard to the extent of waste management. Fig. 1 shows the waste controlling order in Ghana.

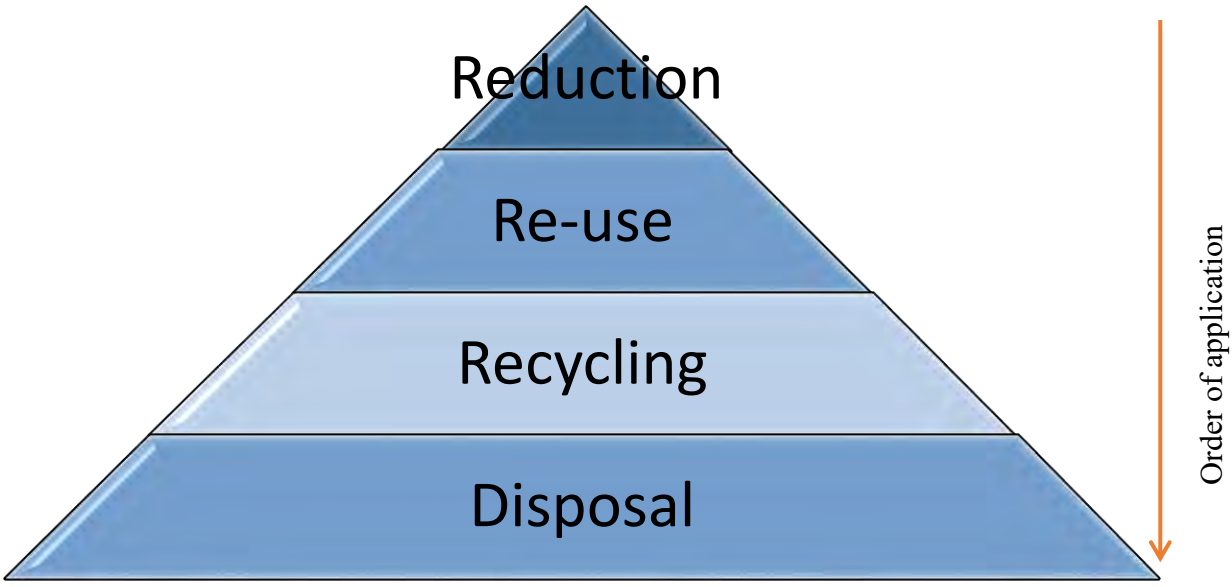

Figure 1: Waste controlling order in Ghana

The waste controlling concept as shown in Figure: 2was derived from the EU waste policy as cited by Agwu (2012) captioned 'waste hierarchy' which has been modified and contextualized in the Ghanaian perspective by this study.

Disposal of waste is the broadest and forms the basis of how Ghanaians look at 'waste'. The control order increases from the reduction point of view through re-use, recycling and to the final base which is disposal. People are more into the conventional heaping of waste than the modern system of recycling and reduction. The moment something becomes non-useful to a person, the first consideration to make is disposing it off. These wastes are sent to few dumpsites; but majority ends up in drains, streams, and open places. The methods of disposal are often open dumping, open burning, burying, controlled burning and tipping at dumpsites. This has created a pressing sanitation problem as many towns and cities are overwhelmed with management of solid, liquid and electronic waste.

Waste recycling has become a viable economic option in Ghana despite the considerable cost of collection; this comes next to disposal. Waste recycling technologies are being used by few industries in the country to circumvent the need for treatment and the discharge and disposal of large volumes of waste as well as reducing demand for raw materials, energy and water. A new industry in Tema recently started buying sachet water packs from consumers for recycling and many people were involved in its collection. Bottles, wrappers plastic bags are being recycled into useful products. Also, as part of the advocacy for recycling, Center for School and Community Science and Technology Studies (SACOST) and Zoomlion Ghana Limited planned and formed partnership on the Zoom kids' projects (SACOST, 2012) to involve the youth in recycling. As part of this initiation, goal post net was made from sachet water packs.

Home Economics Department of University of Education, Winneba also introduced a course for recheffei′ - that is turning old food into different dishes. All these ideas have been helpful in the re-use and recycling level in the hierarchy.

According to a paper presented by Anku (2000), the increase in scavenging has boasted the re-use of waste in Ghana despite its considerable hindrance to Municipal waste disposal operations.

Scavengers play vital role in waste re-use and should be considered seriously in waste management for example, they can be designated as official used-materials merchants and given training and status upgrading (Anku, 2000). Waste reduction forms the peak of the waste controlling order, because most people do not really consider or care about the waste they generated. Disposal of waste causes shortages of landfill sites and policies should be designed and implemented to monitor, support, and suggest ways to reduce waste disposal (EPA Anniversary Lecture, 2004).

2.3 Theoretical Framework

This study is established on Ajzen (1991) Theory of Planned Behavior (TPB). According to Ajzen (1985), Maddan, Ellen & Ajzen (1992) and Ajzen & Driver (1992), what an individual does is determined by personal motivation which is determined by attitude, social support and perceived behavioural control. They further explained that these factors are grounded by the persons' perception of social, personal, and situational consequences of the specified action. The individual's behavioral beliefs, normative beliefs and control beliefs, respectively, determine his/her attitude towards the behaviour, subjective norm and perceived behavioural control; these collectively influence the intention and the actual behaviour when that individual is under self-

control. Ajzen (1991) represented this framework diagrammatically as shown in Figure 2.

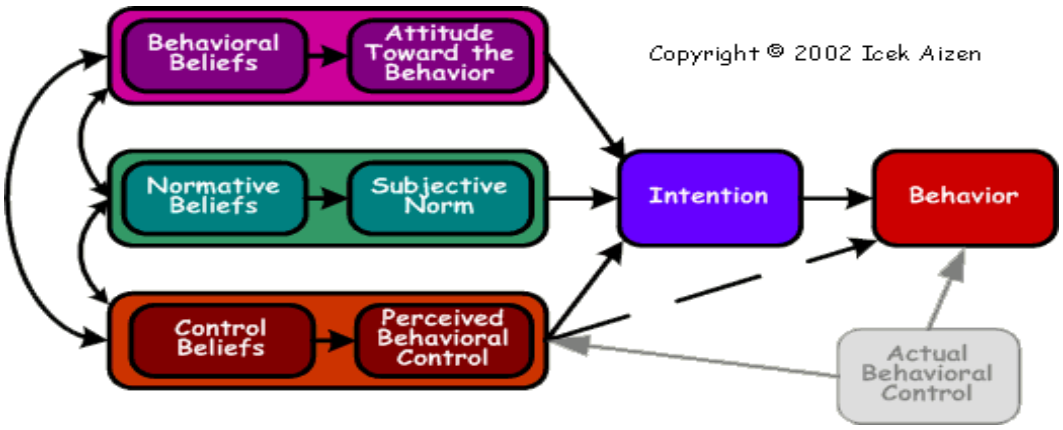

Figure 2: Theory of Planned Behaviour

Source: Ajzen, I. (1991)

TPB allows for a better evaluation of human behavior when participation decisions are voluntary and under an individual control. Gamba & Oskamp (1994), Scott & Willets (1994), Kuhlemier, Van den Berg& Lagerweij (1999), Grodzinska-Jurczak, Agata& Agata(2003) have used the Theory of Planned Behaviour to predict a person‘s intent to participate in a specified behaviour. TPB has also been used successfully by some researchers in environmental behaviour to explore attitudes that trace the correlation of beliefs to behaviour.

This study assumed that the knowledge level, waste management policies and background of students and staff of the University of Education, Winneba influence their attitude, subjective norm and perceived behavioural control, thus, determining the behavioural intention and the actual behaviour exhibited in their practices and behavioural management of waste on campus.

2.4 Waste Management Problems

Abrokwah (1998) has observed that ignorance, negligence, lack of law to punish sanitary offenders, and low level of technology in waste management are the major causes of waste problems in Kumasi. He suggested that awareness should be created among residents to manage household refuse and educate them on the hazards that bad waste disposal could pose to the environment and to themselves. Although the University is a higher institution of learning and ignorance or illiteracy cannot be said to be the major problem with regard to poor waste management behaviour and practices, other factors like beliefs, perceptions, cultural derivatives could have advance this problem hence, this study was to find out the behavioural practices in the University of Education, Winneba.

According to Agbola (1993), cultural derivatives, beliefs, perceptions and attitudes are learned response sets. They can therefore be modified or changed through education. These points to the fact that people with negative behaviour relating to waste and sustainable environment can be changed for the better through education. Some cultures directly influence behaviour and practices. In the Ghanaian culture, sanitation of the house and environment is left mostly for the women and this culture could influence students and staff behaviour on waste management. Formal education for women is said to be a pre-requisite for change in sanitation behaviour in our communities (Pacey, 1990). Multiple approaches are needed to tackle waste management.

Gourlay (1992) argues that by focusing on the production process itself, examining where wastes are generated, and exploring how they can be reduced can help achieve large waste reduction results.Even simple measures, such as separating wastes so that they can be reused more easily, using different raw materials or replacing non-biodegradable products with biodegradable ones can results in effective waste reduction.

He also claimed that the greater part of present waste arises not because the producer does not want it, but he fails to use it. This argument places emphasis on recycling and conversion of waste as important solid waste management practices.

Stirrup (1965) indicated that, pulverization and grinding are means of reducing the volume of waste or they are used to prepare refuse for final disposal processes. He further stressed that in some instances a threefold problem could be overcome using composting. Thus, the feeding of impoverished soils, disposal of large portions of the refuse, and the disposal of sewage sludge can be realized through composting. Moreover, Stirrup (1965) claimed that the major advantages of incinerations are complete destruction of combustible and organic matter, reduction of bulk, the ability to operate under hygienic conditions free from interference by the type of weather conditions that would affect disposal by tipping and the possibility of using residual heat from the furnaces. The waste management system of Ghana, especially in the cities and major towns lack most of these advantages due to the inability to afford incinerators. Gourlay (1992) observed that in larger cities, collection and disposal of waste is a municipal responsibility, but the actual business of disposal is often contracted out to private firms.

2.5 Behavioural Issues

Educational and promotional tools, such as staff education, event promotion and training, are essential for the successful implementation of a waste management plan (CCME, 1996). Raising awareness about different waste management programmes can have positive effects, but there are several methods which can be used to change behaviour to improve participation or correct problems (Timlett & Williams, 2008).

Once new initiatives are introduced, people will need time to adjust until the new plan becomes normal behaviour, but once this behaviour is established it is difficult to break (Timlett & Williams, 2009).

Establishing certain behaviour patterns in transient populations such as student groups and military populations, and in high density residential areas can be challenging. Targeted strategies which are aimed at specific areas and groups (Purcell & Magette, 2010), and which focus on providing instructions on how, what, and where efforts should be focused can result in greater success rates (Smyth, Fredeen, & Booth, 2010). It is also important to consider the socio-economic conditions of the group that is expected to participate in the programme of behaviour pattern (Matsumoto, 2011).

Participation and perception towards different waste management plans can be impacted by a variety of factors including, the level of knowledge regarding the impacts of current and suggested actions; access to adequate facilities; adequate knowledge and expertise to carry out what is being asked; concern for the community; and knowledge of the consequences or benefits of their actions (Davies, Phillips, Read, & Lida, 2006; Hansmann, Bernasconi, Smieszek, Lonkupoulos, & scholz, 2006; Thøgerson & Grunert-Beckmann, 1997). It is possible to achieve significant short-term success in altering behaviour by implementing incentive-based programs which offer a reward for participation (Timlett & Williams, 2008); however, behaviour changes brought about through these methods are not maintained in the long-term once the reward is removed (Kaplowitz, Yeboah, Thorp, & Wilson, 2009). Personalized feedback has also been shown to result in behaviour change (Timlett & Williams, 2008).

2.6 Ghana Government Law and Policy on Environmental Sanitation

In September 2010, a revised Environmental Sanitation Policy of Ghana was produced. The overall goal of this new policy is to develop a clear and nationally accepted vision of environmental sanitation as an essential social service and a major determinant for improving health and quality of life in Ghana. The policy is a necessary tool required to help shape all efforts in dealing with the overwhelming challenges of poor sanitation in Ghana. The policy on sanitation in Ghana mainly focuses on the strategic elements (which are to provide a clearer strategic framework for achieving the overall goal of the sector) under seven policy areas namely:

- Capacity development
- Information, education and communication
- Legislation and regulation
- Levels of service sustainable financing and cost recovery
- Research and development
- Monitoring and evaluation

Environmental sanitation is considered as a major component of the Medium-Term Development Policy Framework (MTDPF, 2010 – 2013) as well as the previous Growth and Poverty Reduction Strategy (GPRSII, 2006 – 2009). This is adequately captured under the Expanded Development of Production Infrastructure pillar of the MTDPF (2010 – 2013).

While creating awareness for change in environmental sanitation behaviour of all citizens and improving enforcement management are important strategies that can remedy the poor situation of services, improving the knowledge and expertise of sector staff is critical. The Environmental Sanitation Policy (Revised, 2010) supports the above

goal and recommends institutional strengthening and capacity enhancement of sector institutions and staff as an important requirement.

The National Environmental Sanitation Strategy and Action Plan (NESSAP) is in response to the need to refocus the environmental sanitation sector in Ghana to meet MTDPF (2010 – 2013) objectives as well as those of MDGs and other recent international initiatives such as the Sanitation and Water for All: a Global Framework for Action (SWA).

The current Environmental Policy of Ghana stresses on the principle of privatization of waste management in the urban areas in Ghana, which depends on the National Environmental Action Plan (NEAP), 1991 – 2000 and the Urban Environmental and Sanitation Project (USEP), 1995-2000. Consequently, Ghana government has come out with an environmental sanitation policy which seeks to define a systematic approach and framework within which resources can be used most efficiently (MLGRD 1999). The objective of this policy is to maintain a clean, safe and pleasant physical environment in all human settlements to promote the social, economic and physical well-being of all sections of the population. Under this policy, roles and responsibilities of the public and the private sectors as well as the principal and allied sector agencies have been spelt out.

2.7 Legal Framework of Waste in Ghana

To address the problem of waste management, Government has over the years put in place adequate national policies, regulatory and institutional frameworks. An Environmental Sanitation Policy was formulated in 1999. This policy has been amended and strategic action plans developed for implementation. Various relevant legislations for the control of waste have also been enacted. These include the following:

- Local Government Act, 1990 (Act 462);

- Environmental Assessment Regulations, 1999 (LI 1652);
- Criminal Code, 1960 (Act 29);
- Water Resources Commission Act, 1996 (Act 522)
- Pesticides Control and Management Act, 1996 (Act 528); and
- National Building Regulations, 1996 (LI 1630)

In addition to the above policies and legislations, the Ministry of Environment, Science and Technology, the EPA, Ministry of Local Government and Rural Development and the Ministry of Health have prepared the following guidelines and standards for waste management:

- National Environmental Quality Guidelines (1998);
- Ghana Landfill Guidelines (2002);
- Manual for the preparation of district waste management plans in Ghana (2002);
- Guidelines for the management of healthcare and veterinary waste in Ghana (2002); and
- Handbook for the preparation of District Level Environmental Sanitation Strategies and Action Plans (DESSAPs).

2.8 Municipal Waste policy

According to Songsore (1992), solid waste management has remained one of the intractable problems with the Metropolitan Assemblies. His argument supports the fact that waste producers generate large volumes of wastes but do not dispose of waste in an acceptable manner. This is important to the study because people's attitudes and perception towards waste management are questionable. With the establishment of the Waste Management Department (WMD) of Metropolitan and Municipal Assemblies, the public tends to have the view that the departments should be solely responsible for

managing wastes. He further observed that indiscriminate disposal of waste has resulted in the clogging of the few built drainage channels and natural watercourses with garbage and silt, which are not removed regularly.

The district assemblies of Ghana stated on their blog on sanitation and waste management website that "Waste management remains a challenge confronting the Municipality despite efforts so far made and certain areas are characterized by choked drains, indiscriminate waste disposal and uncollected refuse in central waste containers.

Notable factors accounting for the waste management problem include:

- Poor conceptualization of sanitation and lack of adequate sanitary facilities;
- Ignorance and irresponsibility of individuals, households and communities;
- Lack of community action and springing up of unauthorized temporary structures; and
- Continuously increasing number of squatters.

On the district assembly website, it was also indicated that lack of regular budgetary allocation for sanitation and virtual absence of fee based service provision in low income areas also account for the waste problems.

Again, improving the delivery of environmental sanitation services is one of the key challenges of our times. The immediate impact of poor services is often felt and seen by many residents and so Metropolitan, Municipal and District Chief Executives (MMDCEs) are engaged in daily waste collection and costs take about a third of municipal budgets besides periodic support from District Assemblies Common Fund (DACF) and other sources.

2.9 The Talloires Declaration

'Talloires declaration' is the declaration made by institutions regarding the issues of institutions involved in environmental sustainability (ULSF, 2001). This was as a result of university leaders 'significant concerns and impact on students and staff in general on sustainable environment. In 1990, a declaration by Presidents, Rectors and Vice-chancellors held in Talloire, France called the "Talloires Declaration" in which the event was tagged 'University Leaders for a Sustainable Future' and Ghana was one of the signatories to this declaration and was represented by Prof. Akilakpa Sawyerr from University of Ghana. Since this declaration more universities world-wide have joined in the fight for Environmental Sustainability but only one university, that is, Methodist University, has joined from Ghana afterwards in 2008. The University of Education, Winneba is yet to be a member. Although many institutions are managing in their own small way regarding the environmental sustainability, the issue is whether they have a comprehensive system in place, especially in the area of waste management behaviour and practices.

Universities educate most of the people who develop and manage society's institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies, and tools to create an environmentally sustainable future. Universities have all the expertise necessary to develop the intellectual and conceptual framework to achieve this goal. Universities must play a strong role in the education, research, policy development, information exchange, and community outreach to help create an equitable and sustainable future.

2.10 University Policy Library

According to the University of Minnesota (UM) policy of environmental management on waste and disposal (UMN Policy, 2014) there are three steps necessary to manage waste, they are:

1. ***Identify wastes***: Members of the University community must be aware of the wastes that they produce and the appropriate University management system for each type of waste.
2. ***Evaluate waste***: Members of the University community must evaluate their waste for its physical, chemical and biological characteristics to determine how it is to be properly managed.
3. ***Manage waste:*** Once the waste has been identified and evaluated, generators must manage their waste according to applicable University of Minnesota waste management instructions. The University waste management instructions have been developed to keep the University in compliance with all applicable laws and regulations and to induce a safe and healthy workplace.

2.11 Waste and Recycling in the University of Edinburg

As part of the waste management strategies, the University of Edinburg have form a waste and recycling team that provides services with regard to waste management on the University campus. These Services include the placing of bins, share recycling points across the estates, encourage the separation of waste and increase the quantity and quality of recycling (University of Edinburg, 2015). Wastes ae in streams like the *Orange* for dry mixed recycling which offers recyclable materials from non-recyclable with segregation taking place off-site and *Dark grey* for general waste, this stream are "safe disposables" that goes to landfill. Some of these policies can be emulated by

Ghanaian Universities to help in the management of waste for environmental sustainability.

2.12 Environmental policy of University of Education, Winneba

Good environmental policies in any institutions are the essential mechanisms in effective environmental management. However, the environmental policies, regulations, and institutions that have been developed in Africa and Ghana are generally inadequate to cope with the wide range of environmental problems that exist. In many cases the existing arrangements have not led to sufficient environmental governance especially in the aspect of innovative approaches in managing waste.

The environmental sanitation policy of Ghana in May 1999 indicated that, environmental sanitation is an essential factor that contributes to the health, productivity and welfare of the people and must be given much attention. It was also identified in Ghana's programme of economic and social development set out in "Vision 2020" as a key element underlying health and human development. Although there are many different national policies, however, it is essential for institutions like the universities to adopt their own internal mechanisms in managing waste on its campuses and extend it to the environment or communities in which the institution is located.

Information search from the state housing and development section of the university who are tasked with the environmental issues on the university campuses and document analysis in the University of Education, Winneba showed that there is no written down policy solely on the environment for the university, although they have measures like the ground and sanitation officers, office assistants and cleaners in place dealing with waste on the campuses.

2.13 Economic Instruments and Institutional Innovation

Policy can help create change through the implementation of economic instruments and programmes that encourage institutional innovation. Center for Environmental Fund (CEF) indicated that, economic instruments can take the form of taxes, while innovation can be stimulated through investments in programme funding for emerging technologies (CEF Consultants, 1994). Economic instruments have been shown to have a direct influence on waste management systems (USEPA, 1994, Goddard, 1995; Bilitewski, 2008; Skumatz, 2008) as well as recycling behaviour (Frey & Obsrholzer-Gee, 1997; Bolaane, 2006; Iyer & Kashyap, 2007) which is a critical component to waste management systems. In some instances, incentives can also be provided by third-party organizations.

2.14 Incentives and Policies

All levels of government can take significant steps to implement policies which impact waste management, particularly with demand-side and supply-side policies (Loughlin & Barlaz, 2006). Demand-side policies can be enabled to stimulate the demand for recyclables. Examples include government procurement guidelines, and reduced tax rates for recyclables and products with recyclable content. Supply-side policies can provide financial incentives to residents and businesses through initiatives like deposit-refund programmes, disposal taxes, and use-based waste management fees (Loughlin & Barlaz, 2006).

2.15 Education

Behavioural instruments play a role in waste management strategies through initiatives that inform and educate. Examples of these types of initiatives include waste audits,

school programmes, advertising, training, and competitions (CEF Consultants, 1994). Education has been shown to be a critical component in encouraging public participation in recycling programmes (Bolaane, 2006; Grodzinska-Jurczak *et al.*, 2006).

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter discusses the research methodologies that were adopted for the study. It describes the study area, the research design, the population and sample for the study. It also discusses the instruments used in the data collection, the data collection procedure, the validity as well as the reliability of the instruments used in the study. The data analyses for the study are also discussed.

3.2 Study Area

The study covered three campuses of the University of Education, Winneba. The main campus is in the Winneba Municipality and two campuses located in Ashanti Region, one in the Kumasi Metropolis and the other in Mampong Municipality. The campuses are Winneba, Kumasi and Mampong campus respectively.

3.3 Research design

This study used mixed method design. This popular mixed methods design is often a descriptive survey methodology; it is described in some studies as sequential descriptive mixed method design (Creswell, 2003). With this study, the design was in three stages;

Stage one: collection of quantitative data using questionnaire

Behaviour for this study was pivoted on Knowledge, Attitude and Perception (KAP), therefore the questionnaire was captured into five main sections according to the research questions stated. This was employed as an approach that would probe into the nature of the problem.

Stage two: hypothesis

The associations that existed between the waste management variables were calculated based on some hypothesis posed in this study.

Stage three: collection of qualitative data

Document analysis of the university hand book on rules and regulation, statutes, website, blogs as well as other important policy documents and the use of Focus Group Discussion (FGD) allowed for data triangulation.

3.4 Population

Kubir (1984) defines population as the aggregate or totality of subjects or individuals which references are to be made in a sampling study. Population can also be said to be any group of individuals that have one or more characteristics in common that are of interest to the researcher. Generally, the problem under study pertains in all universities in Ghana, but, for this research, the students and staff of the University of Education, Winneba are the targeted population with a population of about thirty thousand (30,000)

in all the campuses. The available population is the population that the researcher can realistically select (Gay, 1976). For this study, the available population was the students and staff of Winneba, Kumasi and Mampong campuses.

3.5 Sampling Technique

Sampling is the process of selecting a sample from a population (Kulbir, 1984). It is also important to sample when the population understudy is not feasible, unmanageable and geographically scattered (Gay, 1978). In the study, purposive (judgmental) sampling technique was employed. Purposive sampling, also known as judgmental, selective or subjective sampling, is a form of non-probability sampling in which the units to be observed are selected based on the researchers' judgments about which one will be the most useful or representative (Barbie, 2007). This study aimed at an educational institution and purposefully selected University of Education, Winneba since it is the one of the major educational institution in Ghana. The campuses are targeted because they comprise students at different levels, those in the halls, non-residents and students from different departments. The teaching and non-teaching staff were given a fair representation since ground officers, administrators, research assistants and lecturers from various departments of the university were involved.

3.6 Sample Size

According to Borg and Gall (2007), the size of the sample depends on the nature of the study, size of population and the sampling technique. The non-probability sampling technique is used to randomly select two hundred (200) students from each of the three campuses across faculties and departments of the University representing, six hundred (600) students in total. Also, One Hundred and fifty (150) teaching and non-teaching

staff comprising lecturers, administrators and labourers including cleaners and those in charge of grounds work were selected randomly in the three campuses [Fifty (50) from each Campus]. This was done based on those available and ready to take part in the study. In all, the sample size for this study was seven hundred and fifty (750) staff and students.

3.7 Research Instruments

Kulbir (1984) has mentioned that there are four basic research instruments used in educational research which include questionnaire, observation, interviews and unobtrusive methods. The most common instruments used in survey are the questionnaire and the interview schedule. The differences between both instruments are mainly in how they are administered. However, in this study, the main instruments adopted for data collection were Questionnaire, Focus group discussion (FDG) and Document Analysis. The description of each follows.

3.7.1 Questionnaire

In a questionnaire, the subject responds to the questions by writing or, more commonly, by marking an answer sheet. The use of this instrument was to allow the researcher to efficiently understand students' knowledge, behaviour and waste management practices in the University of Education, Winneba. Advantages in the use of the questionnaire are that they can be mailed or can be given to many people at the same time. The questionnaire was used to obtain consistency and wide range of exploratory data on students' behaviour and practices (Robson, 1995).

Also, Walonick (2004) indicated that using questionnaire reduces middle-man bias and minimizes verbal or visual clues that would influence students' responses. Since the

purpose of this study was to obtain large data on knowledge, behaviour and practices of waste management, the researcher found questionnaire appropriate. In employing the questionnaire, the researcher was conscious of the disadvantages associated with its use. One such disadvantage is the fact that respondents would not have the options to express in their own way their views, what they really think is going on in the campuses with regard to waste management - no chance to expand on, or react verbally to a question of particular interest or importance. Unclear or seemingly ambiguous questions could also not be clarified. The questionnaire for students and staff used for this study can be found at appendices A and B respectively.

The questionnaire was captured into five main sections according to the research questions stated. There were forty (40) structured items which highlighted on the following:

- Attitude awareness and practices of students and staff on waste management practices in the University of Education, Winneba. This section of the questionnaire was to determine the degree to which respondents agreed or disagreed to the truthfulness of the questions stated. The questionnaire was placed in such a way that it gave the respondents the chance to choose whether they were sure of the degree to which the question was true or not true.
- The second section focused on the factors that contributed to waste on campuses. These questions were designed in such a way that the respondents could express how common or scarce a named factor was on the campus. Eleven factors were identified and these factors were, Noise pollution, indiscriminate littering, unkept grass and hedges on the compound, uncollected garbage, soil erosion, sewage disposal, public urination, pasting and falling off poster, open waste burning, burst pipes and septic-tanks.

- The third section was on the facilities for waste disposal. For this section, waste was categorized into types – biodegradable waste (food remnants), glass waste, papers/newspapers/cardboards waste, cotton materials/nylons waste, metal scraps waste, broken chairs/tables/and other wooden materials and the last waste type being electronic waste (spoilt monitors, system units, cartridges, toners, printers etc.). Again, methods by which this waste could be disposed off were stated for respondents to choose the facilities they believed on their campuses were used for disposal of specific waste. Respondents had the option to state if they had no idea of how that waste was disposed of.
- Section four sought to clarify how waste was treated in the University of Education, Winneba during waste separation, re-use and recycling. A five-point Likert scale was designed to determine the degree to which students and staff of the University of Education, Winneba agreed or disagreed with the test item.
- The last section was designed to capture the needs and gaps in current policies for University of Education, Winneba on Environmental Sustainability using a 5-point Likert scale. Likert scale is a self-reporting instrument in which an individual respond to series of statements by signifying the degree of agreement. Each choice was assigned a numerical value, and the total score was presumed to indicate the actual ideas of the respondent. A summary of the sections, number of items and how they relate to the research questions are provided in Table 2.

Table 2: Design of research questionnaire

Research Question	Sections	Number of Items
1	Knowledge, Attitude and Practices	1-10

2	Factors that contribute to waste	11-21
3	Facilities for waste disposal	22-28
4	Waste treatment- separation, re-use and recycling	29-34
5	Needs and gaps in policies	35-40

Responses to items 1-10 of the questionnaire were used to answer research question 1, those for items 11-21 answered research question 2. All the research questions were answered according to the various test items as indicated in table 2.

3.7.2 Focus Group Discussion

Krueger (1988) stated that a focus group discussion (FGD) is a good way to gather together people from similar backgrounds or experiences to discuss a specific topic of interest. The group of participants is guided by a moderator (or group facilitator) who introduces topics for discussion and helps the group to participate in a lively and natural discussion. In this study, the focus group discussion was used to validate the responses given by the respondents in the questionnaire. Participants' responses in the questionnaire may not truly represent their behaviour, ideas and actual practices on waste management, but FGD, where they are free to express themselves naturally with series of guided questions, can bring out the true image of the participants' thoughts. This strategy was adopted based on Kitzinger's (1994) ideas on the Methods of FGD which states that FGD are used for generating information on collective views, and the meanings that lie behind those views. FGDs are also useful in generating a rich understanding of participants' experiences and true beliefs (Stewart & Shamdasani, 1990). Detailed reports are normally prepared after each session. Observations during

FGDs are noted and included in the report (Morgan, 1988). The Focus Group Discussion guide, consent form and an evaluation form for this study can be seen at Appendix E.

Procedure for the Focus Group Discussion

1. After participants were seated, the researcher greeted them with a warm welcome and reviewed the following:
    - Who the researcher was, what the study was all about and what was expected to be done;
    - What will be done with the information from the FGD; and
    - Why students from their campuses (Winneba, Mampong and Kumasi) were asked to participate in the study.
2. Explanation of the process

    Groups were asked if anyone had participated in a focus group before. It was then explained to the group that focus groups are being used more and more often in educational and health services research.

    Participant were also enlightened on the following
    - Each person had his own idea that the study sought to learn from (positive and negative);
    - The study was not trying to achieve consensus, just gathering information; and
    - No virtue in long lists: only looking for priorities.
3. This study used both questionnaires and focus group discussions and all the participants have participated in answering the questionnaire. The reason for using FGD in addition to the questionnaire was explained to participants that it would provide more in-depth information from the smaller groups.
4. Ground Rules

Participants were asked to suggest some ground rules. After they brainstormed, it was made sure that the following were part of the listed ground rules:

- Everyone should participate;
- Information provided in the focus group must be kept confidential;
- Stay with the group and please don't have side conversations;
- Turn off cell phones if possible; and
- Have fun

5. Logistics and timing
    - Participants were informed that the focus group was going to last for only 30 minutes hence; they were not allowed to freely move around, except to use the bathroom if the need arose. Participants were also told to help themselves with the refreshments provided by the researcher immediately after the discussion.
6. The group was asked if there were any questions before the main discussion started for it to be addressed.

3.7.3 Document Analysis

Document analysis is a social research method which is an important research tool and is an invaluable part of most schemes of triangulation. Along with interviews and observations, the analysis of existing documents, or "texts," is one of the central sources of qualitative data. Love (2003) points out that, "Documents are part of the fabric of our world" (p. 83). Institutions such as public schools and colleges produce a constant stream of reports, flyers, handbooks, websites, etc. "Existing documents," does not only mean written documents, but also audio and visual recordings. What separates these materials from texts created through interviewing or observation is that they arise without the involvement or instigation of the researcher (Peräkylä, 2005). In this study,

Some University policy documents like the student's handbook on rules and regulations and the University Statues were considered. Also, blogs and websites of the University were viewed to ascertain its practices of waste and waste management.

3.8 Data Collection Procedure

The researcher obtained a permission letter from the Head of Department, Department of Science Education, University of Education, Winneba (see Appendix seven) to the lecturers' in-charge of the students for lectures at the time the researcher visited the department. Also, copies were either shown or given to the secretaries and assistant registrars in the various departments to help in the collection of the data for the staff, especially the lecturers and administrators in high position since getting them to answer the questionnaire was very difficult. This was done to formally seek permission to administer the questionnaire.

A total of four weeks was used to collect data from the two regions (9th February 2015-11th March 2015). Collection of the data for the students was quite easy which took 2-3 days, because most of the lecturers after accepting to allow the study to be conducted in their class asked the researcher to wait and come 5 minutes to the end of the lecture. Most often, the lecturers themselves helped to organize and comport the students for the questionnaire administration by sharing it at the tail end of the lecture with the researcher and asked the students to respond immediately with the rest of the lecture time.

The questionnaire administration was done at the tail end of the lecture in order not to interfere with the learning process. Each student was told to opt out if s/he did not want to be involved in answering the questionnaire. In all departments visited, the selected students were excited about environmental sustainability and waste management and participated keenly. They were given the opportunity to ask the researcher questions to clarify issues that were not clear to them. To ensure independent responses, students also consented to complete the questionnaire before leaving the lecture hall. A maximum of 15 minutes was used by students to answer the items in the questionnaire in all the three campuses of University of Education, Winneba.

In Winneba, it was more challenging because some of the lecturers only remembered, after seeing the researcher even though they agreed that he should come the following week or after scheduling a specified date. In cases like this, date had to be rescheduled.

The good news was that, at the end of the fourth week, most of the questionnaires were gathered for analysis. 100% of the questionnaire were collected for Winneba and Kumasi but 92% was obtained for Mampong Campus.

The Focus Group discussions were carried out only in Kumasi and Winneba Campuses. At Mampong, getting the students to sit for the discussion was difficult and the researcher had to return the same day. Hence, the discussion was only limited to the two campuses.

The original number of four participants was increased to 5 and 7 for Kumasi and Winneba campus, respectively, for the discussion. Consent of students who answered the questionnaire was sought based on their time availability and willingness to partake in the discussion. The discussions were recorded in the biology lab two (B2) for Winneba campus and in Kumasi in one of the lecture halls for the Accounting class. In all,30minutes was used for Kumasi campus and 43minutes for Winneba campus. All the

discussions were guided by the researcher. The discussion only focused on the needs and gaps in the existing waste management in the University of Education, Winneba and what could be done to make it better. Though, the researcher tried his best to ensure even participation and maintained neutral attitude and appearance, there were quite some challenges. Some individuals tried to dominate by stepping in the conversation even when it was not their turn and stopping them was a little difficult; but, generally, the discussion went well for both campuses. The notes jotted were reviewed and the recordings from the focus group interviews were also re-played severally in order to determine which response patterns were in the majority. Each response type was tallied based on their frequency and recurring themes were grouped for and analyses.

3.9 Pilot Test of Questionnaire

A pilot test was carried out on forty (40) students of Ajumako campus of University of Education, Winneba. The sample was made up of ten (10) students offering Fanti programme, twenty (20) students offering Akan-Nzema and ten (10) students offering Gur-Gonja programme. Piloting the questionnaire gave information which served as guidance to correct deficiencies and ensure the appropriateness of the items for answering research questions. The pilot test was done to determine the precision, consistency and stability of a response from the questionnaire. It is necessary for items to be tried on a small sample to see how they will be interpreted by respondents before they are used for the main study. The major reasons for the field test for this study as stated by others (Cone & Foster, 2006; Borg, Gall, & Gall, 2007) were:

1. to evaluate the conversion of responses to data to examine the ability of the survey in producing the desired data;

2. to evaluate the wording of the questions and items in the questionnaires and receive comments from mentors, interns, lecturers (university supervisors), headmasters and SHS students in the field test;
3. to evaluate the clarity of the language and directions for completing the questionnaires;
4. to evaluate how long it will take for completing a questionnaire; and
5. to discover and decide how to handle unanticipated problems.

Consequently, validity and reliability are important concerns in empirical research. They provide the basis for ascertaining the credibility and acceptability of research findings in quantitative study (Creswell, 2003).

3.10 Validity

Validity refers to the extent to which the questionnaire serves the intended purpose or provides trusted data for the research purpose (Robson, 1995). To ensure that the data gathered were valid, the research questionnaire was pilot-tested. The pilot test was done specifically to help in checking the clarity of the items, give feedback on internal validity of the items and to ensure the appropriateness of data to answer research questions, validity which is also the appropriateness, meaningfulness, correctness and usefulness of the inferences that was made in this study was determined by the Researcher's supervisor and other Science Educators. To determine content validity, the questionnaire was further scrutinized by the Researcher's Supervisor. After discussion with the supervisor, the items were rearranged in such a way that each set of items in a group answers one research question. This categorized the arrangements thematically into five sections according to the way the research questions were formulated.

3.11 Reliability

Reliability measures the consistency of instrument to obtain similar responses when repeated on two or more samples with similar characteristics (Robson, 1995). Data from the pilot test was used to test internal consistency of the questionnaire. Cronbach alpha coefficient of reliability, an internal consistency coefficient requiring only one test administration was computed to determine the consistency of related items (Fraenkel & Wallen, 2003).

To address the reliability of the questionnaire, data from the pilot test were fed into SPSS computer software and reliability coefficients computed at 0.05 significant levels. The reliability coefficients ranging from 0.823 -0.837 were found for the 40 items addressing each of the research question categorized in sections (see Appendix C). A coefficient threshold of 0.66 or greater is acceptable for research purposes that involve the use of questionnaires (Nunnaly, 1967; George & Mallery, 2003). The various sections as indicated in Appendix four, list the reliability measures of the subscales. Thus, it was determined that the different items in the subscales of the survey instruments measured the general constructs and produced similar scores, demonstrating that there was internal consistency among the items on the individual scales as well as among the items on the overall scale.

3.11 Data Analysis

3.11.1 Analysis of Quantitative Data: Questionnaire

The information gathered on the study was analysed in three categories. Initially, the data were analysed on campus-by-campus basis, then they were aggregated cross-campus comparison of the data with the final section focusing on aggregated analysis.

All the data was analysed using the Statistical Package for Social Sciences (SPSS) computer software version 16.0. The data was coded for processing and all incomplete items on the questionnaire were treated as missing values and did not count in the statistical analysis. Questionnaire was pooled, edited and scored. Over the years, numerous methods have been used to measure character and personality traits (Likert, 1932).

The difficulty of measuring attitudes, character, and personality traits lies in the procedure for transferring these qualities into a quantitative measure for data analysis purposes. This study looked at converting these traits into quantitative data and the analysis was made based on the research questions and hypothesis stated. Simple frequencies and cross-tabulations was used to analyse the questionnaire. Mean and standard deviations were determined to answer the research questions. Analysis of variance (ANOVA), Independent-Sample t-test and person product-moment correlation was used to analyse the research hypothesis.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

This chapter deals with the analysis of data and discussions of findings of the study.

Seven Hundred and fifty (750) questionnaires were given out across the three campuses, sixteen (16) were not returned. For this reason, the total number of questionnaires analysed was 734. The data collected was in two main parts (Part A and B). Part A was on demographic data, which included the sex, age, position of respondents, residential status, campus and parental level of education of the respondents. Parental level of education was taken out of the Staff questionnaire.

Part B constituted forty (40) scaled items of the same questions developed for both the students and staff (teaching and non-teaching) of the university who took part in the study (see Appendix A and Appendix B).

4.2 Demographic Data for Students and Staff

This section includes analysis of the Campus and Residential Status of Both Staff and Students, Gender, Age and Position of the various respondents. Cross-tabulation of the position of respondents and the other various demographic data has been presented.

Table 3: The respondents' status and their location

	Position	Campus			Total for position
		Winneba Campus	Kumasi Campus	Mampong Campus	
	Student	198	200	185	583(79.4)
	Lecturer	8	21	12	41(5.6)
	Administrative Staff	8	9	8	25(3.4)
	Grounds officer	29	14	19	62(8.5)
	Teaching or Research Assistant	6	6	11	23(3.1)
Total		249(33.9)	250(34.1)	235(32.0)	734(100)

Table 3 shows a total of 734 respondents in total of which 249 (33.9%) were from Winneba Campus, 250 (34.1) from Kumasi Campus and 235 (32.0%) from Mampong Campus. Five hundred and eighty-three (583) representing 79.4% students responded to the test item, 41 (5.6%) lecturers, 25 Administrative staff constituting (3.4%) responded to the staff questionnaire. Also, 62 representing 8.4% Ground workers, and 23 representing 3.1% teaching/ research assistants responded to the questionnaire. Nonetheless, out of the 249 respondents in Winneba campus, 198 were students, 8 were lecturers, 8 administrative staff, 29 were ground officers, and 6 were teaching/research assistants.

Table 4: The residential status of the respondents and their positions in the university

	Position	Residential Status		
		Non-Resident	Campus Resident	Total
	Student	394	189	583(79.4)
	Lecturer	29	12	41(5.6)
	Administrative Staff	21	4	25(3.4)
	Grounds officer	52	10	62(8.5)
	Teaching or Research Assistant	19	4	23(3.1)
Total		515(70.2)	219(29.8)	734(100)

From Table 4, out of the 734 respondents 515 representing 70.2% were non-resident on the University campus and 219 representing 29.8% were resident on campus. For the students, 583 (79.4%) students responded to questionnaire and out of it 394 were not staying on campus and 189 were resident. For lecturers, 41 (5.6%) responded to the

questionnaire and only 12 were resident and the rest of the 29 were not residents on the University campus.

Table 5: The gender status of the respondents

		Gender		
	Position	**Male**	**Female**	**Total**
	Student	339	244	583(79.6)
	Lecturer	20	21	41(5.6)
	Administrative Staff	15	10	25(3.4)
	Grounds officer	47	15	62(8.5)
	Teaching or Research Assistant	14	9	23(3.1)
Total		435(59.3)	299(40.7)	734(100)

There were more male respondents across all the designated positions of respondent in the university as shown in Table 5. It was deduced that, 435 representing 59.3% males responded to the questionnaire whereas 299 representing 40.7% females took part in the study. Out of the 435 males, 339 were students, 20 were lecturers, 15 were administrative staff, 47 were ground workers and the rest of the 14 male respondents were Research/teaching assistants. It was only among the lecturers that approximately the same number of males and females responded to the questionnaire that was 21 and 20 respectively.

Table 6: The respondents age and their position in the University

Position		**Age**						
		Below 18yrs	**18-24yrs**	**25-30yrs**	**31-34yrs**	**35-40yrs**	**above 41yrs**	**Total**
Student	Freq.	2	356	120	66	25	14	583
	%	0.3	61.1	20.6	11.3	4.3	2.4	100

Lecturer	Freq.	0	0	5	4	24	8	41
	%	0	0.0	12.2	9.7	58.5	19.5	100
Administrative Staff	Freq.	0	4	4	0	12	5	25
	%	0	16	16	0	48	20	100
Grounds officer	Freq.	0	14	10	0	28	10	62
	%	0	22.6	16.1	0	45.2	16.1	100
Teaching/ Research Assistant	Freq.	0	1	6	0	13	3	23
		0	4.3	26.1	0	56.5	13	100
Total	Freq.	2	376	145	69	102	40	734
	%	0.3	51.2	19.8	9.4	13.9	5.4	100

Note: The percentages (%) generated were only within the positions of the respondent and the frequencies were abbreviated as freq.

From Table 6, only 2(0.3%) students from this study were below the age of 18 and all the University staff were above 18years. Most of the students fell between the ages of 18-24years that is out of the 583 student respondents, 356 representing 61.1% were within 18-24years. For the lecturers, 41 responded to the question and none of them were below 18years or fell between the ages of 18-24years of age. Interestingly, the administrative staff, grounds officers and administrative staff were all above the age of 18years and none of the respondents from these three groups were within the ages of 31-40years.

The parental education backgrounds of respondents were computed in this study. This sought to find out if the respondents' parental education background had influence on their behaviour towards waste and waste management. For the 584 students,

121(20.7%) had parents who had No Formal Education, 144 (24.7%) of the respondents had parents with basic education, 136 (23.3%) parents had Secondary education and 183 (31.3%) parents completed Tertiary Education. This has been shown in Figure 3.

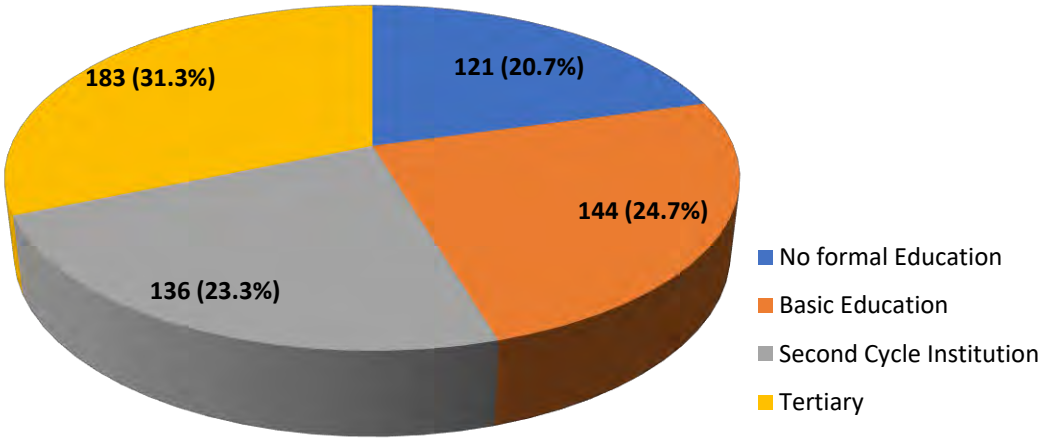

Figure 3: Parental Educational Background of respondents

ANALYSIS OF PART B OF THE QUESTIONNAIRE

The questionnaire for the study were analysed in response to the research questions for the study, this has been elaborated below.

Research question 1: ***What are the knowledge, attitudes and practices of staff and students of University of Education, Winneba with regard to waste and waste management on campus?***

This research question established the main behaviour of the respondents towards waste and waste management. Behaviour is centered on knowledge, attitude and perception (KAP). Ten (10) items were developed to answer this research question. Frequency counts were converted into percentages and results presented in the various behavioural themes and captioned. Also, the mean and standard deviation were calculated to inform the extent of the behavioural theme (knowledge, attitude and practice) and the variability among the respondents. The responses on knowledge are presented in Table 7.

Table 7: The respondents' knowledge of environmental issues on campus

Item		**Responses**	
		Frequency	**Percent**
I am very Knowledgeable with regards to Environmental issues on my campus?	Very True	127	17.3
	True	394	53.7
	Not True	99	13.5
	Not true at all	17	2.3
	Not Sure	96	13.1
	Total	733	99.9
Missing	Unanswered	1	0.1
Total		734	100.0
Mean Knowledge = 2.40	**SD = 1.192**		

Table 7 showed that, 733(99.9%) responded to it and only 1 respondent did not answer that item which is treated as missing. Also, a total of 521 that is (127 for very true plus 394 for true) representing 71% admitted that they were knowledgeable with regard to environmental issues on their campus. The respondents who were not sure whether they were knowledgeable on issues regarding environmental problems were 96.

Respondents' knowledge about global issues regarding waste management by university leaders was sought. The item was placed as, *I know of Talloires declaration on*

sustainable waste management by universities. The respondents were made to choose the degree of acceptance.

As shown in Figure 4, most of the respondents had little knowledge on the Talloires Declaration of 1990 by University leaders with the theme 'University Leaders for Sustainable Future' (ULSF). The mean of 3.66 showed they had low knowledge on the item. All the 734 respondents attended to this test item and among them only 13.8% had knowledge of the Declaration, 63.7% had no knowledge of it, while 22.5% were not sure.

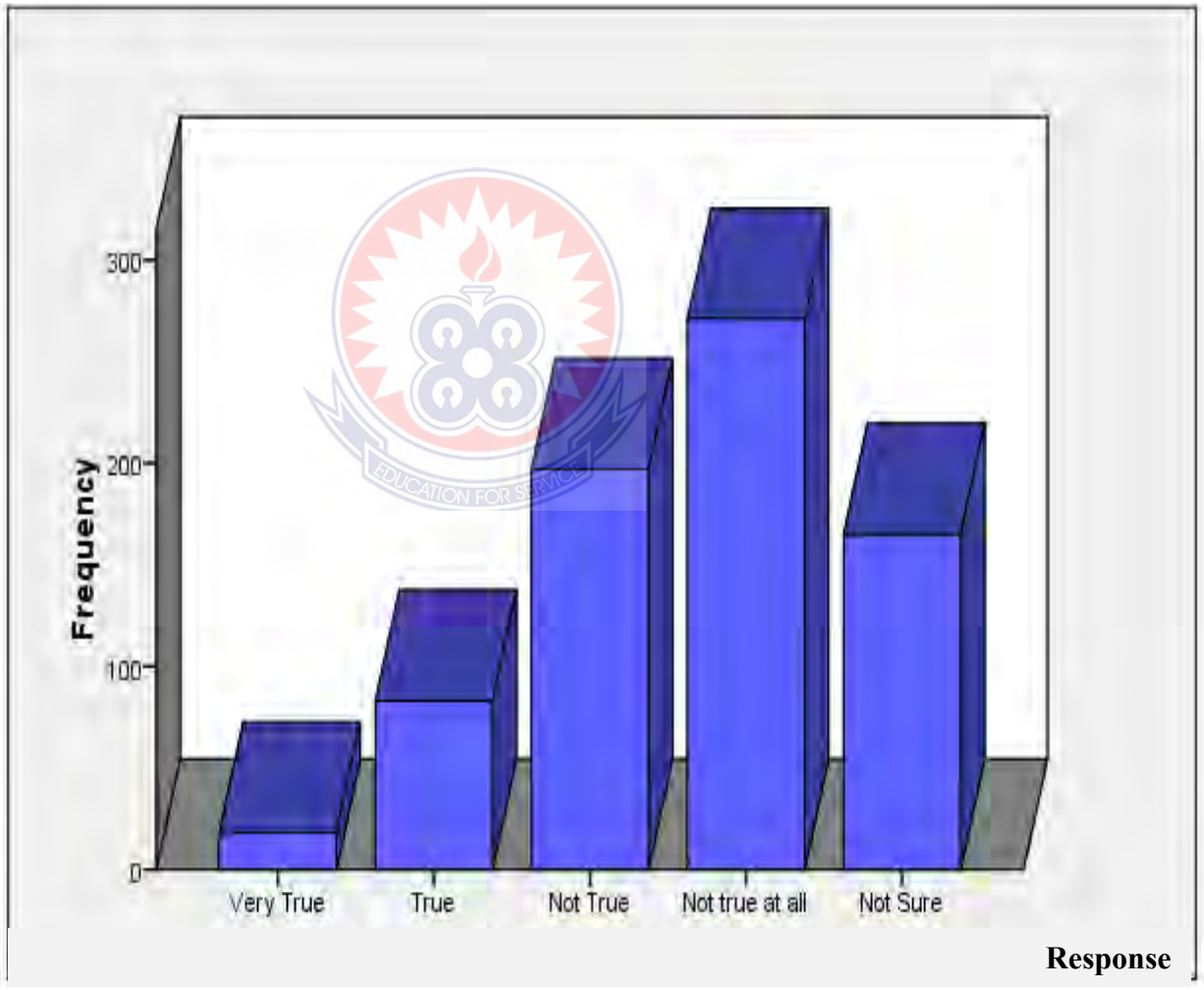

Fig. 4: Respondents' knowledge of the Talloires declaration on sustainable waste management

Attitudes and Practices of waste were part of the fundamentals on which behaviour for this study was established. Several items were put together to determine the attitude and

practices of respondents towards waste practices in the University. The frequency of each response was converted into percentages and their various means and standard deviations determined. This is shown in Table 8.

Table 8: The attitudes and practices of the respondents towards waste and waste management on the 3 campuses of University of Education, Winneba

Item	Percentages (%) of Staff and Students responses						
	N	VT	T	NT	NTA	NS	M	SD
7. Students/ Staff often flash their toilet after use	733	139 (18.9%)	271 (36.9%)	189 (25.7%)	92 (12.5%)	42 (5.7%)	2.49	1.12
8. When I realize the washroom is dirty, I do clean it	734	147 (20.0%)	197 (26.8%)	214 (29.2%)	131 (17.8%)	45 (6.1%)	2.63	1.17
9. I do report unclean places to the porters and ground works	733	159 (21.7%)	177 (24.1%)	247 (33.7%)	122 (16.6%)	28 (3.8%)	2.57	1.12
10. When I see rubbers and bags on my way on campus I often pick them to the bin	734	138 (18.8%)	201 (27.4%)	222 (30.2%)	143 (19.55)	30 (4.1%)	2.63	1.12

- VT= Very True **Total number of respondent =N**

- T = True
- NT = Not True
- NTA= Not True at all
- NS= Not Sure

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- Percentage scores in parenthesis ( )
- M = Mean
- SD = Standard Deviation

Table 8indicated that, 733 responded to how often they flush the toilet after use and 410 representing 55.8% collectively agreed, 281 representing 38.2% do not often flush the toilet after use and 42 representing 5.7% were not sure if they often flush the toilet after use. The mean of 2.49 showed that the respondents possess relatively high attitude in flushing toilets after use.

Furthermore, the next item sought to find out if respondents routinely clean the washroom when they realized it was dirty. This item was not only looking at respondents' attitude when in the classroom or offices but also in their residence, be it campus or home. In total, 734 responded to the item and out of it, 344 representing 46.8% cleaned the washroom when they realized it was dirty, 345 representing 47% do not and 45 representing 6.1% said they were not sure if they have the attitude of cleaning the washroom after use. The mean of 2.63 is above the upper limit of 2.50 meaning the respondent have low attitude when it comes to cleaning the washroom after use.

The last two items explained the general practices of the respondent when it came to waste and waste management. The first item asked if respondents always reported unclean places to the porters and ground officers. It was indicated that, 336 (45.8) always did reported unclean places 369 (50.7%) did not and 28 (3.6%) said they were

not sure if they often reported unclean places to the porters or ground officers (cleaners). The mean of 2.57 indicated that the respondents had low practices when it comes to reporting unclean places. The Standard deviation above 1.0 meant that, there was high variability among the respondents' reactions to the test item.

The last item in the Table 8 sought to find out if respondents often picked rubbers and bags (plastic waste) to the bin when they saw them on their way. In all, 734 responded to the test item and among them 339 (46.2%) does often pick rubbers to the bin, 367 (49.75%) does not and 30 (4.1%) were not sure if they often pick plastic waste on their way if they saw them. The mean of 2.63 showed that, the respondents' practices when it came to picking rubbers and bags (plastic waste) on their pathways were low. And the standard deviation of 1.116 meant there was high variability in their responses.

Research question 2: What major factors contribute to the environmental problems in the University of Education, Winneba?

This research question sought to find out the most common environmental problems on the various campuses of University of Education, Winneba. This would help authorities find the best way of reducing this kind of environmental problems on the Campuses. Table 9 showed the factors that contribute to environmental problems in the University of Education, Winneba.

Table 9: Common environmental problems in the various campuses of the University

Item	Percentages (%) of Staff and Students responses								
	N	VC	C	NC	NCA	DN	M	SD	Rank
11. Noise Pollution	732	168 (22.9)	296(40.3)	212(28.9)	54(7.4)	2(0.3)	2.22	0.981	**1st**
12. Air Pollution	733	126 (17.2)	115(15.7)	365(49.7)	103(14.0)	24(3.3)	2.71	1.015	**5th**
13. Indiscriminate littering	733	164 (22.3)	142(19.3)	343(46.7)	69(9.4)	15(2.0)	2.49	1.005	**4th**
14. Unkept grass and hedge	733	62 (8.4)	114(15.5)	358(48.8)	151(20.6)	48(6.5)	3.01	0.981	**10th**
15. Uncollected garbage	733	50 (6.8)	60(8.2)	513(69.9)	108(14.7)	2(0.3)	2.93	0.714	**7th**
16. Soil erosion	733	69 (9.4)	109(14.9)	371(50.5)	136(18.5)	48(6.5)	2.98	0.987	**9th**
17. Sewage disposal/ "free range"	733	38 (5.2)	209(28.5)	279(38.0)	166(22.6)	41(5.6)	2.95	0.970	**8th**
18. Public Urination	733	83 (11.3)	166(22.6)	323(44.0)	139(18.9)	22(3.0)	2.80	0.974	**6th**

19. Pasting and Falling of posters	733	170(23)	192(26.2)	252(34.3)	87(11.9)	32(4.4)	2.48	1.102	3rd
20. Burning of waste openly	731	85(11)	363(49.5)	159(21.7)	105(14.3)	19(2.6)	2.47	0.968	2nd
21. Burst pipe of water	733	128(17)	124(16.9)	220(30.0)	141(19.2)	90(12)	3.04	1.386	11th

- VT= Very Common
- C = Common
- NC = Not Common
- NCA= Not Common at all
- DN= Don't Know

Total number of respondent =N

- Percentage scores in parenthesis ( )
- Mean
- Standard Deviation

Table 9 reported the frequencies, means, standard deviation and percentages of responses to the questions on the type of waste/ environmental problems commonly seen on the various campuses of the university. Eleven (11) problems were identified and four of the items had their means below the upper limit of 2.5. This suggested that, these four identified items are the common environmental problems on Campus. The items were ranked according to their prevalence and Noise making was ranked 1st with a mean of 2.22, followed by burning of waste openly with a mean of 2.47. The 3rd place was taken by pasting and falling off posters on campus with mean of 2.48 and the 4th by indiscriminate littering also with a mean of 2.49. The least environmental or waste problems in the three campuses of the University of Education, Winneba were indicated with their various means as; burst water pipes (3.04) at the 11th position, Unkept grass and hedge (3.01) at the 10th position, Soil erosion (2.98), Sewage disposal/ 'free range' (2.93) and it follows in that order of decreasing magnitude of occurrence as shown in Table 9.

Research Question 3: How adequate are the facilities for disposal of waste materials in the University?

This research question sought to find out what happened to the various waste types that was generated on the University campuses. Seven waste categories were identified and respondents were asked to identify the kind of facilities that existed on their campus for the disposal of that waste type. This was to inform the study how each waste type was being treated on campus and whether that facility was adequate for the general waste disposal for the University of Education, Winneba. These disposal facilities were shown in Table 10.

Table 10: The types of waste generated in the University and their disposal facilities

Waste types		Frequency & (%) of Staff and Students responses on Disposal facilities of the 7 types of waste generated on Campus					
	N	OB	LF	C	I	R/R	DK
22.Biodegradables (food remnants)	725	46 (6.2)	115 (15.6)	75 (10.2)	27 (3.7)	144 (19.5)	318 (43.1)
23. Glass	723	62(8.4)	199(27.0)	49(6.6)	37(5.0)	55(7.5)	322(43.6)
24. Papers, newspapers, Cardboards	727	250(33.9)	64(8.7)	54(7.3)	59(8.0)	52(8.0)	248(33.6)
25. Plastic/ rubbers	715	81(11.0)	228(30.9)	16(2.2)	24(3.3)	91(12.3)	275(37.3)
26. Nylons/ Cotton Material	717	75(10.2)	91(12.3)	10(1.4)	12(1.6)	59(8.0)	470(63.7)
27. Scrap metal	728	27(3.7)	164(22.2)	23(3.1)	21(2.8)	75(10.2)	418(56.6)
28. Electronic waste	686	14(1.9)	82(11.1)	2(0.3)	27(3.7)	49(6.6)	512(69.4)

Average of the 7 waste types	**717.3**	**79.3**	**134.7**	**32.7**	**29.6**	**75**	**366.1**
Ranking		3rd	2nd	5th	6th	4th	1st

- OB = Open Burning
- LF = Land Filling
- C = Composting
- I = Incinerators
- Recycle/Re-use

Total respondent =N

- Percentage scores in parenthesis ( )
- DK = Don't Know

Table 10 presented the types of waste generated in the University and their facilities for disposal. It can be seen that most of the respondents avoided the question especially the type on electronic waste where only 686 out of the 734 staff and students responded to the item. Majority of the respondents said they do not know how the wastes were being disposed-off. These group forms the highest in all the respondents on the seven waste types identified. Apart from those who indicated that they do not know, 144 (19.5%)of the respondents 'said Biodegradables (mainly food remnants) are often recycled/re- use, 199 (27.0%) agreed that glass is mainly disposed by land filling, 250(33.9%) established that Papers, Newspapers and Cardboards were being Burnt Openly. Furthermore, 228 (30.9%) and 91 (12.3%) responded that Plastics/rubbers and Nylons/ Cotton materials respectively were disposed-off by Land filling. Also, 164 (22.2%)and 82 (11.1%) equally agreed that, Scrap metals and Electronic waste were respectively disposed off by land filling.

The averages of the total responses for each waste disposal facility for all the responses to the seven identified waste types were computed and ranked in order to determine the highest and lowest waste disposal facility for the seven waste types. Figure 5 gave a more detailed picture on the most used waste disposal facility. From the graph, the majority of 366.1 by average said they do not know how these wastes generated on

campus were disposed. To be specific on the actual waste disposal methods, the results indicated that Land filling is the highest method of waste disposal method in the university with an average frequency of 134.7, followed by Open burning 79.3, Recycling/ re-use 75 , Composting 32.9 and the lowest was the use of Incinerators 29.6.

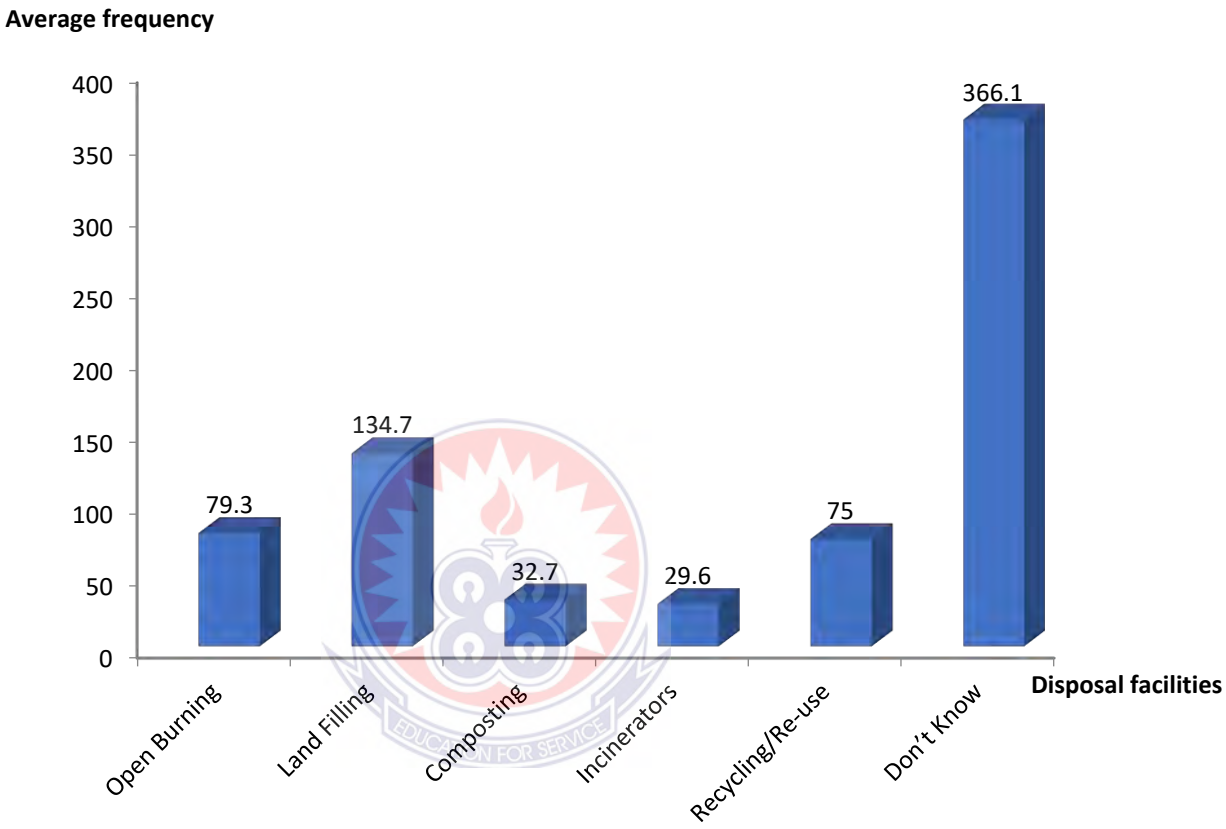


Figure 5: The averages of the total responses for the seven waste types and their disposal facilities in the University

Research Question 4: How does the University treat the wastes on campus with respect to, waste separation, re-use or recycle of used materials?

This research question sought to find out how University of Education, Winneba treated waste at the point of collection and disposal. Several questions were asked to ascertain if the waste were collected on daily bases, whether they were separated at the collection point or they are taken to the dumpsite. The frequencies of participants' responses were noted and converted into percentages. The means and standard deviations were

determined. The responses with mean lower than the upper-class limit of 2.50 was considered High and those above it were low (meaning respondents do not agree to the test item). This was shown by Table 11.

Table 11: Waste treatments in the various campuses of the University

Item	Percentages (%) of Staff and Students responses							
	N	SA	A	D	SD	NS	M	SD	Rank
29. Waste were collected on daily basis at vantage points on Campus and Residences	729	209 (28.5)	406 (55.3)	212 (28.9)	52 (7.1)	31 (4.2)	2.00	0.955	**High**
30. There were labelled waste containers in halls and offices for waste separation	729	157 (21.4)	87 (11.9)	111 (15.1)	287 (39.1)	87 (11.9)	3.08	1.359	**Low**
31. The University often re-uses scrap papers	729	27 (3.7)	84 (11.4)	274 (38.3)	63 (8.6)	281 (38.3)	3.67	1.203	**Low**
32. Waste collected on this campus were recycled	729	32 (4.4)	118 (16.1)	168 (22.9)	141 (15.5)	297 (40.5)	3.72	1.267	**Low**
33. The University has a dump site for waste disposal	729	311 (42.4)	116 (15.8)	45 (6.1)	56 (7.6)	201 (27.4)	2.62	1.703	**High**
34. Waste at dumpsite were burnt	726	165	265	108	75	113	2.60	1.356	**High**

openly	(22.5)	(36.1)	(14.7)	(10.2)	(15.4)

- SA= Strongly Agree **Total number of respondent =N**
- A = Agree
- SD = Disagree
- D= Strongly Disagree
- NS= Not Sure

- Percentage scores in parenthesis ( )
- M = Mean
- SD = Standard Deviation

All the responses from Table 11 displayed significant variation among respondents with standard deviation higher than 1.0 except in item 29 where almost all the respondent agreed that waste was collected on daily basis at vantage points on campus and residence with a standard deviation of 0.955. There were high responses for three items, these items were; item 29, "Wastes were collected on daily basis at vantage points on campus and residence, item 33, "The University has a dump site for waste disposal" and the last piece, item, 34, "Wastes at dumpsite were burnt openly". These items had means of 2.00, 1.75 and 1.356 respectively. Any item with mean below 2.50 indicated a high response, meaning; respondents either agreed or strongly agreed to the test item. The responses from test item 30 clearly indicated that, there were no labelled waste containers in halls and offices for waste separation because the respondents either disagreed or strongly disagreed to the item with a mean of 3.08 which was a low response. Likewise, there were low responses for both items that asked whether the University often re-uses scrap papers and whether Waste collected on this campus were recycled with means of 3.67 and 3.72 respectively.

Research Question 5: What are the needs and gaps in current policies and programmes on waste management on the University campuses?

This research question sought to bring to light some needs and gaps in the current policies and programmes on waste management in the University of Education, Winneba. This has been indicated in Table 12

Table 12: Waste treatments needs and gaps in the University

Item	Percentages (%) of Staff and Students responses							
	N	SA	A	D	SD	NS	M	SD	Rmks
35. I know of the rules and regulations on waste in the University	728	113 (15.4)	262 (35.7)	105 (14.3)	82 (11.2)	165 (22.5)	2.90	1.416	**Low**
36. Waste management on this campus is commendable	729	142 (19.3)	326 (44.4)	98 (13.4)	58 (7.9)	104 (14.2)	2.55	1.457	**Low**
37. Waste separation should be encouraged	729		84 (11.4)	274 (38.3)	63 (8.6)	281 (38.3)	1.99	1.261	**High**
38. The university should adopt the 'drop and pay' system of rubbish management style	729	32 (4.4)	118 (16.1)	168 (22.9)	141 (15.5)	297 (40.5)	2.33	1.287	**High**
39. I am not satisfied with the current management of waste on the campus, hence the policy should be reviewed	729	311 (42.4)	116 (15.8)	45 (6.1)	56 (7.6)	201 (27.4)	2.22	1.111	**High**
40. The universities policy on waste management should include the neighbouring communities	726	165 (22.5)	265(36.1)	108 (14.7)	75 (10.2)	113 (15.4)	1.81	1.174	**High**

- SA= Strongly Agree
- A = Agree
- SD = Disagree
- D= Strongly Disagree
- NS= Not Sure

Total respondent =N

- Percentage scores in parenthesis ( )
- M = Mean
- SD = Standard Deviation

Table 4.10 displayed that, there was high variability among the respondents for all the test items that answered Research Question 5 since the standard deviations were above 1.0. Comparing the means item 35 and 36 have low responses with means above 2.50 implying that the staff and students of University of Education, Winneba, strongly disagreed or disagreed with the two items that was; item **35. "**I know of the rules and regulations on waste in the university" and item **36.** "Waste management on this campus is commendable". There were high responses for items **37-40**, meaning all these responses have means below 2.50. The items with their means in parenthesis were as follows; **37.** "Waste separation should be encouraged" (1.99),**38.** "The university should adopt the 'drop and pay' system of rubbish management" (2.33), **39. "**I am not satisfied with the current management of waste on the campus; hence the policy should be reviewed" (2.22) and the last item, **40. "**The universities policy on waste management should include the neighbouring communities" (1.81)

TESTS OF RESEARCH HYPOTHESES

These hypotheses were formulated to test whether there were any statistically significant differences between the knowledge of students in the various campuses, the background (Sex, age, and parental education) and their level of awareness, knowledge and practices in the University Education, Winneba. Also, the significant difference in the attitudes of students and staff in the University of Education, Winneba was established.

Null Hypothesis 1 *(H_0): There were no significant differences in students' knowledge of wastes in Winneba, Mampong and Kumasi Campuses.*

This null hypothesis sought to establish whether there was significant difference in the Knowledge level of students in Winneba, Mampong and Kumasi Campuses on waste and environmental problems. One –Way ANOVA was employed in this analysis.

Descriptive analysis was carried out to determine the students' mean knowledge for the three Campuses. The test for the statistics was done at α= 0.05. This is shown in the Table 13 (a) and (b).

Table 13 (a): Descriptive analysis on students' Knowledge in waste for Winneba, Mampong and Kumasi campuses

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Winneba Campus	248	2.49	1.295	.082	2.33	2.65	1	5
Kumasi Campus	251	2.47	1.243	.078	2.31	2.62	1	5
Mampong Campus	234	2.51	1.240	.081	2.35	2.67	1	5
Total	733	2.49	1.258	.046	2.40	2.58	1	5

Table 13 (b): Test of significance in students' Knowledge in waste for Winneba, Mampong and Kumasi campuses

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.264	2	.132	.083	.920
Within Groups	1158.887	730	1.588		
Total	1159.151	732			

* The mean difference is significant at the .05 level

From Table 13 (a), the means for Kumasi, Winneba and Mampong Campuses were quite close and almost the same. The standard error for the knowledge with regards to

environmental issues increased with increasing standard deviation. Also, Table 13 (b) presented the ANOVA table which indicated that the computed value (0.920) is greater than α= 0.05. Thus, the results indicated that there is no significant difference in the knowledge of environmental issues poses by students in Winneba campus, Mampong campus and Kumasi campus therefore we fail to reject the null hypothesis that there was no significant difference in the variances on the knowledge of the students in waste and environmental problems. This indicated that, the students on the three campuses of the University of Education, Winneba did not differ when it came to knowledge with regards to environmental issues and problems on the campuses.

Null Hypothesis 2 *(H_0): There was no significant difference between the background (Sex, age, and parental education) and level of awareness, knowledge and practices of students of University Education, Winneba on issues regarding waste.*

This hypothesis sought to establish the difference between the background (Sex, Age, and Parental education) and level of awareness, knowledge and practices of students of University of Education on issues regarding waste. Correlation was used to analyse this hypothesis. The parental education was answered by only the students and that had the sample size (N) to be 584 without missing values.

Table 14: Respondents background variables and level of awareness, knowledge and practices on waste in the University

		Gender	Age	Parental Education	Awareness	Practice	knowledge
Gender	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	734					
Age	Pearson Correlation	-0.050	1				
	Sig. (2-tailed)	0.173					
	N	734	734				
Parental Education	Pearson Correlation	0.038	-0.080	1			
	Sig. (2-tailed)	0.361	0.054				
	N	584	584	584			
Awareness	Pearson Correlation	0.067	-0.043	-0.062	1		
	Sig. (2-tailed)	0.071	0.246	0.135			
	N	733	733	583	733		
Practice	Pearson Correlation	0.093*	-0.100**	-0.042	.056	1	
	Sig. (2-tailed)	.011	.007	.314	.129		
	N	734	734	584	733	734	
Knowledge	Pearson Correlation	0.088*	-0.069	0.041	0.126**	0.096**	1
	Sig. (2-tailed)	0.017	0.061	0.327	0.001	0.009	
	N	733	733	583	732	733	733

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

From the Table 14, the Pearson correlation (r) of respondents as highlighted indicated that, there were both positive and negative relations that existed between waste

management behaviour (Knowledge, Awareness, and practices) and the background variables (Gender, Age and Parental Education) of respondents in the University.

The Knowledge on waste from staff and student's responses had positive relation with background variable such as gender ($r = 0.088$, $N = 733$, $p < 0.05$) and parental education ($r = 0.041$, $N = 583$, $p < 0.05$) and negative correlation exised between knowledge and age ($r = -0.069$, $N = 733$, $p < 0.05$).

Practices of waste management had negative correlation with gender ($r = -0.100^{**}$, $N = 734$, $p < 0.05$) and age ($r = -0.042$, $p < 0.05$). Also, the correlation between practices and parental education was positive ($r = 0.056$, $N = 584$, $p < 0.05$).

Respondents awareness on waste problems in the university had a positive relations with gender ($r = 0.067$, $N = 733$, $p < 0.05$) and negative correlation with age ($r = -0.43$, $N = 733$, $p < 0.05$) and parental education ($r = -0.62$, $N = 583$, $p < 0.05$) respectively.

A further analysis revealed a positive relation between knowledge and awareness ($r = 0.126^{**}$, $N = 732$, $p < 0.05$) as well as knowledge and practice ($r = 0.096^{**}$, $N = 733$, $p < 0.05$).

Null Hypothesis 3 *(H_0): There was no significant difference in the attitudes of students and staff in the University of Education, Winneba (t-test).*

This hypothesis was formulated to find out if there was significant difference in the attitude of staff (Lecturers) and student's attitude of reporting unclean places to the porters and ground officers. An Independent Sample Test (IST) was used to analyse this question since there was two different individuals' (staff and students) involved. This had been shown in Table 15.

Table: 15: IST on staff and students attitude of reporting unclean places to ground officers and porters

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Attitude: I do report unclean places to the porters and ground workers	Equal variances assumed	3.024	.083	1.756	621	.080	.314	.179	-.037	.664
	Equal variances not assumed			1.609	44.733	.115	.314	.195	-.079	.706

From Table 15, it can be stated that the computed value (0.80) (2-tail) was greater than α= 0.05. Thus the results indicated that there was no significant difference in the attitude of staff (lecturers) and students' on campus waste management by reporting unclean places to the porters and ground workers, therefore we fail to reject the null hypothesis that there was no significant difference in the variances on the attitude of the staff and students. This revealed that, the students and staff in the three campuses of the University of Education, Winneba did not differ when it came to the attitude of reporting unclean places to the porters and ground officers.

ANALYSIS OF FOCUS GROUP DISCUSSION (FGD)

Responses in the questionnaire for the students may not truly represent their behaviour, ideas and actual practices on waste management but with FGD where they felt free to express themselves naturally with series of guided questions could bring out the true image of the participant's thoughts. This strategy was adopted based on Kitzinger's, (1994) ideas on the Methods of FGD which said FGD were used for generating information on collective views, and the meanings that laid behind those views. This FGD focused on the needs and gaps of managing waste on the various campuses of the University. Notes taken on individual and focus group interviews were analysed by summarizing recurring themes through close re-reading of the text. Data from field notes, interview transcripts and comments from participants were coded based on the questions for the FGD. In all 12 participants took part in the discussions, Seven (7) from Winneba campus and Five (5) from Kumasi Campus. The impressions of students about waste were indicated in Table 16.

FGD Question 1: What are your general impressions about environmental issues and waste management on your campus? Do you think there are problems with how waste is managed on this campus?

Table 16: Impression about waste problems in the University of Education, Winneba

Impression	***Yes***	***No***
There are problems with how waste is managed on this campus	12 (100%)	0 (0.0%)
I know these problems on the campus	12(100%)	0 (0.0%)
I know of Talloires declaration on sustainable environment	0 (0%)	12 (100%)

From Table 16, all the 12 participants represented 100%, held the impressions that there were problems with how waste was managed on their campuses and they knew these problems. Also, all the respondents (100%) indicated that they did not know Talloires declaration of 1990 on sustainable waste management.

FGD Question 2: What were some of the factors that contributed to environmental/waste problems in the University?

With this research question, the responses of the participants were tallied and converted to frequencies based on the number of times the factor was mentioned in the discussion as a contributor to environmental problems in the University. This was shown in Table 17.

Table 17: Factors that contribute to waste

Factor	Tally	Frequency	Position
Noise pollution especially during hall week and weekend programmes on Campus	~~////// //~~	12	1st
Emptying of dustbins	~~////// //~~	12	1st
Burning of waste openly at dumpsites	~~//////~~	10	2nd
Wrongfully pasting and falling of posters on campus	~~## ///~~	8	3rd
Emptying of septic tanks	~~## //~~	7	4th

From Table 17, both noise pollution and emptying of dustbins gained the first position with each mentioned 12 times by the respondents, burning of waste openly appeared 10 times (Second position), wrongfully pasting and falling of posters on campus scored 8 (third position) and finally Emptying of septic tanks were mentioned 7 times taking the fourth position among the factors that contributed to waste on the University campuses.

FGD Question 3: Have you come across any policy document on any environmental issue or how waste should be managed on campus? If yes what do you think about this policy?

This FGD question aimed at finding out the awareness of participants on some of the environmental issues on their campuses based on some documents in the university as indicated in Table 18.

Table 18: Policy documents on environmental issues in the University

Statement	***Yes***	***No***
Have you come across any policy document on environment/waste on Campus?	0 (0%)	12 (100%)
Were you given the student handbook?	12 (100%)	0 (0%)
Have you read or checked out some the rules and regulations about pollution and environmental management issues in the student handbook?	1 (8.33%)	11(91.67%)
Are you concerned and committed to solving the environmental issues on campus?	12 (100%)	0 (0%)

From Table 18, all (100%) of the participants in the FGD mentioned that, they have not come across any document on environment/ waste on campus but they all (100%) accepted that they were given the student handbook. Interestingly, only 1(8.33%) from Winneba campus mentioned of spotting the rules and regulations about pollution and environmental issues in the students' handbook. The entire participants (100%) said they were concerned and committed to solving the environmental issues on their campus.

FGD Question 4: What suggestions do you have to improve the environmental problems in the University particularly in waste management?

Participants were provided with evaluation forms to state their suggestions towards improving the environmental management issues in the University since they had already stated that they were concerned and committed towards solving the environmental issues on their various campuses. The suggestions from the various participants were placed together and arranged based on similar themes and listed as follows;

Winneba Campus

- Dumpsite should be relocated away from students' canteen (south Campus bush Canteen)
- Avoid direct burning of waste to reduce air pollution
- Proper supervision and management of students and staff washroom to prevent public urination at obscure places
- A student at Aggrey Hall Block 'A' is collecting empty container rubbers and water sachets and re-using them for selling locally made drinks and bag production. She needs to be encouraged, supported and acknowledged by the University to entice more students to get themselves involved.
- There should be routine maintenance of the facilities such as the septic tanks to the water closet and also regular emptying of such facilities.
- The use of liberation square for funerals and other programmes should be limited and if possible stopped to reduce the rate of noise pollution
- Regular emptying of all dustbins, not the ones only visible to superiors.
- Waste management techniques should be taught as a minor subject for all departments across all faculties in the University

Kumasi Campus

- Community in which the University is located should be educated on proper waste management and its disposal
- There should be specific guidelines on how waste is being collected especially in terms of waste separation and recycling of waste materials
- Incentives can be given to the best department that recycles waste and controls waste pollution annually or semester based.

- Anyone caught disposing off waste indiscriminately should be fined to serve as deterrent for others
- There should be policy on recycling, waste separation and re-use of usable materials in the University
- Proper location should be sited for dumping of waste based on proper dumpsite rules and regulation as stipulated by the Ghana laws

FINDINGS AND DISCUSSION

The following findings were established based on the demographic data;

Majority of the participants were non-residents in all the campuses and across the designated positions in this study as shown in Table 4This result indicated that most of the staff and students of the University of Education, Winneba do not stay on campus. The reason could be that there was not enough accommodation for staff and students.

The male respondents were relatively higher than the female respondent in the study. In all the participants who took part in this study, the male respondent dominated the females in all the groups according to their positions except for the lecturers that had approximately an equal number of respondents (Male, 20; Female 21).

The findings further indicated that all the staff and student respondents were above the ages of 11 years as shown in Table 5 hence, display formal operational intelligence as described by Piaget (1965) in his theory of cognitive development. This implied that all the respondents were able to use scientific reasoning, testing possible explanations on the environment and understanding some basic concepts on the environment and how this behaviour affects the environment (Piaget, 1965). The respondents could tell how

certain practices exhibited by themselves or management could affect their environment and general well-being.

Behaviour by this study was defined based on KAP (Knowledge, Attitude and Practice) to assess waste management practices of students and staff of the University. A model of descriptive evidence was sought to answer the question on behaviour as follows;

Knowledge

Waste management was indicated as a problem in the University of Education, Winneba and staff and students of the University had made it clear that they were knowledgeable of these problems as shown in Table 5 where 71% of the respondents admitted that they are knowledgeable of the environmental problems on their campuses. This confirms other studies within the sub-regions such as those of Chan's (1998), Agwu (2010) and Ifebgesan (2010), whose studies also reported that people's environmental knowledge were highly specific to local issues and geographic scale. Also, studies by Duan and Fortner (2005) revealed similar results.

The responses as depicted by the graph in Figure 4revealed that only 13.8% cumulatively settled that they knew of the Talloires declaration on sustainable waste management practices. The rest of the respondent did not know or are not even sure if they have heard of it. Though, Ghana was a signatory to this declaration and was represented by Professor Akilakpa Sawyer (Formal Vice Chancellor of University of Ghana, Legon), it remains news to the public since most are still not aware of it. Afterwards, only one institution (Valley View University) had joined in 2008. Respondents indicated that they knew the problems on their campus but did not know

what other universities across the world were doing with regards to the environment. This study is consistent with other studies (Agwu, 2012; Duan & Fortner, 2005) that established that people had high awareness and knowledge in local environmental issues than global issues like the Talloires declaration.

Attitude

Most students were not aware of the rules and regulations on pollution and environmental management as stipulated in the students' handbook (Table 18), as 91.67% indicated that they did not read or checked out the rules and regulations in the handbook. The attitude of paying attention on environmental issues by students was shown to be minimal. The attitude of not reading materials that are not directly link to students programme of study is common among university students. Students have the notion that waste management is not their responsibility and so do not show much concern when it comes to information regarding waste. This was also mentioned in the 18th Session of the United Nations Commission on Sustainable Development, National report for Ghana that "major groups of individual citizens continue to assume that their host institutions, government institutions and the local government only have the responsibility in managing waste". These institutions get overwhelmed with the waste problem, whiles citizens stand aloof and even sometime act negatively to pollute the environment (Anku, 2000).

Practices

Table 8 indicated some behaviour and practices of respondents on waste management in the University and the findings displayed that respondents generally had negative practices on waste and environmental management. The response to flushing the toilet was low (Mean 2.49), most did not have the desire to report unclean places to cleaners

(45.8%) and others (49.75%), did not have the habit of picking rubbers on their way when they came across it. These behaviours characterized negative practices on waste management. The findings of this study affirm the study carried out by Agwu (2012) on solid waste management in Ogun state that revealed differences in students' knowledge and practices of waste management and it goes further to contradict other studies (Palmer, 1995; Rausepp, 2001; Ehranpoush & Moghadam, 2005) that found no difference in respondents' knowledge and practices of waste management.

The following findings were established to determine the factors that contributed to environmental problems in the University;

The results from Table 9were the characteristics of environmental problems in the University of Education, Winneba. These features indicate the common environmental characters that make up the environmental problems in the campuses of the University. It was established from the results that, noise pollution, burning of waste openly at dumpsites as well as pasting and falling of posters were the major contributors to pollution and waste in all the three campuses of the University where this study was carried out. Soil erosion, unkept grass and hedge as well as burst water pipes were the least environmental problems recorded in the University. The environmental problems were grouped into types as indicated in Table 10 to determine the major contributors of pollution and waste in the university. Seven waste types such as Biodegradables, glass, papers, plastics, electronic waste among others were determined. The process of determining the types of material in a pollution or waste stream by proportion is called waste characterization. Anomanyo (2004) indicated that insufficient information on the quantities and characteristics of waste is the major contributing factor to Ghana's waste management problem. Cheremisinhoff (2003) also emphasized that, understanding the

characteristics of waste is a must in waste management systems because it allows planning, sizing facilities, recovery methods and many others. These findings were in accordance with the waste characterization studies and waste audits. Waste characterization studies and audits allow you to identify the major contributors to the waste in the geographic location where the studies took place. This process of waste characterizations and auditing are critical to the process of designing and implementing a waste management plan for the University and also it provides insight as to where diversion efforts should be focused as revealed in many studies such as (Armijo de Vega, Ojeba Benitez & Ramirez Barreto, 2008; Smyth, Fredeen & Booth, 2010).

The following findings revealed the facilities for disposal of waste materials in the University;

It was shown in Table 10 that in all the seven waste types listed, the major method of waste disposal for the University was Land filling and open burning. It meant that, the University end up heaping the rubbish at the Land fill sites for collection but due to either delay in picking them or a way of reducing the heap it ends up being burnt. What the respondents refer to as land fill sites in the University were just dumpsites. The plastics, papers and cardboards from hall and offices constitute a significant part of the campus waste. This increases the overall volumes occupying a significant volume of space during landfilling due to its bulky volume (Hoornweg and Bhada-Tata 2012). Burning of waste openly could result in air pollution and health issues due to the heavy metal additives (Ketibuah, Asase, Yussif, Mensah, & Fisher 2004).

The following indicated how the University treats its waste on campus in terms of collection, separation, re-use and recycling of used materials;

Table 11 showed that the University was very consistent in the collection of waste on daily bases but did not separate the waste, re-use the usable ones or even recycle the waste collected. Label containers were not provided by the University for waste separation. Monney (2013) indicated in his study that plastic waste separated from wastes could be sold to recycling companies. Old Papers/Newspapers at the offices could also be sold to be recycled into egg-crates and toilet rolls.

The FGD also indicated that waste separation was not encouraged in the University of Education, Winneba especially from the point of collection and at the various dumpsites.

In the event of finding out the needs and gaps in current policies and programmes on waste management in the University of Education, Winneba, the following were established;

Document analysis showed that some of the University policy documents had some rules and regulations on waste and environmental management on its campuses but most of the students as well as some the staffs were not aware of it. This was also affirmed by the responses in Table 18 of the FGD. All the respondents (100%) said they have not come across any policy document on environment in the University of Education, Winneba. The University has well developed rules and regulations in the students had book which students do not take time to read it. Table 9 also indicated that all the campuses have a dump site for gathering rubbish and this rubbish are often burnt openly on the campuses.

The study also found out that the respondents agreed and accepted that the drop and pay policy as indicated in Table 12 and that it would help reduce the waste management menace in the University so it should be adopted. USEPA (2009) indicated that incorporating user fees ensures that those responsible for generating the waste are

responsible for the disposal cost. This shifts some responsibility to citizens and producers (Park, 2009). These would also be in line with the "polluter pay principle" as indicated in the study by Fishbein, Ehrenfeld &Young (2000).

The findings of this study in Table 12 again indicated that the University should include the neighbouring communities in its policies on waste management as a mean of 1.81 indicated high responses. This if adhered to would be in line with the directives in the waste management policy as indicated by the Association of University Leaders indicated that communities around the university should be included in the waste management issues of the University (ULSF, 2001),

The FGD indicated that students were committed and concerned about the environmental issues and waste management on campus.

The FGD again revealed that the University had not given much priority to the siting of dumpsites since students' residents and eating places on the campuses were too close to the disposal sites.

The hypothesis established the following;

There was no significant difference in the knowledge of students on issues in the three campuses of the University. This study indicated that geographical location was not a predictor of students' knowledge on waste and environmental issues.

The study found correlation between respondents' Knowledge and practices of waste management. This result was consistent with previous studies by Kellert (1885), Raudsepp (2001) and Agwu (2012), who had documented some background such as gender, age as well as parental education, environmental knowledge, awareness and practice. The findings from this study also showed that waste management behaviour (Knowledge, Attitude and Practice) as seen in the correlation results in Table 14 tend to

differ by gender, age and parental education. There were both negative (which means as one variable increases the other variable decreases as seen in the case of parental education and practice) and positive correlation (as one variable decreases the other also decreases and vice versa example as seen in knowledge and practice) in the results.

The Test of significance as indicated by Table 13 (b) showed that there was no significant difference in the variances on the knowledge of students in the three campuses of the University of Education, Winneba.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

5.1 Overview

This chapter presents the summary of the study, major findings, conclusions drawn from the findings and the recommendations based on the study findings. Suggestions for further studies have been provided as well.

5.2 Summary of the study

The purpose of this study was to find out the problems and prospects associated with environmental sustainability, particularly in the area of waste management behaviour and practices in the University of Education, Winneba- Kumasi, Winneba and Mampong Campuses. The study also sought to analyse the needs and gaps in the current policies on waste management in the University of Education, Winneba.

The study was a descriptive survey. It addressed 5 research questions and tested 3 hypotheses.

In all, Seven Hundred and Thirty- Four (734) staff members and students of the University of Education from the three main campuses (Kumasi, Winneba and Mampong) were used for the study. The data were in two main parts (Part A and B), the first part A, was on Demographic data which included the Sex, Age, Position, Residential status, Campus and Parental level of Education of the respondents (Students only). Part B constituted forty (40) scaled items of the same questions developed for both the students and staff (teaching and non-teaching) of the University who took part in the study. These forty items were captured into five main sections according to the

research questions stated. Cross tabulations were used for the demographic data. Most of the items were cross tabulated with the position of the respondent to give a clear distinction of the group of the respondent in-terms of their position like student, lecturer, grounds worker or administrative worker. Descriptive statistics, namely, frequencies and percentages was used to analyse the results of all the demographic data for this study. Means, standard deviations, frequencies and percentages were used to address the research questions, and chi-square as well as multiple comparisons was used to test the hypotheses. The study findings were summarized as follows;

The study revealed that:

Waste management was a problem in the University of Education, Winneba and staff and students of the University were knowledgeable of these problems of waste on their campuses. Their environmental knowledge was highly specific to their local issues and geographic scale.

Respondents had low knowledge in global issues on environment sustainability and waste management like that of the Talloires declaration.

Respondents generally had negative practices on waste and environmental management. Noise pollution, burning of waste openly at dumpsites as well as pasting and falling of posters were the major contributors of waste in all the three campuses of the University of Education, Winneba where the study was carried out.

The major method of waste disposal in the University were Land filling and open burning. What the respondents referred to as land fill sites were just dumpsites.

The University was very consistent in the collection of waste on daily bases but did not either separate or re-use the usable ones in the waste collected on the campuses.

Some of the University policy documents had some rules and regulations on waste and environmental management on its campuses but most of the students as well as some of the staff were not aware of them.

The respondents agreed and accepted that the drop and pay policy if implemented would help reduce the waste management menace in the University so it should be adopted.

The hypotheses however revealed that:

No significant difference existed between knowledge of environmental issues possessed by students in Winneba campus, Mampong campus and Kumasi campuses.

There was correlation between respondents' Knowledge and practices of waste management in the University and their background variables. Some background variables such as gender, age as well as parental education associate either positively or negatively with the environmental knowledge, awareness and practice.

Waste management behaviour (Knowledge, Attitude and Practice) tend to differ by gender, age and parental education.

No significant difference existed in the attitude of staff (lecturers) and students on campus waste management by reporting unclean places to the porters and ground officers.

The focus group discussion also made it known that:

Students knew the problems of environmental issues on their campuses but have no idea of the Talloires declaration on sustainable management of the environment by the Association of University Leaders for Sustainable Future of which Ghana was signatory to in the year 1990.

The major contributors to environmental problems in the University were noise pollution, emptying of dust bins, burning of waste openly and wrongfully pasting and falling off posters on campus.

Although the University had provided students with the Students Handbook, they had not taken time to read and know the aspect on pollution and environmental problems on the campuses perhaps, there had not been much importance attached to it.

5.3 Conclusions

It is admirable to know that, Ghana as country had many laws and regulation for environmental management. Also, the management of University of Education, Winneba has in place numerous initiatives towards addressing waste management and sanitation on its campuses (Rules and regulation on waste on campuses, the grounds workers and many others). However, there are certain constraints on waste management that remain a challenge for the University that need to be addressed. This study although focused on the University of Education, Winneba, it is also very important for the country Ghana. The reason being that, the study had pronounced implication for waste management in the Ghanaian schools from basic level to the tertiary since most of the

participants were either teachers or potential teachers who were going to teach at various levels in the country. The challenges facing the country's bid to meet the MDG 7 target on sanitation was enormous and required an urgent multi-stakeholder action plan like the involvement of higher institutions to address them. Again, staff and students of the University of Education, Winneba understood that waste management on their campus was a major environmental problem and therefore, were aware of it. However, they possessed poor waste management practices with regards to the environmental sustainability.

5.4 Recommendations

In view of the above findings and the conclusions drawn, the following recommendations/ suggestions were made:

1. The University of Education, Winneba should as part of their environmental management plans include behavioural issues that specifies basic knowledge, attitudes and practices on waste management by staff and students as practiced by other universities like University of Edinburg that had develop waste teams that provides different kinds of services and education in waste management.
2. The University should develop comprehensive waste management policies for the various campuses with the aim of satisfying the objectives of environmental protection and rational use of resources. In this act, the University should take into accounts the economic constraints and differences in local conditions of these campuses. These policies should be based on environmentally and socially sound principles necessary to curtail some negative impacts of the University on the environment.

3. The University should make it mandatory for the orientation of fresh members of the University community (including those for the Sandwich programmes) on basic washroom usage if possible on lavatory usage especially how to flush the water closet.
4. Waste collection and deposit points should be designed for each of the campuses with segregated facilities and simple waste separation points to enhance easy collection and disposal of waste from the halls, staff residences and the offices. Dust bins with specific colours can be designed and placed at vantage points for the collection of separated waste and can be maintained through the transit points to the dumpsite.
5. The waste collection points on the various campuses should be strategically situated considering the residents and eating places of the staff and students. More appropriately, the dumpsites should be developed into land fill site so that proper environmental management principles can be adhered to.
6. The University should make it a point to intensively orientate fresh members of the University community on environmental pollution especially in the aspect of waste.
7. The University should open up to global waste management philosophies as designated by University Leaders for Sustainable Future (ULSF) by joining the Talloires declaration to help collectively implement environmental friendly society by raising awareness and understanding of sustainable environmental issues and changing behaviours for a more sustainable tomorrow.
8. The University should enact waste management laws with stiffer penalties on offenders to ensure compliance. Also, the "polluter pays principle" (PPP) and the "extended producer responsibility" (ERP) can be introduced. When incorporating

ERP, businesses are assigned the responsibility for the environmental impacts across the life cycle of their products (Fishbein, Ehrenfeld &Young, 2000). This responsibility challenges business to develop and design environmental friendly products; meaning waste is reduced from the outset and products can be redesigned to be easier to recycle (CCME, 2009) promoting the creation of closed loop systems (Fishbein et al., 2000). The University can sign a memorandum of Understanding with the firms that supply electronic devices or the graphic companies that supply newspapers for all the departments to come for them at a period for a fee.

9. Effective monitoring of ground workers in the various campuses of the University should be intensified to ensure that their performance is up to expectations.
10. Establishment of recycling plants in the various campuses to reduce the waste generated by the University.
11. Targets should be set on recycling and recovery of waste materials in the University on yearly intervals; this should be an integral part of the University's Strategic plan.

5.5 Suggestions for further studies

This study was undertaken to unearth staff and students' behaviour and practices of waste management towards environmental sustainability. Using the Theory of Planned Behaviour (TPB) approaches to ascertain waste management practices had been in existence for some time now as seen in works of Agwu (2010) and Ifegbesan (2010). The fact was that, there were no many researches in this regard especially in Ghana. However, more researches elsewhere have shown many evidences and enthusiasm about

behaviour in waste management for many years, trends in the available researches have been affirmative and its reliability with modern-day theories for environmental studies. More researches should be mounted in the country to gather potential efficacy of this method in as many departments and educational institutions as possible especially in our Colleges of Education, Polytechnics and other educational institutions.

The following suggestions were made for further studies:

1. This study showed that noise pollution, burning of waste openly and in-appropriate pasting and falling off posters were the major contributors of the environmental pollution in the University. Hence, further, studies should be done to determine the level of the noise pollution, how frequent is the noise pollution on the Campus and the actual sources of the noise pollution in the University. Furthermore, advance studies should look at the kind of waste that is normally burnt and where one can appropriately paste posters or post no bill as well as the frequency of the falling of these posters on the campuses.
2. Comparable studies should be conducted in other Universities, Polytechnics, and Colleges of Education in the country to ascertain if the problems are alike or otherwise.
3. Further studies should be conducted on the tons of waste generated in all the educational institutions in the country.
4. Other studies can look at the impacts of tertiary education in the country on general waste management in the communities they are located.
5. Again, further studies should be conducted to compare the general waste management of institutions that are members of the Talloires declaration of 1990 and practice the recommendations made by University Leaders for

Sustainable Future (USLF) with those that are not members to evaluate their environmental management skills.

REFERENCES

Agbola, T. (1993). Environmental education in Nigerian Schools. In W. L. Filho, & . (Ed.), *Education in the common welath of learning, Vancouver.*

Agency, U. E. (1995). *Decision-makers' guide to solid waste management.* (Vol. II). Washington, D.C: Retrieved from http://www.epa.gov/osw/nonhaz/municipal/dmg2/ on 2nd September, 2013.

Agwu, M. O. (2012). Issues and challenges of solid waste management practices in port-harcourt city, Nigeria. A behavioural perspective. *American Journal of Social Sciences*, 2156-1540. doi:10.5251/ajsms.2012.3.2.83.92

Ahwoi, K. (1999). *Environmental Sanitation Policy, Ministry of Local Government and Rural Development.* Accra.

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour . In J. K. (Eds), *Action control: from cognition to behaviour.* . New York : Springer-Verleg.

Ajzen, I. (1991). The theory of planned behaviour, Organisational Behaviour and Human Decision Processing. 50, P.179-211.

Ajzen, I. (1991). The theory of planned behaviour. Organisational Behaviour and Human Decision Processing. 50, P. 179-211.

Ajzen, I., & Driver, B. L. (1992). Application of the theory of planned behaviour to leisure choice. *Journal of Leisure Research*, 24, 207-224.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* New Jersey: Prentice-Hall, Upper Saddle River.

Anku, S. E. (2000). *Solid Waste Management in Ghana, paper presented at a training workshop on Environmental Management for selected District Assemblies in Ghana.* Accra.

Anomanyo, D. E. (2004). *"Integration of Municipal Solid Waste Management in Accra (Ghana): Biorector Treatment Technology as an Integral Part of the Management Process".* Lund University, Sweden.

Armijo de Vega , C., Ojeba Benetez, S., & Ramirez Barreto, E. M. (2008). Solid waste characterisation and recycling potential for a university campus. *Waste management (New York, N. Y.)*, 28, S21-6. doi:10.1016/j.wasman.2008.03.022

Asabere-Ameyaw, A., Anamuah-Mensah, J. & Kolawole, R. (2008). Human Impact on the Environment. Winneba: SACOST, University of Education, Winneba.

Asare-Donkor, N. K., Wemegah, D. D., & Adimado, A. A. (2013). "Chemical Analysis of Freshwater Bodies in the Kumasi Metropolis and Its Environs, Ghana". *Journal of Environment and Earth Science, 3*(9), 37-45.

Association of University Leaders for a Sustainable Future. (1990). *The Taillores Declaration.* http://www.ulsf.org/programmes_tailloires_report.html downloaded 24/05/2013.

Awuah, E. & Fiakuma, E. (2007). "State of Sanitation in Accra". *SWITCH: Accra Visioning and Scenario Planning Workshop*, 1-5.

Babbie, E. (2007). *The Practice of Social Research.* Belmont, CA: Wadsworth Publishing Company.

Bilitewski, B. (2008). Pay-as-you-throw- a tool for urban waste management 10.1016/j.wasman.2008.08.001. *Waste Management, 28*(12), 2759, Elsevier Ltd. doi:10.1016/j.wasman.2008.08.001.

Boadi, K. O. & Kuitunen, M. (2002). "Urban Waste Pollution in Korle Lagoon, Accra, Ghana". *The Environmentalist., 22*, 301-309.

Bolaane, B. (2006). Constraits to promoting centered approaches in recycling. *Habitat International, 30*(4), 731-740. doi:10.1016/j.habitatint.2005.10.002.

Borg. W. R., Gall, J. R. & Gall, M. D. (2007). *Educational research: An introduction. (8th Ed).* Boston: Peanson Education Inc.

Canadian Council of Ministers of the Environment . (2009). *Waste audit users manual: A comprehensive guide to the waste audit process.*

CEF consultants . (1994). *A handbook of policy tools.*

Cheremisinhoff, P. N. (2003). *"Handbook of Water and Wastewater Treatment Technologies".* Woburn, USA: Butterworth-Heinemann Publications.

Ghana's Constitution. (1993). *The 1992 4th Republican Constitution of the Republic of Ghana (last amended 1996).* Accra: Chapter 6 Article 36 (9). Retrieved March 25, 2015, from http://www.refworld.org/docid/3ae6b5850.html

Ghana's Constitution. (last amended 1996). *the 1992 4th Republican Constitution of the Republic of Ghana.* Accra: Chapter 6 Article 36 (9). Retrieved March 25, 2015, from http://www.refworld.org/docid/3ae6b5850.html

Credzinska-Jurczale, M., Tomal, P., Tarabula-Fiertak, M., Nieszporck, K., & Read, A. (2006). Effects of an educational campaign on public environmental attitudes and behaviour in Poland. *Resources, conservation and Recycling, 46*(2), 182-197. doi:10.1016/j.rescorec.2005.06.010

Creighton, S. H. (1999). *Greening the Ivory Tower. Improving the Environmental Track Record of Universities, Colleges, and Other Institutions* . Cambridge, Mass: MIT Press.

Creswell, J. W. (2003). *Research Design: Qualitative, quantitative and mixed methods approaches.* London: Sage.

Daily Graphic. (2011). *Sanitation a major problem; Says Okudjetu Ablakwa.* Accra: Daily Graphic, Friday, July 1, 2011.

Dalal-Clayton, D. B., & Bass, S. (2009). *The challenges of environmental mainstreaming: experience of integrating environment into development institutions and decisions (No. 1).* IIED.

Davies , G., Phillips, P. Read, A., & Lida, Y. (2006). Demonstrating the need for the development of internal research capacity. Understanding recycling participation using the theory of planned behaviour in the west oxforshie, UK. *Resources, Conservation and Recycling, 46*(2), 115-127. doi:10.1016/j.resconrec.2005.07.001

Ehrampoush, M. H. & Maghadam, B. (2005). Survay of knowledge attitude and practices od Yazd of medical science students about solid waste disposal and recycling. *Iranian Journal of Environmental Health, Science and Engineering, 2*(2), 26-30.

El-Haga, S. M. (2007). *Sustainable industrial design and waste management: Cradle-to-cradle for sustainable development.* Oxford: Elservier/Academic Press.

EPA. (2002). *Manual for the preparation of District Waste Managemen Plans.*

EPA Anniversary Lecture. (2004). *Urban Land Use Planning Consideration in Environmental Management of Ghana.*

Fakayode, S. (2005). "Impact assessment of industrial effluent on water quality of the receiving Alaro river in Ibadan, Nigeria". *African Journal of Environmental Assessment and Management, 10*, 1-13.

Filho, W. L. (1999). *Sustainability and University Life.* Bern, Switzerland: Peter Lang Scientific Publishers.

Fishbein, B. K., Ehrenfeld, J., & Young, J., E. (2000). *Extended producer responsibilty: A material policy for the 21st century.*

Fraenkel, J. R., & Wallen, N. E. (2003). *How to design and elatuate research in education (5th ed).* New York, NY: McGraw Hill.

Frey, B. S., & Obsrholzer-Gee, F. (1997). The cost of price Incentives: An Empirical Analysis of motivation crowding- cont. *The American Economic Review, 87*(4), 746 – 755.

Gamber, R., & Oskams, S. (1994). Factors influencing community residents' participation in commingled curb size recycling programmes. *Environment and Behaviour*, 26, 586-612.

Gay, L. R. (1987). *Educational Research: Competencies for Analysis and Application* (3rd ed.). Columbus, Ohio: Merrill Publishing Company.

Ghana Government. (2010). *"Ghana Shared Growth and Development Agenda (GSGDA) 2010-2011".* Accra.

Ghana MAF . (2011). *"Go Sanitation: Country Action Plan for Sanitation, 2011".* United Nations.

Goddard, H. (1995). The benefits and costs of alternative solid waste management policies. *Resources, Conservation and Recycling, 13*(3-4), 183- 213. doi:10.1016/0921-3449 (94) 00021-v.

Government of Ghana. (2005). *" Growth and Poverty Strategy (GPRS II), 2006-2009"* (Vol. 1). Policy Framework. Accra.

Green Ghana. (2012). *Ghana: MDGs 2015 Target (Sanitation).* Retrieved 07 10, 2014, from http://www.greenghanaian.file.wordpress.com/2012/photo1.jpg

GSS. (2013). *Millinium Development Goals in Ghana.* Accra: Ghana Statistical Service.

Hansmann, R., Bernasconi, P., Smieszek, T., Lonkupoulos, P., & scholz, R. (2006). Justification and self-organisation as determination of recycling behaviour: The case of used batteries. *Resources, conservation and Recycling, 47*(2), 33-159. doi:10.1016/j.resconrec.2005.10.006

Hoornweg, D. & Bhada-Tata, P. (2012). " What a waste: A Global Review of Solid Waste Management", The World Bank. *Urban Development Series, 15*, 8-10.

Ifegbesan, A. (2010). Exploring secondary school students' understanding and practices of waste management in Ogun state, Nigeria. *International Journal of Environmental Science Education, vol. 5*(No. 2), 201-215.

Iyer, E. S., & Kashyap, R. K. (2007). Consumer recycling: Role of incentives, information and social class. *Journal of Consumer Behaviour, 47*, 32-47. doi:10.1002/cb.

Jean, P. (1965). The stages of the intellectual development of the child. *Educational psychology in context: Readings for future teachers*, 98-106.

Kaplonitz, M. D., Yeboah, F. K., Thorp, L., & Wilson, A. M. (2009). Garthering imput for recycling: Communication strategies at big ten universities. *Resources, Conservation and Recycling, 53*(11), 612- 623.

doi:10.1016/j.resonrec.2009.04.018

Kellert, S. R. (1985). Atttitude towards animals: Age-related development among children. *The Journal of Environmental Education, 16*(3), 29-39.

Ketibuah E., Asase M., Yussif, S., Mensah, M. Y. & Fisher, K. (2004). "Comparative Analysis of Household Waste inthe Cities of Stuttgart and Kumasi - Option for Waste Recycling and Treatment in Kumasi". *Proceedings of the 19th international CODATA Conference*, (pp. 1-8).

Kitzinger, J. (1994). The Methodology of Focus Groups: the importance of interaction between research participants. *Social health IUn*, 16:103-121.

Kruger, K. A. (1988). *Focus Groups: A practical guide for applied research.* Sage, UK.

Kuhlemeier, H., Van den Bergh, H., & Lagerweij, N. (1999). Environmental knowledge, attitudes and behaviour in Dutch secondary education. *The Journal of Environmental Education*, 30(2), 4-14.

Kulbir, S. S. (1984). *Methodolgy of Research in Education.* Sterling Publishers: Sterling Publishers. Retrieved November 22, 2014, from https://books.google.com.gh/books? id=AAAACAAAj

Lewin, K., Lippitt, R., & White, R. (1939). Patterns of aggressive behavior in experimentally created social climates. *Journal of Social Psychology*, 10: 271–301.

Loughlin, D. & Barlez, M. (2006). Policies for Strengthening Markets for Recyclables: A Worldwide Perspective. *Critical Reviews in Environmental Science Technology, 36*(42), 287- 326. doi:10.1080/1064330600566952

Love, P. (2003). Chapter 6: Document Analysis. In F. K. Manning, *Research in the college context: Approaches and methods* (pp. 83-97). New York, NY: Brunner-Routledge.

Maddan, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin*, 18(1), 3-9.

Matsumoto, S. (2011). Waste separation at home: Are Japanese municipal curbside recycling policies efficient? *Resources, Conservation and Recycling, 55*(3), 325-334, Elsevier Biv . doi:10.1016/j.resconrec.2009.04.018.

Meakin, S. (1992). Hazardous waste management: Canadian directions. *Government of Canada: Depositing services Programms*. Retrieved from http://dsp-psd, pwgsc.gc.cq/collection-R/LoPBdp/BP/BP, bp323-e.htm

Meakin, S. (1992). *Hazardous waste management: Canadian directions. Government of Canada: Depository Services Program. Retrieved from http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/BP/bp323-e.htm.*

Monney, I. (2014). Ghana's solid waste management problems: the contributing factors and the way forward. Retrieved March 23, 2015, from Modern Ghana Web site: http://www.modernghana.com/news/544185/1/ghanas-solid-waste-management-problems-contrib.html

Monney, I., Robert, B., Richard, B., Frederick, O. K., Samue, N. O. & Esi, A. (2013). Urbanization and Pollution of Surface Water Resources in the Two Largest Cities in Ghana. *International Journal of Environmental Monitoring and Analysis, 1*(6), 279-287. doi:10.11648/j.ijema.20130106.12

Monney, I., Tiimub, M. B., & Bagah C. H. (2013). Characteristics and management of household solid waste in urban areas in Ghana: the case of WA. *Civil and Environmental Research, 3*(9).

Morgan, D. (1988). *Focus group as qualitative research.* Sage, UK.

Murray, H. (1938). *Explorations in Personality.* New York: Springer.

Myjoyonline. (2014). *Health News of Wednesday: Ghana's cholera outbreak worst in 30 years.* Accra: Ghana Web. Retrieved 15 March, 2015, from

http://www.ghanaweb.com/ghanahomepage/health/artcle.Php?id=328382&com ment=0#com

Oduro-Kwarteng, S., Monney, I., & Braimah, I. (2015). Human resources capacity in Ghana's water, sanitation and hygyiene sector: analysis of capacity gaps and policy implications. *Water Policy, 17*(3), 502-519.

Palmer, J. A. (1995). Environmental thinking in the early years: Understanding and misunderstanding of concept related to waste management. *Journal of Environmental Education Research, 1*(1), 35-45.

Park, J. W. (2009). 3R Policies of Korea. Retrieved from http://eng.me.go.kr/file.do?method=fileDownloader&attachSeq=133

Peräkylä, A. (2005). Analyzing talk and text. In ,. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research (3rd Ed.)* (pp. pp 695-727). Thousand Oaks, CA: Sage.

Purcell, M. & Magette, W. L. (2010). Attitude and behaviour towards waste management in the Dublin, Ireland region. *Waste management, 30*(10). doi:10.1016/j.wasman.2010.02.021.

Raudsepp, M. (2001). Some socio-demographic and socio-psychological predictors of environmentalism. *TRAMES, 5*(4), 355-367.

Sakai, S., Sawel, S., Chandler, A. J., Eighmy, T., Kosson, D., & Vehloew, J. (1996). "World trends in municipal solid waste mangement". *Waste Management, Vol.16 (5/6)*, pp.341-350.

Scott, D., & Willets, F. K. (1994). Environmental attitudes and behaviour. *Environment and Behaviour*, 26(2), 239-261.

Scott. D., & Willets, F. K. (1994). Environmental attitudes and behaviour. *Environment and Behaviour*, 26(2), 239-261.

Seadon, J. K. (2006). *Integrated waste management-looking beyound the solid waste horizon. Waste management* (Vol. 12). Elservier Ltd. doi:10.1016/j.wasman.2008.03.033

Skumatz, L. (2008). Pay as you throw in the US: Implementation, impacts and experience. *Waste management*, 28(12), 2778-85, Elsevier Ltd. doi:10.1016/j wasman.2008.03.033.

Smyth, D. P., Fredeen, A. L., & Booth, A. L. (2010). Reducing Solid Waste in higher education: The first step towards " greening" a university campus. *Resources, Conservation and Recycling*, 54 (11). doi:10.1016/j.resconrec.2010.02.008

Songsore, J. (1970). Review of Household and Environmental Problems in Accra Metropolitan Area, Accra.

Speer, S. A. (2002). 'Natural' and 'contrived' data: A sustainable distinction? Discourse Studies. 4, 511-525.

Stern, P. C. (1997). Toward a working definition of consumption for environmental research and policy. In T. D. P. C. Stern, *Environmental Consumption Research direction* (pp. 12-35). Washington, DC: National Academy Press.

Stewatt, D. W. & Shamdasani, P. N. (1990). *Focus Groups: memory and practices.* Sage, UK.

Suttibak, S., & Nitivattananon, V. (2008). Resources, Conservation and Recycling Assessment of factors influencing the performance of solid waste recycling

programmes. *Conservation and Recycling*(53), 45-56. doi:10.1016/j.rescnrec.2008.09.004

Thøgerson, J., & Gruent-Beckmann, S. C. (1997). Values and attitude formation towards emerging attitude objects: from recycling to general waste minimsing behaviour. In M. M. (Ed), *Advances in consumer Research* (pp. pp.182-189). Provo. UT. A.

Tonlette, R, & Willliams, I. (2009). The impact of trancient populations on recycling behaviour in a densely populated urban environment. *Resources, Conservation and Recycling*. doi:10.1016/j.resconrec.2009.03.010.

U.C. Davies. (n.d). *college and university waste reduction and Recycling Manual.*

UNDP. (2012). *"The Millinium Development Goals Report 2012", United Nations.* New York.

UNEP. (2002). *Africa Environment Outlook Past, present and future perspectives.* London: Earthprint.

UNICEF. (2014). *Cholera outbreak in the West and Central Africa: Regional Update, 2014 - Week 52.* Retrieved February 25, 2015, from www.unicef.org/cholera

University of Edinburg (2015) . Waste and Recycling, http://www.ed.ac.uk downloaded 06/06/2016.

UMN (2014). Waste Management and disposal/ UMN Policy- Policy Library, http:// policy. umn.edu. downloaded 06/06/2016

USLF. (2001). Talloires declaration, http://www.ulsf.org/programs_talloires_report.html downloaded 24/05/2013).

Williams, P. (2005). *Waste treatment and Dispatch* (2nd ed.). Chrislester: John Wiley and sons Ltd.

World Bank. (2012). *UNDP-Water & Sanitation Program.* Washington DC: World bank: http://www.worldbank.org/en/country/ghana/whats-new?docty_exact=UNDP-Water+%26+Sanitation+Program&.

Wright, T. S. (2002). Definitions and Frameworks for Environmental Sustainability in Higher Education. *International Journal of Sustainability in Higher Education, 3*(3), 203-220.

Yale. ((2014)). *Environmental Perfomance Index.* Yale: Yale University.

Appendix A

UNIVERSITY OF EDUCATION, WINNEBA

Questionnaire for Staff

Dear Staff,

The purpose of this survey is to help identify the level of environmental sustainability and sustainable campus practices in your institution. This information will be important in order to plan for a future intervention. All your responses will be treated in strict confidentiality, so I ask you to kindly respond as honestly as possible. Thank for sparing time to complete the questionnaire.

Instruction: Please tick (√) or fill in where applicable

PART A **Demographic data**

Campus:……

(a) Non- Resident (b) Resident

Sex: (a) Male (b) Female

Age: (a) Below 24yrs (b) 25-30yrs (c) 31-34yrs (d) 35yrs- 40yrs (e) Above 41yrs

Position

(a) Student (b) Lecturer (c) Administrative Staff (d) Grounds Worker

(e) Teaching/Research Assistant

S/N	(RQ 1) Knowledge, Awareness and Attitude	Very true	True	Not True	Not True at all	Not Sure
1.	I am very knowledgeable with regards to environmental issues and problems on my campus.	[ ]	[ ]	[ ]	[ ]	[ ]
2.	I know of Talloires declaration on sustainable waste management by the Association of Universities Leaders.	[ ]	[ ]	[ ]	[ ]	[ ]
3.	I am aware of the environmental policy of the University of Education, Winneba	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Environmental problems on this campus is not of interest to me	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Waste management on campus is satisfactory	[ ]	[ ]	[ ]	[ ]	[ ]
6.	I worry about waste in the community I find myself	[ ]	[ ]	[ ]	[ ]	[ ]
7.	Staff often flush their toilet after use	[ ]	[ ]	[ ]	[ ]	[ ]
8.	When I realize the washroom is dirty, I do clean it	[ ]	[ ]	[ ]	[ ]	[ ]
9.	I do report unclean places to the porters and ground workers	[ ]	[ ]	[ ]	[ ]	[ ]
10.	When I see rubbers and bags on my way to campus I often pick them to the dust bin	[ ]	[ ]	[ ]	[ ]	[ ]

(RQ 2) Factors that contribute to waste/ pollution

Which of the under listed environmental problems are common factors that contribute to environmental pollution on your campus? Please indicate how common you think the problems are.

S/N	Environmental problem	Verycommon	Common	Not common	Not Common at all	Don't know
11.	Noise pollution					
12.	Air pollution					
13.	Indiscriminate littering					
14.	Unkept grass and hedge					
15.	Uncollected Garbage					
16.	Soil erosion					
17.	Sewage disposal/ 'free range'					
18.	Public urination					
19.	Pasting and fallen off posters					
20.	Burning of waste openly					
21.	Burst water pipes					

(RQ 3) Facilities for waste disposal

What happens to the waste generated on your campus?

S/N	Type of wastes	Open burning	Land filling	Composting	Incinerator	Recycle/Reuse	Don't know
22.	Biodegradables (food remnant)						
23.	Glass						
24.	Papers, newspapers and cardboard						
25.	Plastics/rubbers						
26.	Nylons/cotton materials						
27.	Scrap metals						
28.	Electronic waste						

(RQ 4) Waste treatment

Please share your opinion about the following statements on environmental sustainable practices.

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure
29.	Waste were collected on daily basis at vantage points on Campus and Residence					
30.	There were labelled waste containers in halls and offices for waste separation					
31.	The University often re-uses scrap papers					
32.	Waste collected on this campus are recycled					
33.	The university had a dump site for waste disposal					
34.	Waste at dump site were burnt openly					

(RQ 5) Policy issues

Please share your opinion about the following statements on the gaps, and needs of the current policies in the University of Education, Winneba

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure
35.	I know of the rules and regulations on waste in the University					
36.	Waste management on this campus is commendable					
37.	Waste separation should be encouraged					
38.	The University should adopt the 'drop and pay' system of rubbish management style					
39.	I am not satisfied with the current management of waste on the campus, hence the policy should be reviewed					
40.	The University's policy on waste management should include the neighboring communities					

Appendix B

UNIVERSITY OF EDUCATION, WINNEBA

Questionnaire for Students

Dear Student,

The purpose of this survey is to help identify the level of environmental sustainability and sustainable campus practices in your institution. This information will be important in order to plan for a future intervention. All your responses will be treated in strict confidentiality, so I ask that you to respond so as honestly as possible. Thank you for sparing time to complete the questionnaire.

Instruction: Please tick (√) or fill in where applicable.

PART A **Demographic data**

Campus:……

(a) Non- Resident (b) Resident

Sex: (a) Male (b) Female

Age: (a) Below 18yrs (b) 18-24yrs (c) 25-30yrs (d) 31yrs- above

Position

(a) Student (b) Lecturer (c) Administrative Staff (d) Grounds Workers

Parental Educational Background

(a) No formal Education (b) Basic School (c) Second cycle Institution

(d) Tertiary

PART B

S/N	(RQ 1) Knowledge, Awareness and Attitude	Very true	True	Not True	Not True at all	Not Sure
1.	I am very knowledgeable with regard to environmental issues and problems on my campus.	[ ]	[ ]	[ ]	[ ]	[ ]
2.	I know of Talloires declaration on sustainable waste management by Association of University Leaders.	[ ]	[ ]	[ ]	[ ]	[ ]
3.	I am aware of the environmental policy of the University of Education, Winneba	[ ]	[ ]	[ ]	[ ]	[ ]
4.	Environmental problems on this campus is not of interest to me	[ ]	[ ]	[ ]	[ ]	[ ]
5.	Waste management on campus is satisfactory	[ ]	[ ]	[ ]	[ ]	[ ]
6.	I worry about waste in the community I find myself	[ ]	[ ]	[ ]	[ ]	[ ]
7.	Students often flush their toilet after use	[ ]	[ ]	[ ]	[ ]	[ ]

8.	When I realize the washroom is dirty, I do clean it	[ ]	[ ]	[ ]	[ ]	[ ]
9.	I do report unclean places to the porters and ground workers	[ ]	[ ]	[ ]	[ ]	[ ]
10.	When I see rubbers and bags on my way to campus I often pick them to the dustbin	[ ]	[ ]	[ ]	[ ]	[ ]

(RQ 2) Factors that contribute to waste/ pollution

Which of the under listed environmental problems are common factors that contribute to environmental problems on your campus? Please indicate how common you think the problems are.

S/N	Environmental problem	Verycommon	Common	Not common	Not Common at all	Don't know
11.	Noise pollution					
12.	Air pollution					
13.	Indiscriminate littering					
14.	Unkept grass and hedge					
15.	Uncollected Garbage					
16.	Soil erosion					
17.	Sewage disposal/ 'free range'					
18.	Public urination					
19.	Pasting and falling off posters					
20.	Burning of waste openly					
21.	Burst water pipes					

(RQ 3) Facilities for waste disposal

What happens to the waste generated on your campus?

S/N	Type of wastes	Open burning	Land filling	Composting	Incinerator	Recycle/Reuse	Don't know
22.	Biodegradables (food remnant)						
23.	Glass						
24.	Papers, newspapers and cardboard						
25.	Plastics/rubbers						
26.	Nylons/cotton materials						
27.	Scrap metals						
28.	Electronic waste						

(RQ 4) Waste treatment

Please share your opinion about the following statements on environmental sustainable practices.

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure
29.	Waste were collected on daily basis at vantage points on Campus and Residence					
30.	There were labelled waste containers in halls and offices for waste separation					
31.	The University often re-uses scrap papers					
32.	Waste collected on this campus are recycled					
33.	The University has a dump site for waste disposal					
34.	Waste at dump site were burnt openly					

(RQ 5) Policy issues

Please share your opinion about the following statements on the gaps, and needs of the current policies in the University of Education, Winneba

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure
35.	I know of the rules and regulations on waste in the University					
36.	Waste management on this campus is commendable					
37.	Waste separation should be encouraged					
38.	The University should adopt the 'drop and pay' system of rubbish management style					
39.	I am not satisfied with the current management of waste on the campus, hence the policy should be reviewed					
40.	The University's policy on waste management should include the neighbouring communities					

Appendix C

Pilot test results on reliability statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.831	.812	40

Intraclass Correlation Coefficient

	Intraclass Correlation[a]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.109[b]	.068	.180	5.914	39	1521	.000
Average Measures	.831[c]	.746	.898	5.914	39	1521	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. Type C intra-class correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

b. The estimator is the same, whether the interaction effect is present or not.

RELIABILITY STATISTICS: ITEM-TOTAL STATISTICS BASED ON THE RESEARCH QUESTIONNAIRE

Research Question 1, Knowledge, Awareness, Attitude	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am very knowledgeable with regards to environmental issues and problems on my campus	117.1	362.554	0.422	0.825
I know of Talloires declaration on sustainable waste management by Universities	115.98	360.076	0.351	0.826
I am aware of the environmental policy of the University of Education, Winneba	116.65	362.131	0.432	0.825
I came to study/teach/work so environmental problems on this campus is not of interest to me	116.2	371.446	0.175	0.83
Waste management on campus is satisfactory	116.83	375.533	0.101	0.832
I worry about waste in the community I find myself	117.13	373.343	0.165	0.83

Students/Staff often flash their toilet after use	116.68	359.404	0.4	0.825
When I realize the washroom is dirty, I do clean it	116.7	352.882	0.502	0.821
I do report unclean places to the porters and ground works	116.48	361.948	0.412	0.825
Research Question 2, Factors that contributes to waste/ Pollution				
When I see rubbers and bags on my way to campus I often pick them to the dustbin	116.78	353.563	0.622	0.82
Noise pollution	117.2	384.831	-0.127	0.835
Air pollution	116.15	381.31	-0.022	0.832
Indiscriminate littering	116.1	377.733	0.087	0.831
Unkept grass and hedge	115.8	377.241	0.118	0.831
Uncollected Garbage	115.93	384.071	-0.116	0.834
Soil erosion	116	374.359	0.181	0.83
Sewage disposal/ 'free range'	115.98	373.256	0.203	0.83
Public urination	116.43	373.276	0.181	0.83
Pasting and fallen off posters	116.9	386.195	-0.156	0.837
Burning of waste openly	116.15	378.387	0.049	0.833
Burst water pipes	116.05	376.869	0.084	0.832

Research Question 3; Facilities for waste disposal

Biodegradables (food remnant)	114.63	339.369	0.552	0.818
Glass	114.65	347.926	0.443	0.823
Papers, newspapers and cardboard	115.13	339.343	0.456	0.822
Plastics/rubbers	115.33	333.815	0.51	0.82
Nylons/cotton materials	114.63	339.728	0.508	0.82
Scrap metals	114.23	351.461	0.391	0.824
Electronic waste	114.2	351.856	0.399	0.824

Research Question 4; Waste Treatment

Waste were collected on daily basis at vantage points on campus and residence	117.45	368.51	0.338	0.827
There were labelled waste containers in halls and offices for waste separation	116.65	360.438	0.324	0.827
The University often re-uses scrap papers	115.5	358.154	0.48	0.823
Waste collected on this campus are recycled	115.38	366.651	0.255	0.829
The University has a dump site for waste disposal	116.65	354.9	0.379	0.825
Waste at dump site are burnt openly	116.28	363.23	0.269	0.828

Research Question 5; Policy Issues

I know of the rules and regulations on waste in the University	116.48	361.64	0.324	0.827
Waste management on this campus is commendable	116.63	362.907	0.275	0.828
Waste separation should be encouraged	117.25	375.218	0.09	0.833
The University should adopt the 'drop and pay' system of rubbish management style	116.95	360.1	0.365	0.825
I am not satisfied with the current management of waste on the campus, hence the policy should be reviewed	116.43	362.969	0.339	0.826
The University's policy on waste management should include the neighbouring communities.	117.28	357.692	0.449	0.823

Appendix D

Some observations that prompted the study

Solid waste on Campus: A student involved in 'free range' at Winneba campus

Dumpsite 100metres from students' canteen (Winneba Campus)

Uncollected rubbish around Students hall south campus

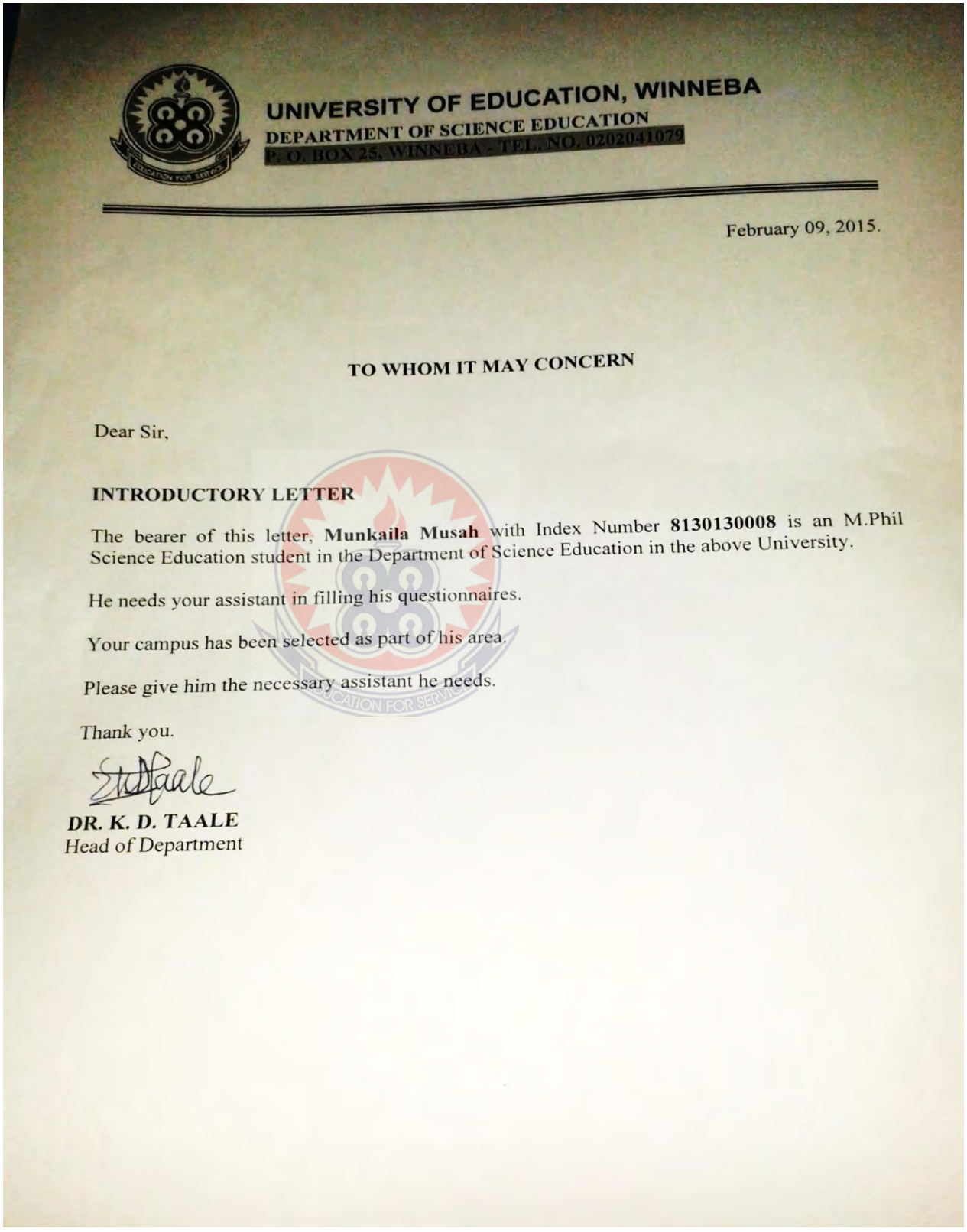
University dumpsite Manpong campus

The drainage outlet from the students' hall (Winneba Campus)

Shit on Shit, popularly known as 'SOS' by Students

Appendix E

Introductory Letter to Conduct a Study



UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF SCIENCE EDUCATION
P. O. BOX 25, WINNEBA - TEL. NO. 0202041079

February 09, 2015.

TO WHOM IT MAY CONCERN

Dear Sir,

INTRODUCTORY LETTER

The bearer of this letter, **Munkaila Musah** with Index Number **8130130008** is an M.Phil Science Education student in the Department of Science Education in the above University.

He needs your assistant in filling his questionnaires.

Your campus has been selected as part of his area.

Please give him the necessary assistant he needs.

Thank you.

DR. K. D. TAALE
Head of Department