GRATIFICATION FACTORS' INFLUENCE ON MOBILE PHONE TECHNOLOGY USE LEVELS AMONG PUBLIC UNIVERSITY STUDENTS IN NAIROBI CITY COUNTY, KENYA

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Gratification Factors' Influence on Mobile Phone Technology Use Levels among Public University Students in Nairobi City County, Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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This thesis has been submitted for examination with my approval as University Supervisor.

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DEDICATION

In memory of my parents, Baba Hezron Onyango Ogonda and Mama Esther Okinda Onyango. You taught me that perseverance leads to a bounteous harvest. This is one.

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ABBREVIATIONS AND ACRONYMS

CHSS		College of Humanities and Social Sciences
COHRED		College of Human Resource Development
FASS		Faculty of Arts and Social Sciences
IED	-	Improvised Explosive Device
IJMC	-	International Journal of Mobile Communication
IM	-	Instant Messages
ISTE	-	International Society for Technology
JKUAT		Jomo Kenyatta University of Agriculture and Technology
KNBS	**-**	Kenya National Bureau of Statistics
KU		Kenyatta University
KUCCPS	**-**	Kenya Universities and Colleges Central Placement Services
MPT	**-**	Mobile Phone Technology
NCST	-	National Council for Science and Technology
SBE		School of Business and Economics
SMS	-	Short Message Service
SNS	-	Social Networking Sites
SPSS	-	Statistical Package for Social Sciences
UoN		University of Nairobi
US	-	United States of America

OPERATIONAL DEFINITION OF TERMS

Addiction
excessive use, misuse and abuse of a mobile phone to the extent that one becomes dependent on it (Tessa, 2014).

Cognition
acquiring information, knowledge and understanding.

Digital Natives
a term used to refer to the notion of those that have lived their whole lives surrounded by a variety of technologies (Cambridge Advanced Learners Dictionary, 2017).

Diversion
emotional, pleasurable and aesthetic experience, tension release and escape.

Gratifications
satisfaction that one derives from using mobile phones (Tessa, 2014)

Mobile Phone Technology Use employment of mobile phone for purposes of communication.

Mobile Phones
also known as cell phones or just as mobile - devices which connect wirelessly to the public switched telephone network (Cambridge Advanced Learners Dictionary, 2017).

Motivation
the push/pull factor or habit of using mobile phones (Cambridge Advanced Learners Dictionary, 2017).

Phubbing
phone snubbing – attending to the phone instead of the immediate surrounding (Ugur & Koc, 2015).

Social Utility strengthening contacts with family, friends and so on.

Technology application of knowledge to ease work.

ABSTRACT

This study investigated the gratification factors influencing mobile phone technology use levels by public university undergraduate students in Nairobi, Kenya. The objectives of the study were; (1) To investigate the influence of cognition on undergraduate university students' use levels of mobile phones, (2) To assess the influence of diversion on undergraduate university students' use levels of mobile phones, (3) To examine the influence of social utility on undergraduate university students' use levels of mobile phones (4) To establish the moderating effect of demographic characteristics on the independent variables of cognition, diversion, and social utility in undergraduate university students' use levels of mobile phones. Uses and gratifications theory and media technological determinism theory were employed in the study. The study target population was 246,871 undergraduate university students in public universities in Nairobi, Kenya. The study design was mixed, that is, both quantitative and qualitative designs were used. The research used self-administered questionnaires, in-depth interviews and focus group discussions as data collection tools. The sampling technique that was employed in this study was multistage together with systematic sampling to get a quantitative sample size of 573 undergraduate students. The qualitative sample size was 12 informants. The data was analyzed using both descriptive and inferential statistics and then processed using the Statistical Package for Social Sciences (SPSS) version 22. Findings showed there was a correlation between extent of mobile phone technology use and cognition activities among undergraduate universities students. Secondly, the study revealed that mobile phone technology has become essential in diversion activities among undergraduate university students and thirdly, the study found that social utility influences mobile technology use among undergraduate university students. The study concluded that the higher the need for cognition, diversion and social utility, the higher the need for mobile phone technology use among undergraduate university students. The study recommended, first to software developers that they could develop a specific mobile phone software for university students to use for cognition, diversion and social utility. In addition, further research could be carried among post graduate students and also among private universities in Kenya to find out the gratification factors influencing mobile phone technology use levels.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Mobile phone technology has spread widely throughout the world among all cultures and classes. The manufacturers of this gadget have succeeded in availing different models that are affordable, accessible and usable by the poor and the rich, the illiterate and the sophisticated by simplifying the technology.

1.1.1 Global Perspective

Mobile phone as an interpersonal communication medium has entrenched itself in the modern world as an equipment that can be used for many functions besides communication. It is handy but its major strength lies in the fact that it is portable and has multiple uses, especially the smart phones (Jiantti, 2015). Smart phones can be used to download and upload files such as songs, movies, sending e-mails, photographs, interactive games and searching for information from the Internet among other uses. However, these many uses can also present a problem when abused as is always the case with many other useful technologies, especially in a learning environment where learners from diverse backgrounds want to experiment with technologies. According to Gardiner (2015), the urge to use mobile phone is so strong that it is difficult to change adding that the mobile phone usage controls those students   instead of them controlling it. This can lead to abuse just like excessive use of intoxicating substances leads to their abuse.

In the United States of America, college students use mobile phones to maintain privacy and also use them (mobile phones) to keep in touch with their parents (Ishii, 2011). The writer further states that Scottish government has identified text bullying, filming violent incidents, downloading inappropriate materials, harassment, and data protection risks as some of the mobile phone abuses in their learning institutions, otherwise the device should only help a student to make calls, text, e-mail, connect with the Internet, take pictures and make videos among other uses (Kolb, 2011).

However, it is important to know the factors that influence the use of the mobile phone technology among undergraduate university students in Kenya so as to understand if the use is of any value or it needs to be regulated.

In the United Kingdom, lonely participants in a study preferred making voice calls and rated texting as a superior medium for expressive and intimate contact (Reid & Reid, 2007). In order to write a text or read one during class, it means the student's attention will be distracted and this will amount to misuse of the mobile phone. Ugur and Koc (2015), calls this habit – phubbing – which means phone snubbing, that is, attending to the mobile phone instead of the immediate surroundings. This could be influenced by the need for diversion from the task at hand. When this use persists, it may lead to addiction which then leads to the need to find out what gratification factors influence such kind of mobile phone use. Tessa (2014) says that whenever a habit changes into an obligation, it can be considered an addiction (abuse) and that all entities capable of stimulating a person can be addictive. The mobile phone device has been found to be used by truant students to cheat in examinations which interfere with the measuring of learning outcomes (Campbell, 2006). This is misuse of the device which should be used to enhance cognition by referring to educational resources from the Internet. In a study that examined parents', teachers' and students' perception of the effects of students' access to mobile phones on students' performance found that students with mobile phones perform poorly and misbehave more often than students without mobile phones while in Nigeria, looking into the usage and perceived effect implications Internet enabled phones have on the academic performance of the tertiary students found that Internet enabled usage does not affect the academic performance of the students (Ezemenaka, 2013).

1.1.2 Kenyan Perspective

In Kenya, technological innovation spearheaded by Safaricom's *M-Pesa* brand has given the mobile phone a new meaning where the mobile phone numbers are used as banks with the mobile phone number acting as the bank account number. The facility by Safaricom and other mobile phone operators in Kenya has made the banks device ways of partnering with mobile phone service providers in order to get a share of the

money transfer market and also to remain relevant in the fast-changing world where money and technology matters. University students use this service to send and receive money from or to their friends and relatives. This use has manifested itself in the increasingly popular phone-based gambling games where millions of shillings are at stake. This habit has been aggravated by the mobile phone capability of being everywhere, every one, every time (Yan, Chen & Yu 2013). This is a habit that may be influenced by the need to be withdrawn from the surrounding environment. The device use can be discourteous such as when it loudly rings during lectures in lecture theatres or classrooms. The mobile phone can be used for bullying and displaying inappropriate materials. Loud phone use and calls regarding certain sensitive matters in public also pose as a nuisance. All these many uses can lead to mobile phone abuse to an impressionable undergraduate university student where they may be influenced by the social utility gratification factor of the mobile phone.

Individuals and organizations are adopting the mobile phone technology to their peculiar communication needs and wants. Undergraduate university students are not left behind in exploiting the advantages of the mobile phone technology which include calculator, clock, games, video function, calendar, FM radio, music player, picture identity, streaming multimedia, speaker phone, hard drive and camera among others. University undergraduate students being at that stage of life when they are transiting from being dependants to be their own persons, are likely to experiment as they seek what can satisfy their peculiar communication needs. The mobile phone seems to be handy in fulfilling or gratifying these needs. In a research titled "Mobile phone Usage at the Kenyan Base of Pyramid", the authors, Crandall, Otieno, Mutuku, Colaco, Grosskurth, and Otieno, (2012), found that of the mobile phone applications and services, 100 per cent of Kenyans use calling services, 85.3 per cent use SMS services, 84.4 per cent use M-Pesa services, 72.6 per cent use credit/airtime services, 12.1 per cent use mobile phones to track lost money while 18.9 per cent use it to monitor commodity prices. On the other hand, while striving to get maximum gratification from the mobile phone students invariably find themselves captivated by the many capabilities and the wide range of uses to choose from. In this regard therefore the uses and gratification theory, media technological determinism theory would provide better theoretical framework through which to examine the

gratification factors influencing mobile phone technology use by undergraduate public university students in Nairobi City County, Kenya.

1.2 Statement of the Problem

Mobile phones as interpersonal media have extraordinary technology that make them attractive and engaging (Economides & Grousopolou, 2008), and these attributes have made them to attract every segment of the society. As a result of this, the mobile phone device has quickly spread among users. Current researches have estimated that 100 percent of university students own and use mobile phones and that all of them bring these devices to class; (Ugur & Koc, 2015). Students use mobile phones for discussion, photographs and video, podcasting, video recording, calculators, polling, research, calendars, taking notes and scavenger hunts (Kolb, 2011). This study sought to find out the factors influencing university students to use their mobile phones. In Tanzania, a study by Kihwele and Bali (2013), found that students with mobile phones perform poorly and misbehave more often than those without.

With research capabilities, mobile phones can assist students to more quickly access information they need for the task they are working on which aids learning (cognition). In a study carried out by Economides and Grousopolou, (2008), it was revealed that students typically used their phones more than 10 hours per week mainly for calling, which could be influenced by factors such as the need for cognition, diversion, or social utility. Educators can take advantage of the proliferation of the mobile phones and use it for instructional purposes (Kolb, 2011).

However, despite the numerous advantages of mobile phones, university students are also exercising their freedom of expression by engaging in such practices as text bullying, filming violent incidents, downloading inappropriate materials, and harassment as ways of diversion and social utility. Texting can be very disruptive and distractive in many situations more so in a learning environment (Kolb, 2011). It is a common occurrence to observe students who are physically present in class, yet mentally preoccupied by non-course related material on their mobile devices. As mobile devices have deeply saturated the university student population, this problem

is likely to continue posing a significant obstacle for faculty. Tessa (2014) says that whenever a habit changes into an obligation, it can be considered an addiction (abuse) and that all entities capable of stimulating a person can be addictive. The mobile phone device has been found to be used by truant students to cheat in examinations which interfere with the measuring of learning outcomes (Campbell, 2006). This is abuse of the device which should be used to enhance learning by referring to educational resources from the Internet.

The increased access and availability of mobile phone to undergraduate university students and the freedom to use it as they please, can lead to abuse which can be a challenge to both the students and the university administration. The purpose of this study therefore is to investigate how mobile phone technology influence cognition, diversion, and social utility among public university students in Kenya. In a nut shell, the general objective of this study was to examine the gratification factors influence on mobile phone technology use level by public university undergraduate students in Nairobi City County, Kenya.

1.3 General Objective

The general objective of this study was to examine the gratification factors influencing mobile phone technology use levels by public university undergraduate students in Nairobi City County, Kenya.

1.3.1 Specific Objectives

This study had four specific objectives as follows:

1. To investigate the influence of cognition on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya.
2. To assess the influence of diversion on mobile phone technology use levels among public university undergraduate university students in Nairobi City County, Kenya.

3. To examine the influence of social utility on mobile phone technology use levels among public university students in Nairobi City County, Kenya.

4. To establish the moderating effect of demographic and area of study characteristics on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya.

1.4 Research Questions

1. What is the influence of cognition on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya?

2. What is the influence of diversion on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya?

3. What is the influence of social utility on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya?

4. What is the moderating effect of demographic and area of study characteristics on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya?

1.5 Significance of the Study

Reasons for choosing this area for study include the value that the mobile phone technology has acquired in Kenya since its introduction, the many uses to which the mobile phone has been or can be put into by the various categories of users, its popularity among university students where almost every student owns at least a hand set (96.4% among undergraduate university students in Kenya, and the learning environment in which it is used (Jantii, 2015). In a study titled 'The Usage of Social Media among Young Adults Living in Nairobi, Kenya', it is reported that when the youths in the study were asked about the reasons for mobile phone popularity, they pointed out that they are cheap, easy to use and portable(Jantii, 2015). Due to these reasons mobile phones easily become accessible to university students who seek gratification arising from mobile phone use. This study adds to the understanding of

gratification factors influencing mobile phone use by public university undergraduate students in Nairobi City County, Kenya. As such the significance of this study was to facilitate knowledge of the factors that influence university students to use their mobile phones during their stay at the university and this understanding can make a contribution to the formulation of intervention measures in learning environments should there be need.

This knowledge of gratification factors may be of importance to university authorities and management, university students, service providers, lecturers and the general business community who may require to validate the need of mobile phone technology use within the university environment. This may come handy while making valuable choices about the normal operations of university students within or out of university environment. This can enable university authorities and management to decide and develop a policy framework on mobile phone technology use by students. Students can learn how gratification factors on mobile phone use can affect their learning and social life within the university environment and even after school. University lecturers can be able to understand how to handle and control their classes from unnecessary phone usage which can be distracting. This study will provide an understanding of the gratification factors influencing undergraduate university students to use their mobile phones in a university learning environment responsibly. University students after study will go back to their various communities and the mobile phone is a communication device that has been embraced and therefore it is important that the gratification factors influencing its use at this stage be known to help understand it better in future.

1.6 Scope of the Study

This study only dealt with the cognition, diversion, social utility and the moderating effect of these factors on mobile phone technology use among undergraduate university students in Nairobi City County, Kenya. The undergraduates were the only university students included in the study while only six public universities out of a total 36 chartered public universities which had campuses in Nairobi City County by 2002 were considered in the study. It was delimited geographically to Nairobi City

County out of 47 counties in Kenya. The study was guided by the uses and gratification theory and the media technological determinism theory.

1.7 Limitation of the Study

Geographically, this study was conducted in Nairobi County of Kenya as it is the capital city of Kenya and more so it is a metropolitan and cosmopolitan city comprised of many cultures, ethnicities, and classes of people, social groups, race and various types of institutions. It is therefore easy for influences to spread especially among peers not forgetting that Nairobi is the center of Kenyan education and technology. As a result, most of Kenyan universities and colleges are located here. However, the study targeted a third (1/3) of public universities that were chartered in Kenya by 2002 with campuses established in Nairobi County. To have a clear focus of the study, public universities were preferred because they are government sponsored thus, they still held the trust of the public that they are affordable hence the majority of parents and students still prefer them as their ultimate choice destination for higher education. In this study, affordability of the cost of university education is important as this ensures most of the students who qualify for university education do join to take their various university courses without being barred by high fees. This gave a total of six public universities to be sampled to represent the third, with a population of 246, 871 (CUE, 2017) undergraduate students from who a sample population of 573 for quantitative while a sample of 12 informants was taken for qualitative purposes. This study confined itself to undergraduate university students only.

The study again basically relied on narrative type of review of related literature. The principle drive of a narrative review was to give the researcher and reader an all-inclusive overview of the topic and to highlight substantial areas of research, so that these reviews could help to identify gaps in the research and help to refine and define research questions.

Methodological scope limited itself to a mixed research design, with a population of six public universities in Nairobi City County with their undergraduate students. Mixed design was preferred as the research took the benefit of using numeric ways

(from quantitative data) and narrative (from qualitative data) to explore the research problem. Hence the design was based on both perspectives with a sample size based on methods employed by the study. Data collection involved techniques available to the researcher and this was limited to questionnaires, in-depth interviews and focus group discussions. This assisted to explore, interpret the phenomenon of mobile phone technology use by university students. Lastly, mobile phones have different capabilities, however, this study dealt with mobile phones in general since any phone's capability, be it call and text only or a smartphone can be used in a learning environment and can be gratifying in cognition, diversion and social utility.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section looked at review of related literature in the field of study. Narrative review was used to critique and summarize bodies of literature, to create comprehensive conclusions about the topic, to identify gaps or inconsistencies in the body of knowledge while focusing on research questions. The review mainly focused on; theoretical framework, conceptual framework, review of variables, empirical review, critique of existing literature and research gaps. This provided a roadmap to what this study wanted to measure with regard to the research objectives.

2.1.1 Mobile Phone Use: An Overview

In terms of cognition, when a person uses a medium to obtain information, keep up with information on current events, learn about things in general, strengthening knowledge and understanding the environment, the person is using the medium for cognition, (Dominick, 2001). There are many versions of mobile phones with different levels of function capabilities mostly determined by their prices and what the buyer intents to use the phone for. However, any phone can be used to get information even though the accessible sources may be limited to the low-end mobile phone owners. As a result, university students can use the phone to access academic information in an affordable manner and allow them to get information available on the Internet (Napolitano, 2010). The Internet and social networking capabilities of the mobile phone affords sharing of thoughts and ideas in an easy to access manner. Other studies have also found that the mobile phone medium can be used for tutoring, accessing Internet resources and connecting students, instructors, and parents in efforts to coordinate school related activities (Katz, cited in Campbell, 2012). Due to the many uses to which a mobile phone can be put to, chances of it being misused are also high. The relative advantage of an innovation makes it easily adoptable to the new users and uses and in this instance the mobile phone has many advantages to a university student (Rogers, 1995). The task here was, to investigate

the gratification factors influencing university students to use these many mobile phone technology capabilities. Due to the wide range of learning materials available through the Internet, a university student with the intention of searching for relevant learning materials may end up lost in the sea of sites such that after a long time spent surfing the net, the result could be time wasted instead of being gainfully used to get information. This can go on to such an extent that it becomes a student's way of diversion.

Mobile phone as an interpersonal communication medium can be used to create diversion through stimulation, relaxation, emotional release or catharsis and it can also be of social utility where the need to strengthen contact with family, friends and others in society is fulfilled (Dominick, 2001). The mobile phone fits this bill well for the capabilities value of this technology lie not only in communication but in the fact that it provides an outlet for self-expression, examination and entertainment (De Gouveia, 2013). This study investigated what gratification factors influence students' mobile phone use in the university. Strengthening contacts with the family, but this study found out how gratification factors influence university students to use mobile phone technology. The entertainment bit of mobile phone technology use can easily enslave a user so that the user concentrates on the mobile phone to the exclusion of everything else.

Due to the existence of file sharing networks, the practice has contributed to persistent and sometimes inadvertent exposure of sexual material to adolescents and youths and can be addictive (Greenfield, 2004). Risk factors that predispose university students to mobile phone technology use include: loneliness, introversion, depression, low self-esteem, and difficulty with self-expression, conformity to peers, impulsivity online, and loss of control of mobile and online activity among others (Swamepoel, 2012). This makes the mobile phone compatible to the university students since it relates well to the existing ideas about communication among the university students. This has been reported to be happening to the general mobile phone users but this study found out how gratification factors influence the Kenyan university undergraduate students in their use of mobile phones. University students are learners and accordingly, the degree to which an idea is perceived to have an

added advantage than its predecessor will make more people to adopt it (Rogers, 1995). So, due to the many advantages of the mobile phone to a student, adoption rate is high and this causes them to use the device in ways that could also disrupt their learning expectations.

2.2 Theoretical Framework

The study applied the uses and gratifications approach, the media technological determinism theory as the overall research theoretical framework in trying to answer the questions of the gratification factors influencing mobile phone technology use among undergraduate public university students in Nairobi City County, Kenya.

2.2.1 Uses and Gratification Theory

The uses and gratification theory, which was the main theoretical approach within which this study was done, postulates that people have needs and drives that are satisfied by using both media and non-media for communication. This theory was developed by among others, Katz, Blumler and Gurevitch in 1974 when they stated that people actively seek out specific media and specific content to generate specific gratifications (results), (West & Turner, 2000). Herta Herzog (1944) studied women's attraction to radio operas for emotional release, vicarious satisfaction and learning from the programs while Katz, Gurevitch, and Haas in 1973 found use of media as being for acquiring information, knowledge, pleasure, status, strengthening relationship and escape (West & Turner, 2000). Perse (1995), says that people using computers for electronic communication satisfy the following needs: learning, entertainment, social interaction, escapism, passing the time and out of habit adding that use of computers hooked to networks or information services for reasons of passing time or out of habit suggests a ritualistic use. It is said that this ritualistic use of computers for connectivity might lead some users of computer networks or information services to misuse them (Severin & Tankard, 2001). Diversion, that is, escape from routine and problems, social utility, that is, personal relationships use of the information and surveillance, that is, information about things that might affect one or will help one do or accomplish something (Severin & Tankard, 2001).

This study looked at mobile phones which are a form of communication media technology used for connectivity to information services and individuals in order to see how the gratification factors have influence on how university undergraduate students use the mobile phone technology. The gratification factors influencing mobile phone use singled out in this study were categorized into three as: 1. Cognition – acquiring information, knowledge, and understanding, 2. Diversion – emotional, pleasurable and aesthetic experience, tension release and escape, and 3. Social utility – strengthening contacts with family, friends and so on, (Dominick, 2001). The fourth factor was withdrawal but during the piloting of this study it was realized that the withdrawal factor was closely related to the diversion factor and therefore it was found that it could confuse the students in understanding and interpreting the questionnaire.

2.2.2 Media Technological Determinism Theory

The other theory that was used to guide this study was the media technological determinism theory which is the relation between technology and society and is a term that was coined by Thorstein Veblen (1857-1929). In media technological determinism theory, technology is seen as the prime mover in history where new technologies transform society at every level including institutions, social interactions and individuals, (Chandler, 1995).

Technological determinists interpret technology in general and communications technology in particular as the basis of society in the past, present, and even in future new technologies transform society at every level including institutions, social interactions and individuals (Chandler,1995). Pinch and Bjiker (1984) argued that technology design is an open process which can produce different outcomes depending on the social circumstances of its development and is therefore subject to interpretative flexibility. This study, by looking at gratification factors influencing mobile phone technology use by undergraduate university students, hoped to find out how the mobile phone as a relatively new technology was transforming the use of communication technology by undergraduate university students for cognition, diversion and social utility while in the university learning environment.

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Karl Marx said that technological development determines the kind of society that will emerge while Marshall McLuhan who was another proponent of the media technology determinism posited that technological inventions lead to development of the modern world (Chandler, 1995). Media is said to be a metaphor - a symbolic form - in which information is encoded. Different media have different intellectual and emotional biases due their accessibility and speed of their information. Equally, different media have different political biases; because of their physical form; different media have different sensory biases because of the conditions in which we attend to them. At the same time, different media have different social biases and because of their technical and economic structure; and different media have different content biases (Postman, quoted in Chandler, 1995).

The study looked at the gratification factors influencing the uses of the mobile phone technology as an interpersonal communication media among public university students in Kenya. According to McQuail (2000), communication media technology is fundamental to society and that particular technology influences social change and communication revolutions lead to social revolutions (McQuail, 2000). Chandler (1995), says that a wide range of social and cultural phenomena are seen as shaped by technology. This study looked at how cognition, diversion and social utility influence mobile phone technology use by undergraduate university students in their learning institutions.

The mobile phone technology has relative advantage over fixed land line telephony. The mobile phones are essentially mobile computers with most featuring texting, digital photography, video capabilities, research capabilities and calculators among other features. These advantages have made the mobile phone technology to be easily accepted among university students as it is relatively advantageous, compatible, observable and easy for any new user but this study focused on what levels this technology has influenced students in their gratification seeking affairs. The major advantageous feature of mobile phone technology to university students is the 4E feature, that is, it is everywhere, every time, for everything and everyone (Yan, Chen & Yu 2013). This study helps to ponder where being everywhere includes being in class, and how does that influence its use. Rogers (1995) says that

relative advantage indicates the benefits and the costs resulting from adoption of an innovation. The sub-dimensions of relative advantage include the degree of economic profitability, low initial cost, a decrease in discomfort, social prestige, savings in time and effort, and the immediacy of the reward. Due to this, mobile phone has become the most widely spread technology and the most common electronic device in the world. So, this study tried to find out how cognition, diversion, and social utility factors influenced mobile phone technology use by university students in Nairobi, Kenya.

2.3 Conceptual Framework

In this study, the mobile phone technology was the medium that the university students used and the study looked at the gratification factors that influenced its use.

This study had three testable variables namely the dependent, independent and moderating variables. Mobile phone technology use served as the dependent variable since the researcher aimed to investigate factors that influence mobile phone use among public university students. The independent variables were cognition, diversion and social utility as they are some of the gratification factors that influence mobile phone use. Lastly, the researcher looked at the demographic factors moderating mobile phone technology use by undergraduate public university students. The demographic factors included gender, age, and socio-economic status. This is represented in Figure 2.1

Cognition

- Tutoring
- Accessing internet educational materials
- Connecting fellow students, instructors and parents

Diversion

- Emotion
- Pleasure
- Conformity

Social Utility

- Social connection
- Catharsis
- Stimulation

Demographic Factors

- Gender
- Age
- Area of Study

Mobile Phone Technology Use Levels

- Heavy user
- Moderate user
- Light user

Independent Variable   **Moderating Variable**   **Dependent Variable**

Figure 2.1: Conceptual Frame Work

2.4 Review of Variables

This section discussed the variables in this study. These variables included cognition, diversion, and social utility of the mobile phone technology.

2.4.1 Cognition Factors that Influence Mobile Phone Technology Use

This section was centered on the four categories of the uses and gratifications theory beginning with the cognition category. The cognitive deals with the knowledge of things. Cognition means the act of coming to know something. When a person uses a medium to obtain information, then he or she is using the medium in a cognitive way (Dominick, 1993). Mobile phones have become some of the necessary media of communication among the youths (Ishii, 2010). Most undergraduate university students fall under the youth age bracket therefore mobile media enables students to communicate with others without feeling constrained in the presence of their family. This means the mobile phone medium sets the students free, making them feel liberated from the constraining presence of their family, a situation that obtains in homes where the wired or fixed phone were used. In Kenya few homes had fixed phones and were usually located in premises where the family is likely to be present and its use is invariably monitored thus making it difficult for the students to feel free to express themselves fully. This is the relative advantage that the mobile phone has (Rogers, 1995).

A study done in Greece among university students found that respondents typically used their phones more than 10 hours per week mainly for calling, (Auter, 2007, cited in Economides, 2008). In the United States, college students use mobile phones to maintain or manage privacy, but they also use them to keep in touch with their parents (Aoki, 2003, cited in Ishii, 2010). The current study sought to find out whether cognition influences how Kenyan university students use their mobile phones. Calling on mobile phone could be used by university students when seeking cognition related ideas from others. Jiantti (2015), in the study "The Usage of Social Media among Young Adults Living in Nairobi, Kenya" says that when asked about the reasons for the popularity of the mobile phone, most interviewees pointed out

that they (mobile phones) are cheap, easy to use and portable and this could help explain the university students cognition seeking behaviors using the mobile phone.

Dominick (2001) asserts that according to the uses and gratifications theory, a medium (in this case, a mobile phone) can be used for cognition just like other educational equipment. However, since the sophisticated models like the smartphone can be put to various uses by the user, there is need to find out whether need for cognition is a factor influencing mobile phone use among the Kenyan undergraduate university students. Ordinarily, it would be expected that since they are in the university where their core business is learning, the assumption would be that the factor influencing students to use mobile phones would be need for cognition more than others in the society. This study found out that cognition influences mobile phone technology use.

In the United States, sophisticated mobile phones are used by students to cheat in examinations (Katz, 2012). In such a case, even though the gadget was used in a cognitive way, it was negative since it violated examination regulations which prohibit reference to course material during examinations. The mobile phone in such a case has been used to perpetuate an examination offence and the use was likely a misuse of the phone by the concerned student. The right way of using the phone would be to use it to thoroughly prepare for the examination then abide by the examination regulations that prohibit its use in the examination hall. There was need to find out whether need cognition influences how the Kenyan undergraduate university students used their mobile phones.

Cognitive use of mobile phones has been found to be a problem. It can be put to some use which has negative consequences on intellectual development. For instance it has been found through a study that examined both faculty and students' attitudes about the mobile phone, that the technology is a source of distraction during class, and that it is a potential resource for cheating in examinations leading to a policy being sought to ban the usage of the mobile phone technology in classrooms and school grounds (Campbell, 2012).

2.4.2 Diversion Factors that Influence Mobile Phone Technology Use

Diversion can take many forms where some of the most common include stimulation, relaxation, emotional release of pent-up energy, (Dominick, 1993). The nature of mobile phone technology has shifted from being centered on communication, especially voice communication to be a medium. As a medium, the mobile phone technology has acquired many uses especially for those seeking diversion from the realities of life. With the advent of mobile internet and smart phones, mobile media have become increasingly intertwined with the internet and online technologies. In this mixture, mobile phone users now can access sex chat rooms, where they engage in sexual conversations using mobile phones, and access pornographic material whether intentionally or not. This can be diverting especially to the young people. This is said to encourage and normalize promiscuity in the society (De Gouveia, 2013).

The uses and gratifications theory that is the theoretical framework of this study, informs us that, the mobile phone when used as a communication medium can give the user the opportunity to divert from the realities of life. In this regard, there was need to know whether diversion was a gratification factor that influenced Kenyan undergraduate public university students to use the mobile phone. This could be both positive and negative depending on the circumstances under which it is used. Swamepoel (2012), informed us that mobile phone when used for diversion for long can lead to addiction which then can lead to disruption of normal life. Since university students – especially most undergraduates - were still impressionable, the risk of them being diverted by such sites as those dedicated to sex or other deviant sites such as pornographic areas may divert, but negatively. Since the mobile phone is personal allowing a lot of privacy in its usage, the resultant freedom from parental and other adult interference or interventions may be limited and, in the process, young university students may use the mobile phone to their detriment. Behavioral addiction such as Internet addiction is similar to drug addiction except that in the former, the individual is not addicted to a substance but the behavior or the feeling brought about by the relevant action (Tessa, 2014). A study found that a third of university students in the United States play video games on their mobile phones in

class as a way of diversion (Campbell, 2012). Besides using the mobile phone technology as a form of diversion and social connection, some students use the technology for cheating in examinations. As a result, another study done in the United States shows that 85 per cent of higher education instructors in that country advocate that mobile phones should be banned from being used in the university classrooms (Campbell, 2012). This again, calls for examination of whether diversion is a factor that influence the Kenyan university students regarding mobile phone use.

2.4.3 Social Utility Factors that Influence Mobile Phone Technology Use

Social utility categories of the uses and gratifications theory enable us to learn about the value of the mobile phone gadget in our society. The media function that addresses the social integrative need is called social utility (Dominick, 1993). Within this framework, Campbell (2012), says that the mobile phone has become a fashion totem but laments that the fashion totem has become a nuisance that gives unsolicited melodies, chirps and half-conversations for the co-present others. People suffer these inconveniences silently because, may be, they do not want to be seen to be unfashionable and this can happen in a lecture room. Like other devices, mobile phones have become indispensable in the life of university students' social life and this study would like to investigate the social utility factor influences mobile phone use levels in the Kenyan university context.

Tessa (2014), says that when people use them excessively in public, since when they do so, they are signaling that they have got this shiny object, this status symbol, their iPhone or Android or Blackberry and that they have got important people to talk to or text, who are, may be, even more important than the people right in front of them.

The mobile phone could lead university students to establish stronger relationship with the gadget than with the people in their immediate environment. Tan (1985), further says that media use is goal directed and that we use the media to satisfy specific needs. In this case the media in question was the mobile phone and the goal was for its use in society. A study done by Ugur (2015), found that most mobile phone users use the device to fight boredom, entertain themselves and stay connected

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to the outside world. This study examined how diversion influences the Kenyan university students' use of this mobile phone technology.

In terms of social utility, the mobile phone technology has been found to be the platform for individuals to express anything without the monitoring of rules or authority figures that is available to many people. In the university, most space is shared so that there is nowhere one can be secluded to use the mobile phone and this is where the problem may come where the students using their mobile phones end up inconveniencing the co-present others. This study found out how the Kenyan university students were faring on the social utility factor influencing their mobile phone use. It is a fashion totem and a medium that makes a statement of who one is without necessarily speaking. In this way it is gratifying to own one of one's choice to make a statement to those around. This kind of social utility influencing mobile phone use could also be happening in university among the Kenyan students.

2.4.4 Moderating Effect of Demographic Factors on Mobile Phone Technology Use

Alson and Misagal, (2016) in a study of smartphones usage among college students in the Philippines found that female students use smartphones on socialization particularly on networking sites such as Facebook, twitter, and Instagram while male students had the tendency to use smartphones on entertainment particularly listening to music and watching videos. The present study sought to find out if gender has any effect on mobile phone use among university students. Ogutu, Mariita, Nyakerario, Wanekeya and Akoth (2014), in their study: "Mobile Phone Usage Among University Students in Kenya: A Case Study of the University of Nairobi", found out that male students were more satisfied with their phones applications in diversion than their female counterparts and that female students rated higher in terms of mobile phone usage for academic purposes. Their study was a case study of the University of Nairobi only but the present study proposed to find out whether gender was still a factor influencing mobile phone use among university students in the six universities studied in Nairobi City County. In a base of the pyramid study of mobile phone usage in Kenya, Crandall, Otieno, Mutuku, Colaco, Grosskurth, and Otieno

(2012), found that there was no difference in mobile phone activities between men and women other than mobile Internet usage which they said was dominated by educated male youth. The current study sought to found out what factors influence mobile phone use among Kenyan university students.

2.5 Empirical Review of Mobile Phone Technology Use

In a research titled "Mobile phone Usage at the Kenyan Base of Pyramid", the authors, Crandall, Otieno, Mutuku, Colaco, Grosskurth, and Otieno, (2012), found that of the mobile phone applications and services, 100 per cent of Kenyans use calling services, 85.3 per cent use SMS services, 84.4 per cent use M-Pesa services, 72.6 per cent use credit/airtime services, 12.1 per cent use mobile phones to track lost money while 18.9 per cent use it to monitor commodity prices. The research used face-to-face interviews, key informant interviews and focus group discussions as methods for data collection. Seven hundred and ninety-six (796) respondents were interviewed face-to-face, one hundred and ten (110) participated in key informant interviews and twelve (12) took part in focus group discussions in six (6) districts in Kenya. The study aimed at finding out how Kenyans at the base of the pyramid use their mobile phones. This study concentrated on those Kenyans at the base of the pyramid which left out the students and especially the university students hence the need for the current study that enquired how they use mobile phone for cognition, diversion and social utility.

Robyn-Jay Bage (2012), said that as an educator, it was dismaying to note the number of students who sit in class and use their phones to text, answer e-mails, watch videos and update their social networking pages. This observation by Bage suggest misapplication of mobile phone use among students who would rather attend to their phones in class than listen to the teacher. Ishii (2011), in a study called "Examining the Adverse Effects of Mobile Phone Use among Japanese Adolescents" about junior high school students aged 14 years in Tokyo found that motivating factors for mobile phone use included emotionality and instrumentality. It was found that emotionality was correlated with the frequency of mobile e-mailing and delinquency score. Since university students who are near to the 14-year-olds in

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terms of age and were the target of this study among Kenyan universities, it was important to find out how the university students compared in Kenya with Japanese students in mobile phone use barring the difference in levels of education.

Akanferi, Aziale, and Asampana (2014), in the study titled "An Empirical Study on Mobile Phone Usage among Young Adults in Ghana: From the Viewpoint of University Students", found that young adults use mobile phones for entertainment rather than business and education related functions. It further found that students were obsessed with functions of the mobile phone such as listening to music and messaging with WhatsApp, Facebook and the like. This study looked at the Kenyan university undergraduate students to find out what factors influenced their mobile phone use. Waithaka, (2013), in the study, "Internet Use among Students in Kenya: A Case Study of the University of Nairobi" says that research on the prevalence of the use of Social Networking Sites (SNS) among college students indicate that a large majority of undergraduates have at least one SNS account, which they check multiple times per day. Raacke and Bonds-Raacke, (2008), found in the study on college students' use on SNS in which they surveyed 116 undergraduate students, that 83.2 percent of the students had MySpace accounts, 90.1 percent had Facebook accounts and 74.3 percent had accounts on both sites. Waithaka (2013) says that on average, the participants checked their accounts 4.19 times per day, spending 1.46 hours on their own sites and 1.10 hours on friend's sites.

The current study looked at the gratification factors that influence undergraduate university students to use mobile phones on which the social networking sites run.

2.6 Critique of Existing Literature

Katz (2005) in a study about mobile phone use found out that one out of three students was using their mobile phones and concluded that this may be related to dependency and heavy usage. Katz (2005), has not told us the factors that influence the students to be heavy users of mobile phones. The present study sought to find out the factors that influence students to be heavy mobile phone users to the extent that they misuse the communication gadget. Tessa (2014), in the study "Students' Cell phone Addiction and their Opinions" observed that all entities capable of stimulating

a person can be addictive adding that behavior addiction is similar to drug addiction. This study sought to find out whether the factors influencing mobile phone use come from the need for cognition, diversion, social utility among undergraduate university students in public universities in Nairobi, Kenya.

A study done in Greece among university students found that respondents typically used their phones more than 10 hours per week mainly for calling, (Auter 2007, cited in Economides, 2008).   This can be diverting especially to the young people. This is said to encourage and normalize promiscuity in the society (De Gouveia, 2013).

Ugur, (2015), in a study about the ubiquitous mobile phone technology use found out that most of the respondents used their mobile phones to fight boredom, entertain themselves, and stay connected to the outside world. These are the factors influencing their choice to use the mobile phone technology. This study also wanted to find out if the same factors exist among public university undergraduate students in Nairobi, Kenya. In West Africa, Akanferi et al. (2014) in a study titled "An Empirical Study on Mobile Phone Usage among Young Adults in Ghana: From the View Point of University Students", found that young adults in public tertiary institutions have become obsessed with the functions of the mobile phone such as listening to music and messaging with WhatsApp, Facebook and the like rather than business and education related functions. This study aimed at finding out whether local (Kenyan) university students prefer using the mobile phone technology influenced by cognition, diversion, social utility.

Okoth (2014), did a study in Nakuru, Kenya with an aim to find out the influence of mobile phone technology on learners' grammar. This was an attempt at looking at how mobile phone technology use by learners influences the cognitive aspect of learning. The current study singled out cognition as a gratification factor influencing mobile phone use among undergraduate university students. Alson and Misagal (2016), in a study of smartphones usage among college students in the Philippines found that female students use smartphones on socialization particularly on networking sites such as Facebook, twitter, and Instagram while male students had the tendency to use smartphones on entertainment particularly listening to music and

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watching videos. The present study sought to find out if gender has moderating effect on mobile phone use among university students.

2.7 Research Gaps

Alson and Misagal (2016), used the descriptive-evaluative research design to study smartphone usage among college students in the Philippines in one university. This study intended to address the question of factors influencing mobile phone use by undergraduate university students in six public universities within Nairobi city and used a mixed design approach where qualitative and quantitative designs were employed.

Okoth, (2014), in the study on the influence of mobile phone's technology on learners' grammar: An Evaluation of Public Day Secondary Schools in Nakuru County, Kenya, concentrated only on learners' classroom English grammar in day public secondary schools in Nakuru. Rabin, Muhammed, Umary and Ahmed (2016) in their study titled "Impact of Mobile Phone Usage on Academic Performance among Secondary School Students in Taraba State, Nigeria," found that mobile phone usage significantly influenced academic performance among male and female senior secondary school students. The current study looked at factors influencing mobile phone technology use by university students in Nairobi City County. This study moved a step further and looked at mobile phone use by university students to see the factors influencing its use levels by them.

There was literature on mobile phone use in Kenya, but none focused, especially on the factors influencing use by university undergraduate students. This study, with the objective of examining the gratification factors influencing university students' use of their mobile phone shed light on it. The understanding of gratification factors influencing university students to use their mobile phones technology, gained from this study could help to formulate policies that could guide in the use of the gadgets in learning environments.

2.8 Chapter Summary

This chapter dealt with cognition factors that influence mobile phone technology use, diversion factors that influence mobile phone technology use, social utility factors that influence mobile phone technology use and the moderating effect of demographic factors on mobile phone technology use. The other area dealt with included empirical review of mobile phone technology use and a critique of existing literature. The theoretical framework which included the uses and gratifications theory, the media technological determinism theory, while the conceptual framework looked at the dependent, moderating and independent variables of the study. In addition, the chapter then proceeded to discuss the various uses of the mobile phone as a medium of communication closing with the empirical review and then identified the research gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section includes research design, sampling techniques, data collection, data analysis and presentation which helped provide explanation of rules and procedures upon which claims of knowledge could be made. This was a study on gratification factors influencing mobile phone technology use levels by undergraduate university students in public universities in Nairobi City County in Kenya. This chapter on methodology provides the roadmap on how to achieve the objectives of the study, which were: (1) to investigate the influence of cognition on mobile phone technology use levels among public university undergraduate students use levels of mobile phones in Nairobi City County, (2) to assess the influence of diversion on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya (3) to examine the influence of social utility on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya and (4) to establish the moderating effect of demographic and area of study on the independent variables of cognition, diversion, and social utility on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya. .

3.2 Research Design

This study employed a mixed methodology research design because the researcher used both qualitative and quantitative data in a single study. This represented a substitute methodological style to traditional qualitative or quantitative research approaches, which enabled the researcher to carry out a detailed exploration of complex phenomenon of factors influencing mobile phone use by undergraduate university students in Nairobi, Kenya. The quantitative research assisted in the collection and analysis of numerical data, whilst qualitative research reflected on narrative data collection and analysis. Further, the mixed method also ensured that both open and closed ended questions in the questionnaire besides the in-depth

interview conversations added to the richness of the information given. Wimmer and Dominic (2011), supports the mixed method by asserting that, it also provides informative, complete, balanced and useful research results therefore, this design was able to explain and account for gratification factors influencing mobile phone technology use by undergraduate university students at a comprehensive level.

3.3 Target Population

There are 36 public universities in Kenya currently according to the Kenya Universities and Colleges Central Placement Services (2020). Population being a complete set of individuals, cases or objects with some observable characteristics, the total population for this study was 246, 871 undergraduates in six public universities with campuses within Nairobi City County (CUE, 2020). Nairobi was picked for this study because it is mostly an urban county with a higher concentration of public universities in Kenya. The justification for this was got from commission for university education list of chartered public universities. To qualify for inclusion in this study, the public university must have been chartered by 2002 in Kenya. The following table explains distribution of undergraduate students in these universities.

Table 3.1: Student Enrolment in Six Public Universities by Gender

Name of University	Number of Males	Number of Females	Total Population
1. University of Nairobi	49, 998	31, 591	81, 589
2. Moi University	23, 452	20, 856	44, 308
3. Kenyatta University	33, 755	25, 964	59, 719
4. Jomo Kenyatta University of Agriculture and Technology	15, 180	9, 979	25, 159
5. Egerton University	12,841	7,362	20, 203
6. Maseno University	9,646	6, 249	15, 893
Total	**144, 872**	**101, 999**	**246, 871**

Source: Commission for University Education: State of University Education in Kenya (CUE, 2017)

3.4 Sampling Frame

The sample for the universities to be included in this study was purposively picked from six public universities by 2002 with campuses in Nairobi City County. These included the University of Nairobi, Kenyatta University, Egerton University, Maseno University, Moi University and Jomo Kenyatta University of Agriculture and Technology. Public universities were purposefully preferred because they are government sponsored thus, they still hold the trust of the public that they are affordable hence the majority of parents and students prefer them as their ultimate destination for higher education so they are likely to attract both those from poor economic backgrounds and the rich who meet the university admission cut points. The sampling frame for undergraduate students in the six public universities was provided by the dean of students in each participating university. The sample size was 573 respondents out of the 246, 871 students in the six public universities using the following formula (Bartlett et al, 2001):

$$n = \frac{z^2 pq}{e^2}$$

Where

  n = sample size

  Z = Standard normal value (1.96 for 95% C.I)

  P = Proportion of the population having desired characteristics (default = 0.5)

  e = Margin of error (default 0.05)

Given a population of 246, 871 students, a confidence level of 95%, confidence interval of 5, the sample size would be 384 respondents. Using the Seitel (1987) method, 384 undergraduate students were to be drawn from the six public universities in Nairobi City. However, because of the need to cushion against failure to participate, the additional students were added as "over sample" (Bartlett et al.,

2001). This study adopted the Bartlett et al (2001) formula for oversampling as follows:

$$n2 = \underline{\text{Minimum Sample Size}}$$

Anticipated Return Rate

Where n2 = sample size adjusted for response rate

Minimum sample size = 384

Anticipated Return Rate = 67%

Therefore, n2 = 384/.67 = 573

This therefore brings the sample to participate in the study to 573 student respondents.

Table 3.2a: Population and Sample Size per University

University	Population	Sample Size
1. University of Nairobi	81,588	148
2. Moi University	44, 308	113
3. Kenyatta University	59, 719	184
4. Jomo Kenyatta University of		
Agriculture and Technology	25, 159	28
5. Egerton University	20, 203	76
6. Maseno University	15, 893	24
Total	246, 871	573

3.5 Sample and Sampling Technique

Sampling being the taking of some fraction of or parts of the total number of elements or units in a defined population, purposive sampling was done to get

representative universities, which were a 1/3 of public universities in Kenya. A total of six public university were picked to represent the 1/3 in Nairobi City County which were: University of Nairobi, Kenyatta University, Egerton University, Moi University, Jomo Kenyatta University of Agriculture and Technology and Maseno University were purposively sampled.

To get the right sample from the six universities, the study purposefully sampled the faculties to participate in the study then used simple random sampling to get the individual student participants. The reason for purposefully sampling faculties in universities was because different universities have different faculties and the number was not uniform across the six universities under study. The participant students were divided according to gender and year of study. The gender sampling was determined through proportionate sampling where the numbers in the groups selected reflect the relative numbers in the original group from the population as a whole (Robson, 2002). This study focused on undergraduate students.

However, due to the fact that this study used a mixed method, that is, qualitative and quantitative approaches, the questionnaire was administered to the sampled students to collect quantitative data; and in-depth interviews were conducted to gather qualitative data. Those included in the in-depth interviews were purposefully sampled from students as key informants in this study. This study used twelve (12) key informants for the purpose of conducting in-depth interviews and focus group discussions. These key informants were distributed at the rate of two students per university out of the six public universities within Nairobi City County that participated in this study. The two students were picked based on the number of mobile phones they owned. They had to own two and this was due the consideration that to own more than one and use them concurrently could be an indication that the student was a serious user of mobile phone technology. These were stratified into gender and year of study.

Table 3.2b: Sample Sizes for Male and Female for each University

Name of University	No. of male students	Percentage	Sample size	Sample size per year of study	No. of female students	Percentage	Sample size	Sample size per year of study
UoN	49, 998	61.2%	90	23	31, 591	38.7%	58	14
Moi	23, 452	52.9%	60	15	20, 856	47.1%	53	12
KU	33, 755	56.5%	105	26	25, 964	43.5%	79	19
JKUAT	15, 180	60.3%	17	4	9, 979	39.7%	11	3
Egerton	12,841	63.6%	49	12	7,362	36.4%	27	7
Maseno	9,646	60.7%	15	4	6, 249	39.3%	9	2
Total	144872	58.7%	336	84	101999	41.3%	237	

3.6. Data Collection Methods

The study used both quantitative and qualitative data. Quantitative data involved the collection and analysis of numerical data gathered using the self-administered questionnaire, whilst qualitative data involved the collection and analysis of narrative data got using the in-depth interview guide. Multi-method research mode of data collection involved data collection using two methods from the same paradigm. A self-administered questionnaire and in-depth interview were used as the main methods of data collection from the sampled students. For questionnaires, the researcher visited each of the sampled universities campuses in Nairobi City County and distributed the questionnaires to the sampled respondents to fill in while identifying those that were to participate in in-depth interviews.

3.6.1 Questionnaire

The questionnaire had questions which were aimed at producing greater validity and reliability of the outcome of the study. The self-administered questionnaires were given to the respondents who were asked to fill and return to the researcher. This study had four objectives and each was addressed in the five main sections of the

questionnaire, that is, to investigate the influence of cognition on undergraduate university students' use levels of mobile phones, to assess the influence of diversion on undergraduate university students' use levels of mobile phones, to examine the influence of social utility on undergraduate university students' use levels of mobile phones, to establish the moderating effect of demographic characteristics on the independent variables of cognition, diversion, and social utility in undergraduate university students' use levels of mobile phones.

3.6.2 In-depth Interview

Another method that was used to collect data for this study was structured question guide/interview guide that helped in conducting interviews among key informants who were students in the participating universities. The in-depth interview guide facilitated purposive conversations to collect qualitative data. It also helped in probing clarifications and keeping the interview in focus. The key informants were selected from among other students in participating universities. The criteria for inclusion in the in-depth was ownership of more than one mobile phone. The interviews were conversational in style with a view to enable the researcher to get more details and understand their point of view.

3.7. Data Collection Procedure

Quantitative data was collected using a self-administered questionnaire among the sampled students. The questionnaires were administered directly to respondents who had to fill and hand them back to the researcher. On the other hand, qualitative data was collected through recording using a tape recorder. The recorded data was then later transcribed in preparation for analysis. The structured interview and focus group discussion guide for in-depth interviews and focus group discussion were used among twelve (12) respondents that is (twelve for in-depth interviews and for focus group discussion) chosen from the 573 sampled for that purpose. The interview guide was designed to give a smooth conversation that yielded information from the students. This study design was primarily a mixed one, that is, both quantitative and qualitative. Closed questions are easy to analyze using the SPSS program and that was the main tool of analysis in this study. Since the same questionnaire with the

same standard questions were administered to all student participants, the resultant data was expected to be reliable.

3.7.1. Ethical Considerations

Since this study was mainly dealing with university students, a request was made to the respective university authorities to allow the researcher reach the students. An introductory letter attached to the questionnaire stating that the researcher was a PhD student in the Department of Media Technology and Applied Communication in the School of Communication and Development Studies at Jomo Kenyatta University of Agriculture and Technology was availed. The researcher sought permission from the National Council for Science and Technology (NCST). The research sought permission from sampled universities at the level of the deputy vice chancellor in to conduct research among the students. No interview could take place without the authority of the deputy vice chancellors. Key informant interviews were done after booking appointment with the concerned university authorities who helped the researcher to reach the students. Recording of conversations and taking of notes was done after the participants had been informed and their consent given. Confidentiality of the recorded conversations and the data provided through survey questionnaires was maintained. No money was paid to get the information from the participating respondents.

3.8. Pilot Test

To get a preview of what was likely to obtain on the ground, a pilot survey was carried at Multimedia University of Kenya. This involved the issuing of questionnaires and interviews to a sample of students to test the vulnerability of the research design especially data collection instruments. The weakness and comments were noted and rectified with consultation from the supervisors before the real research commenced.

3.8.1 Data Quality

Data quality was maintained by checking on validity and reliability. All data was inspected for mistakes and corrected where necessary. The data was sorted and selected in accordance with outlaid standard of the study. The data that did not meet the standard were rejected.

3.8.2 Validity and Reliability

This study used internal consistency to test consistency of research instruments. This type of reliability estimates uses of the coefficient of answers obtained from a single survey. This was based on the rating of research questions. The rating was categorized as positive or negative. If the rating of both questions were positive or negative among several respondents, the responses were said to be inconsistent and pattern less. When no pattern was found among responses, the questions were declared so difficult or easy and therefore there was random selection of answers and so unreliable and invalid.

3.9. Data Analysis and Presentation

The data was cleaned, coded, and then entered. Entry was done twice to minimize the incident of error.

3.9.1 Quantitative Data

Factor analysis was used to analyze factors that influence mobile phone technology use by public university students in Nairobi City County, Kenya. Descriptive statistics of mean and standard deviation were used to answer the research questions. The data was analyzed using the SPSS program. This was presented in form of analysis of variance, regression and correlation of analysis.

Since both qualitative and quantitative data collection methods were used, the data was integrated by merging. The qualitative data in text form and the quantitative data in numeric form was combined by reporting quantitative results then qualitative themes that support or repudiate the quantitative results (Creswell, 2011).

3.9.2 In-depth Interviews

As for the in-depth interviews or key informant interviews, the collected data was coded then the emerging themes were identified so that the similarities and differences could be used to develop categories, which were thereafter used to explore relationships among the variables (Lacey et al., 2007). Transcribed interviews were analyzed and the similarities and differences about the coded groups were compiled to form categories. Further, for qualitative data, text data from in-depth interviews were coded and analyzed for themes. This process included preliminary exploration of data by going through the transcripts, coding the data by dividing and numbering them, then use the codes to get themes by putting the codes together and connect the related themes after which a narrative was constructed (Creswell, 2002).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents findings on gratification factors influencing mobile phone technology use levels among public university students in Nairobi, Kenya. The purpose of this study was to examine the gratification factors influencing mobile phone technology use levels by public university undergraduate students in Nairobi, Kenya. The study was based on the following objectives: (1) investigate the influence of cognition on undergraduate university students' use levels of mobile phones (2) assess the influence of diversion on undergraduate university students' use levels of mobile phones (3) examine the influence of social utility on undergraduate university students' use levels of mobile phones (4) establish the moderating effect of demographic characteristics on the independent variables of cognition, diversion, and social utility in undergraduate university students' use levels of mobile phones. This chapter presents the response rate, the demographic data, qualitative findings and quantitative findings and a discussion of research findings to achieve the specific objectives.

The first section of the questionnaire was about the respondent's bio-data. Here there were six items including: gender, year of study, age, area of study, access to a smart phone and the frequency of using a smart phone.

4.2 Response Rate

Data for this study was collected from six public universities in Nairobi, Kenya, where the sample size was to be 384 respondents but it was oversampled to 573 respondents. Table 4.1 shows the response per university based on a sample size of 416 respondents who returned the questionnaires as follows:

Table 4.1: Respondents from Each of the Six Universities

	Questionnaires administered	Questionnaires returned	Response rate (%)
Egerton	76	54	71.1
Moi	113	74	65.5
University of Nairobi	148	82	55.4
KU	184	161	87.5
Maseno	24	17	70.8
JKUAT	28	28	100.0
Total	573	416	72.6

This was considered adequate for purposes of analysis. University of Nairobi (UON) oversample size was to be 148 while those who responded were 82 representing 55.4%, Moi University oversample size was to be 113 while those who responded were 74 representing 65.5%, Kenyatta University (KU) the oversample size was to be 184 and those who responded were 161 representing 87.5%. In Jomo Kenyatta University of Agriculture and Technology (JKUAT) the oversample size was to be 28 and the response was 28 representing 100 per cent response rate, Egerton University the oversample size was 76 and those who responded were 54 representing 71.1% and the last one was Maseno University where the oversample size was 24 and the response was 17 which represented 70.8%.

4.3 Reliability Analysis

Reliability is the degree in which an assessment tool gives consistent results. This research used Cronbach's Alpha test for the reliability of the various constructs. Cronbach's Alpha coefficient is used to determine reliability of constructs extracted from both dichotomous and Likert formatted questionnaires or scales. The alpha coefficients ranges from 0 to 1 (Santos, 1999). The higher the score, the more reliable the generated scale is. Nunnaly (1978) indicated that a coefficient of 0.7 and

above is an acceptable reliability coefficient but lower thresholds are sometimes used in the literature. The results are presented in Table 4.2.

Table 4.2: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha Coefficient
Cognition	8	0.823
Diversion	9	0.755
Social Utility	5	0.746
Frequency of Mobile Phone Use	9	0.796

The results indicated that cognition had a reliability coefficient of 0.823, diversion had 0.755, social utility had 0.746, and frequency of mobile use had 0.796. According to Mugenda and Mugenda (2003), a coefficient of 0.70 and above implies high degree of reliability of the data. Constructs of frequency of mobile phone use, diversion, cognition and social utility were found to be reliable.

4.4 Analysis of Demographic Information

The study sought to analyze demographic information of the students. This information was on the student's gender, their year of study, their age bracket, their area of study, school/faculty, department they were in and if they owned a phone and if yes, whether it was a smart phone. Each has been discussed below.

4.4.1 Respondents' Gender

The respondents were asked to state their gender. See the table 4.3.

Table 4.3: Respondent's Gender

	Frequency	Percent	Cumulative Percent
Female	182	44.3	44.3
Male	229	55.7	100.0
Total	411	100.0	

Out of all the sampled respondents, majority, 55.7% (n=229) were male while the rest 44.3% (n=182) were female. Though the response rate was 416, five respondents did not indicate their gender.

4.4.2 Respondents by Year of Study

In this study the students were then asked about their year of study and their responses were indicated in appendix 7.

The results indicated that majority, 30.2 %(n=92), were in the fourth year of study, followed by 23.9 % (n=73) who were in their first year of study, followed by 18% (n=55) who were second years, followed by 26.6% (n=81) who were third years and finally the least, 1.3 % (n=4) said they were in their fifth year of study. Majority of the students sampled were found to have stayed in the university for a considerable good time as majority had stayed more than two years. This shows that they had already gotten used to the systems of the institution and were therefore well suited to respond on gratification factors influencing mobile phone technology use levels by public university students. Out of the 416 respondents, 111 did not indicate their year of study.

4.4.3 Respondents by Age

In this study the respondents gave their responses according to their age brackets as indicated in table 4.5.

Table 4.5: Respondents by Age

Years			percent
17-19	38	9.8	9.8
20-22	135	34.8	44.6

Majority of the respondents, 37.6% (n=146), were aged 23-25 years, followed by 34.8% (n=135) who were aged 20-22 years followed by 9.8 % (n=38) who were aged 17-19 years, 9% (n=35) who were aged age 29 years and above and finally 8.8% (n=34), who were the least were aged 26-28 years. This was acceptable as majority of the university undergraduate students are aged between nineteen years and twenty-five years on average. Out of the 416 respondents, 28 did not indicate their age.

4.4.4 Respondents by Area of Study

Table 4.6: Respondents by Area of Study

	Frequency	Percent	Cumulative Percent
Accounting	20	7.2	7.2
Business management	84	30.3	37.5
Information science	10	3.6	41.2
Civil Engineering	5	1.8	43.0
Communication	3	1.1	44.0
Human resource management	2	0.7	44.8
Procurement	3	1.1	45.8
Microbiology and Biotech	3	1.1	46.9
Actuarial Science	3	1.1	47.7
International studies	1	0.4	48.0
Geospatial Engineering	4	1.4	49.5
Monitoring and evaluation	2	0.7	50.2
Quantity survey	1	0.4	50.5
Medicine and surgery	3	1.1	51.6
Microprocessor Technology and information	1	0.4	52.0
Electrical engineering	4	1.4	53.4
DLIS	2	0.7	54.5
Mechanical engineering	4	1.4	56.0
Political Science and Public Administration	2	0.7	56.7
Creative Arts	82	29.6	86.3
Environmental science	4	1.4	87.7
Literature	2	0.7	88.4
Dry land Agriculture	4	1.4	89.9
Biochemistry	1	0.4	90.3
Community health management	1	0.4	90.6
Bachelor of Education	18	6.5	97.1
Security	8	2.9	100.0
Total	277	100.0	

The results revealed that majority of the students pursued business management course, 30.3 % (n=84), followed by 29.6 % (n=82) who were found to pursue creative arts. Accounting came third, 7.2 % (n=20) followed by 6.5% (n=18) who indicated Bachelor of Education as their area of study, followed by 3.6% (n=10) who pursued Information Science, followed by 2.9% (n=8) who pursued security. Of all the respondents sampled, 1.8% (n=5) pursued civil engineering while those who pursued geospatial engineering, electrical engineering and environmental science represented 1.4% (n=1.4). Communication, procurement, microbiology and biotech, medicine and surgery and actuarial science, represented by 1.1 % (n=3) each, human resource, monitoring and evaluation, DLIS, political science, literature were pursued by 0.7% (n=2) of the students each. The courses that had least respondents were international studies, microprocessor, biochemistry and community health which had 0.4% (n=1) of the respondents each. From the observations majority of the students sampled pursued business and art courses. Out of the 416 respondents, 139 did not indicate their area of study.

4.4.5 Respondents by School/ Faculty

The faculty or school the students belonged to was shown in Appendix X.

The results clearly show that majority of the students belonged to the school/faculty of arts 28.8% (n=99) followed by those in the school of business and economics 15.7% (n=54), followed by those in College of Human Resource Development (COHRED) 7.8% (n=27), followed by those in the school of FEDCOS 5.8% (n=20), followed by those in the School of Education 5.5% (n=19) followed by those in the faculty of engineering 4.7%(n=16). Following closely were the students in the Faculty of Agriculture 3.5% (n=12), followed by those in the School of Health Sciences 2.95 (n=10), followed by those in the faculty of FASS 2.6% (n=9), followed by those in BBM and mathematics who represented 2.3% (n=8) of all the respondents each. Those from the school/faculties of Information Science, Human Resource, Physical Science and Biological Sciences were 1.7% (n=6) of all the respondents in each category, again those in the faculties of Business Information

and Technology, Hospitality, Nursing, Humanities and Social Sciences, Environment, SPAS represented 1.2% (n=4) of all the respondents for each category, faculties of Tourism had 0.9% (n=3) of all the respondents, CBPS,CHSS had 0.6% (n=2) and lastly students in the Schools of Arts and Humanities, Food and Beverage, SBE, Built Environment, Medicine, SATD and Public Health were 0.3% (n=1) of the respondents in each category. The schools of Business and Arts were found to have majority of the students. Generally, the study covered many schools and faculties found in the sampled public universities. Only 344 respondents indicated their school/faculty.

4.4.6 Respondents by Department

The students were asked about their department and responded as in appendix XI.

From the results in Table 4.7, majority of them, 24.5% (n=79) belonged to the Department of Films and Theatre 24.5% (n=79), 9% (n=29) came from the Department of CESS, following closely were students from the Department of Accounting and Finance 7.4% , (n=24), followed by CIEM 5.6% (n=18), Management and Science 4% (n=13), Library Science 3.4% (n=11), PSS, Communication Studies 2.2% (n=7), Electrical Engineering 1.9% (n=6) Hospitality, Human Resource, Physics, Chemistry, Environmental Science 1.5% (n=5), Tourism, Arts and Humanities, Economics and Statistics, Actuarial Science, Medicine, Mechanical and AFMS 1.2% (n=4), Applied Science, Information Science, Education, Geography, Biology, Geospatial and Space Technology, History, Animal Science 0.9% (n=3), Developmental Studies, Food and Nutrition, Geology, Sociology, PSRI, AST, Special Needs 0.6% (n=2) while Meteorology, Civil and Construction, Real Estate and Construction, Anthropology, Linguistics, Education, Zoology, Biochemistry and Biotech, Kiswahili,

Community Health, English, Public Policy and Administration, Purchase and Supply Chain 0.3% (n=1) had the least. This was clear that majority of the students were from Arts and Business departments. Only 323 respondents indicated their departments out of the 416.

4.4.7 Respondents by Other Areas

The students were also asked to indicate other areas they belonged to and appendix XII presents the findings by the study.

Other students said they belonged to the Institute of Diplomacy and International Studies and History 25% (n=2), Physical Sciences 12.5% (n=1), Physics 12.5% (n=1), Philosophy 12.5% (n=1), Religious Studies 12.5% (n=1) and Statistics and Actuarial Sciences 12.5% (n=1). The findings indicated that areas of study among the sampled respondents were diversified enough.

4.4.8 Access to Smart Phones

The students were asked whether they had access to smart phones and if so how frequently they used them. The results were presented in Table 4.10.

Table 4.10: Access and Use of Smart Phones

		Frequency	Percent	Cumulative Percent
Access to Smart Phones	No	14	3.4	3.4
	Yes	397	96.6	100.0
	Total	411	100.0	
Frequency of use of a Smart Phone	Rarely	19	4.6	4.6
	Once a week	3	.7	5.4
	Twice a week	1	.2	5.6
	Thrice a week	7	1.7	7.3
	Daily	381	92.7	100.0
	Total	411	100.0	

The highest number of students were found to access smart phones as they represented 96.6 % (n=397) of all the students sampled while those who did not have access to smart phones were 3.4% (n=14). Out of all the students who accessed smartphones, majority of them, 92.7 % (n= 381), said they used the phone on a daily basis, 4.6 %(n=19) said they rarely used them, 1.7 % (n=7) used it thrice a week, 0.7 % (n=3) used it once a week while 0.2% (n=1) used it twice a week and were the least. Only 411 answered the question on access to smart phones and frequency of use of a smart phone out of the 416.

4.5 Test of Assumptions of the Variables

In order to infer statistically from the findings, certain assumption should be fulfilled. The test assumptions considered in this study are normality test of all study variables, test of normality for the residuals, test of homogeneity of variance of residuals, testing for outliers and testing for multicollinearity diagnostics. They have been discussed as below.

4.5.1 Test of Normality for the Study Variables

This study performed normality test for all the study variables to examine the distribution of the data. There are various methods to test for normality, these include: Skewness and Kurtosis, formal normality tests such as Kolmogorov-Smirnov test and Shapiro-Wilk test etc. Other methods that can be used to test normality of variables include graphical methods. These graphical methods are normal Q-Q plots, histograms and normal P-P plots. In this study, Skewness and Kurtosis tests of normality were used to test for normality of the variables. For Skewness, if skewness is < -1 or >1, then it is highly skewed; if -1 < skewness < -0.5 or 0.5 < skewness < 1, it is moderately skewed; and if -0.5 < skewness <0.5, it is approximately normal. Normal Q-Q plots were also presented to give a graphical presentation of the normality. For the graphs, normality is indicated if the points tend to lie on the diagonal line.

Table 4.11: Statistics of Skewness and Kurtosis for the Study Variables

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Cognition	415	-.357	.120	.447	.239
Diversion	407	-.360	.121	.140	.241
Social utility	406	-.042	.121	.427	.242
Mobile use index	405	-.050	.121	-.245	.242

The statistic values of skewness under the variables were found to have a range of -0.5 < skewness <0.5 which indicated that the data of the variables was approximately normal.

Additionally, Kolomogorov Smirnov and Shapiro Wilk tests of normality were also applied to examine whether the variables were normally distributed.

Table 4.12: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Cognition	.063	402	.121	.987	402	.131
Diversion	.051	402	.150	.983	402	.109
Social utility	.103	402	.200	.979	402	.055
Mobile use index	.037	402	.200	.994	402	.106

a. Lilliefors Significance Correction

The results showed cognition, diversion, social utility and mobile phone technology use were approximately normally distributed. This was indicated by p-values that were greater than 0.05 at 5% significance level, thus indicating normality of the variables under study.

Further, this was confirmed in the Normal Q-Q plots where the points tend to lie on the diagonal line indicating normality of the variables. For Cognition N=415, Diversion N=407, Social Utility N=406 while for Mobile phone Use Index N=405.
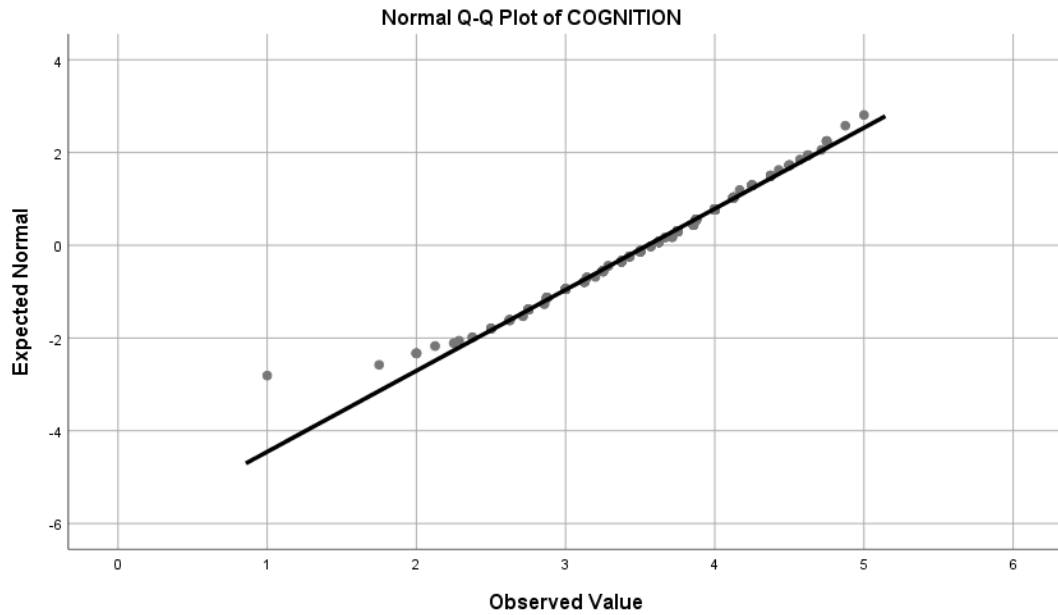
Figure 4.1: Normal Q-Q plot of Cognition
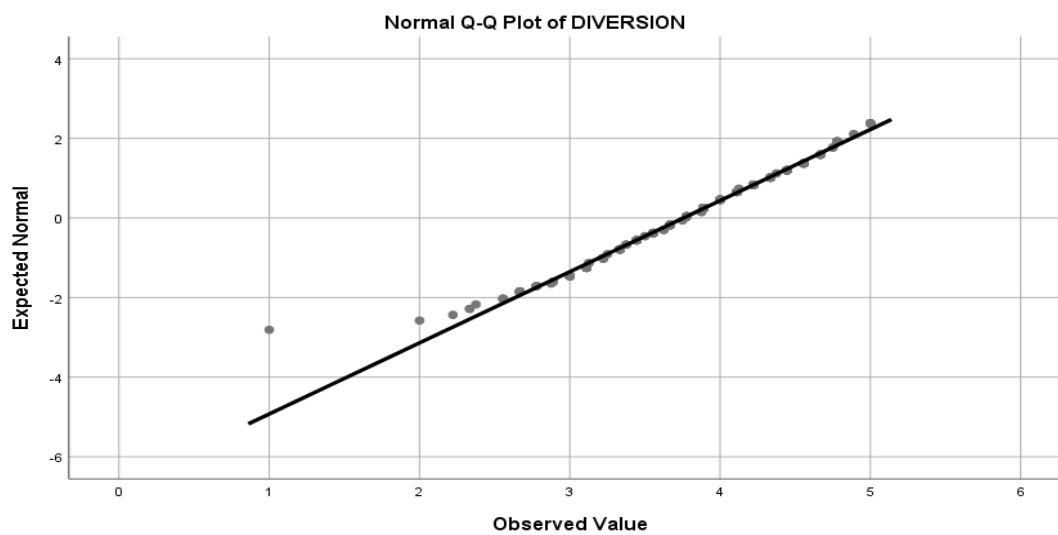
Figure 4.2: Normal Q-Q plot of Diversion
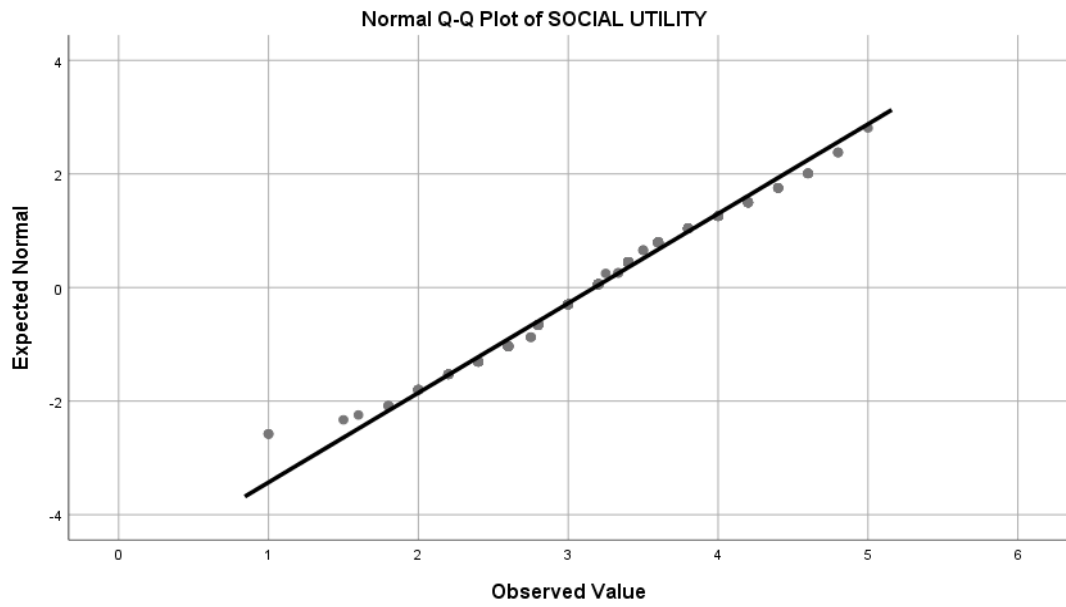
Figure 4.3: Normal Q-Q plot of Social Utility
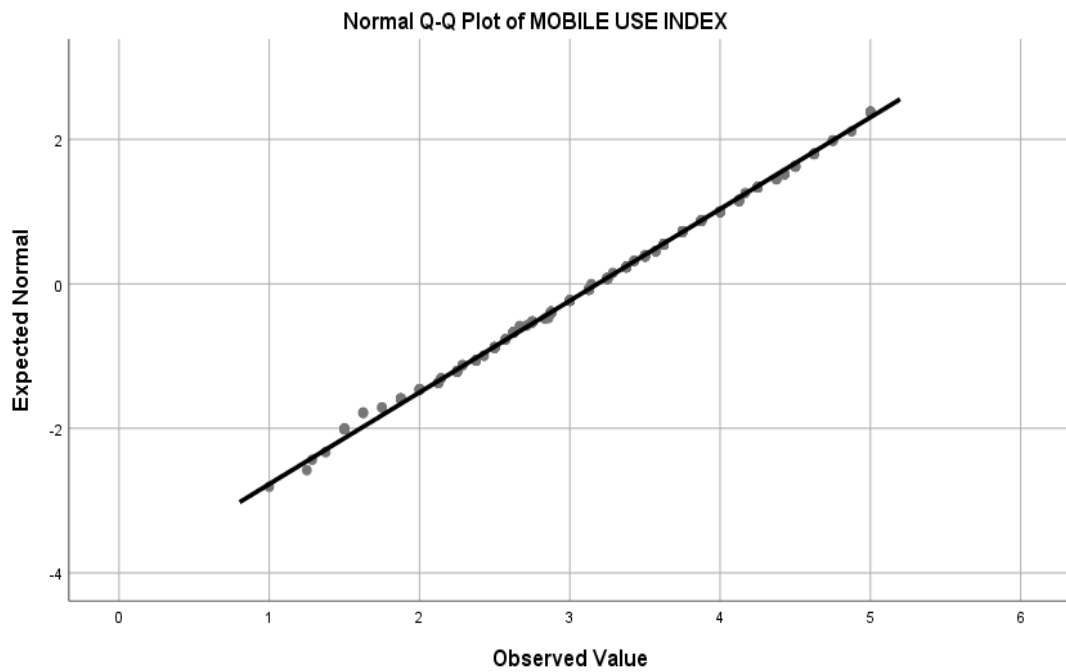
Figure 4.4: Normal Q-Q plot of Mobile Phone Use Index

This study acknowledges that normality of study variables is not a requirement for a parametric test, however, this was performed to show the distribution of the data. In multiple linear regression, the normality assumption only holds to the disturbance or the error term and not to the explanatory variables as is often believed (Statistics Solutions, 2013). Ghasemi and Zahediasl (2012) stated that normality assumption is very important for validation of results in a parametric test. However, in large data sets with above 30 observations, normality is not a major requirement and may be ignored not affecting the end results. In fact, Pallant (2001) and Elliot and Woodward (2007) stated that with large enough sample sizes (> 30 or 40), the violation of the normality assumption should not cause major problems and implies that a researcher can use parametric tests even when the data are not normally distributed.

4.5.2 Tests of Normality, Linearity and Homoscedasticity for a Multiple Regression

This section sought to test for the assumptions made by parametric tests in which linear regression and Pearson's correlation are part of. These assumptions include normality of the residuals, homogeneity of variance and no multicollinearity assumptions. Each is as discussed below.

4.5.3 Normality Test

In multiple linear regression the assumption requiring a normal distribution applies only to the disturbance or the error term also known as residuals not to the independent variables as is often believed. The disturbance term is the random error in the relationship between the independent variables and the dependent variable in a regression model. Each case in the sample actually has a different random variable which encompasses all the "noise" that accounts for differences in the observed and predicted values produced by a regression equation, and it is the distribution of this disturbance term or noise for all cases in the sample that should be normally distributed.

This section shows the normality test of the residuals or the error terms. This assumption was tested using a normal P-P plot and a histogram plot. For a normal P-

P plot, if all the values tend to lie on the straight line cutting across the diagonal, then the variable is said to assume normality. The results were presented in Figure 4.5 and Figure 4.6.
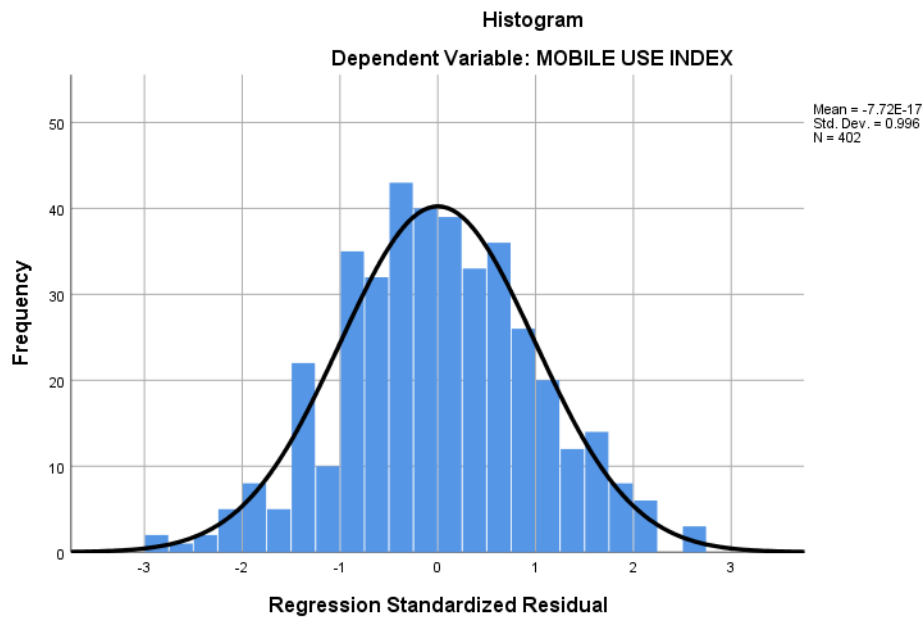
Figure 4.5: Histogram of Residuals in a Multiple Linear Regression with Mobile Phone Use Index as the Dependent Variable
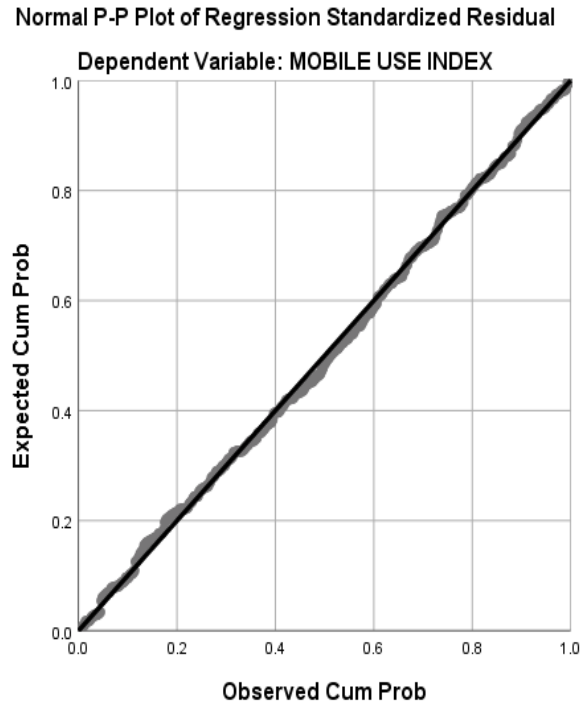
Figure 4.6: A Normal P-P of Residuals in a Multiple Linear Regression with Mobile Phone Use Index as the Dependent Variable

Research findings in Figure 4.6 and Figure 4.7 revealed that the residuals were normally distributed. In the Normal P-P plot, the points tended to lie on the diagonal line while under the Histogram with a normal plot seemed normally distributed. Therefore, it can be concluded that there was no violation of the normality assumption and therefore regression analysis results were validated. This seems to agree with the uses and gratification theory which postulates that people have needs and drives which are satisfied using both media and non-media for communication (West and Turner, 2000).

4.5.4 Homogeneity of Variance

This is also known as homoscedasticity and means constancy or homogeneity of variance. In regression analysis, the residuals are assumed to be the same across all values of the independent variables. A residual scatter plot for predicted scores and

standardized residual values also known as errors of prediction was used to test for homoscedasticity. If the residuals do not fan out that is a triangular fashion that means that the equal variance assumption is met

Scatterplot
Dependent Variable: MOBILE USE INDEX
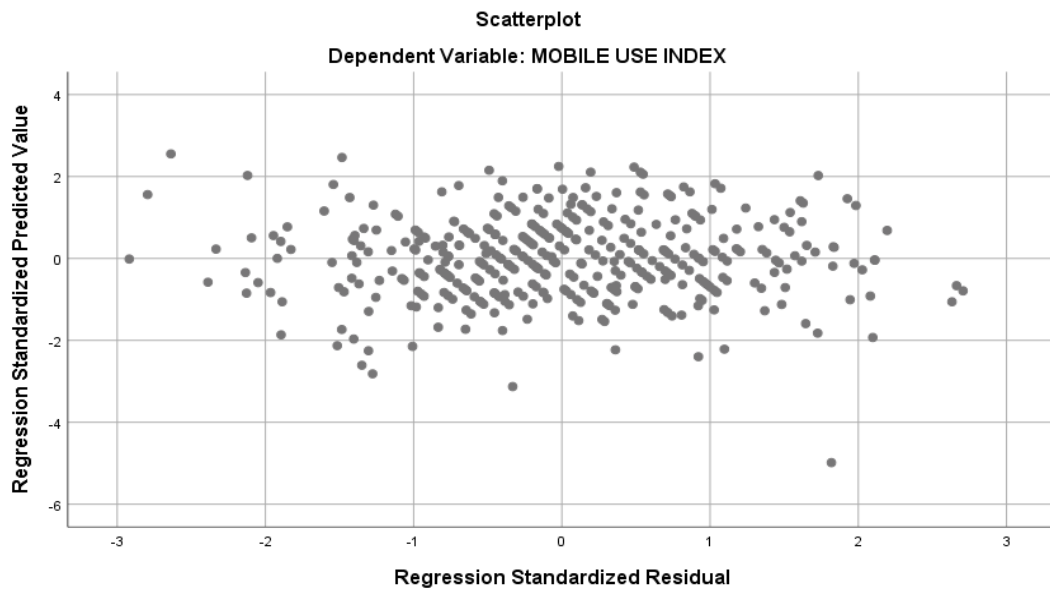
Figure 4.7: A Scatter Plot of the Predicted Values and Residual Values of Mobile Phone Use Index

According to the results in Figure 4.8, the scores appeared to be randomly scattered and again the residuals "dots" are not seen fanning out in any triangular fashion. This indicated that the homoscedasticity assumption was not violated.

4.5.5 Multicollinearity

When predicting a dependent variable using various independent variables in a multiple linear regression, the degree of multicollinearity and its effect on the findings or results is first examined. Multicollinearity refers to the high correlation among the independent variables. In linear regression analysis, independent variables are assumed not to be highly correlated with each other. The examination of multicollinearity is done through employing two-part process (condition indices and decomposition of the coefficient variance) where conclusions are then drawn from

the variance inflation factor (VIF) and tolerance values. The VIF and the tolerance values show or indicate inconsequential collinearity. First, the condition indices are examined.

Table 4.13: Condition Index Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Cognition	Diversion	Social utility
1	1	3.951	1.000	.00	.00	.00	.00
	2	.024	12.859	.05	.09	.05	.99
	3	.014	16.528	.07	.84	.39	.01
	4	.011	19.218	.89	.06	.56	.00

a. Dependent Variable: mobile use index

A condition number between 10 and 30 indicates correlation between the independent variables and when a value is larger than 30, the multicollinearity is regarded as strong. From the results, the condition index numbers lie between 10 and 30 but not larger than 30 and so proceed to conduct the VIF and tolerance tests to draw conclusions.

VIF and tolerance tests were performed for the independent variables namely: cognition, diversion, and social utility

Table 4.14: Multicollinearity Test

Variable	Tolerance	VIF
Cognition	.796	1.257
Diversion	.788	1.269
Social utility	.828	1.208

The results in table 4.14 revealed that multicollinearity did not exist among the study variables. According to Belsley, *et al.,* (2004), a tolerance value below 0.2 indicates multicollinearity, whereas a value above 0.2 suggests no multicollinearity. On the other hand, Gujarati (2007) suggested that a VIF greater than 5 indicates multicollinearity while a VIF less than 0.5 indicates non-existence of multicollinearity. Therefore, this affirms that there was no violation of the no-multicollinearity assumption.

4.5.6 Test of Outliers

Outliers are the extreme values or points which fall more than 1.5 times the interquartile range above the third quartile or below the first quartile in a set of data. Outliers can cause errors in statistical analyses. In this study, outliers were tested using box plots and the results were presented in Figure 4.8.
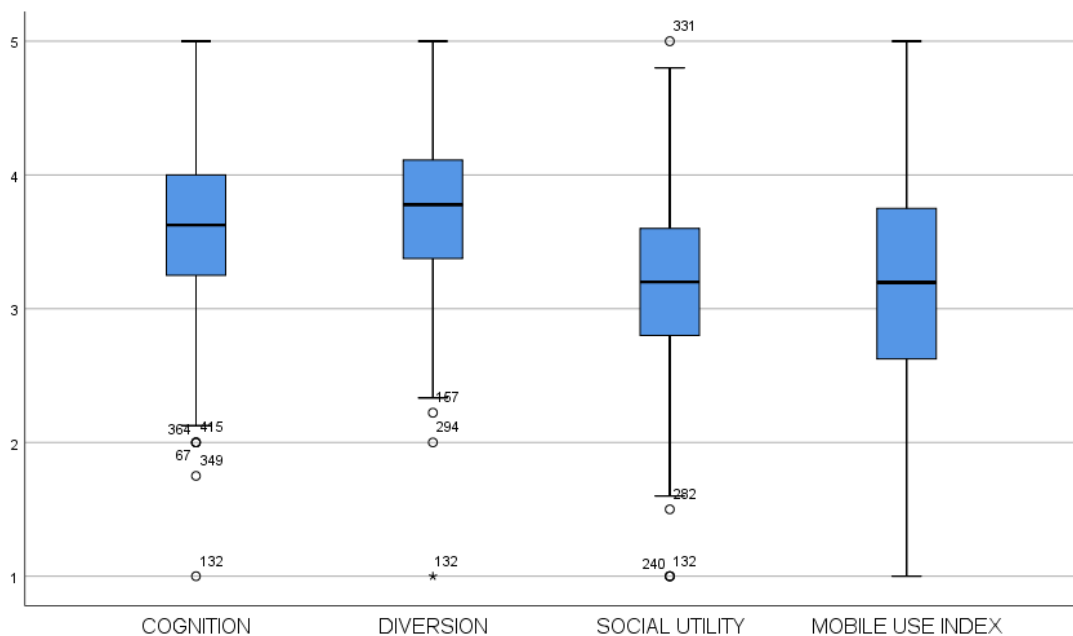
Figure 4.8: Boxplots of the study variables

The results indicated that there was the presence of outliers in cognition which had five, diversion which had three, and social utility which had four. Mobile phone use index did not have outliers.

After deletion, the study went ahead and tested for outliers again where the boxplots in Figure 4.9 were plotted.
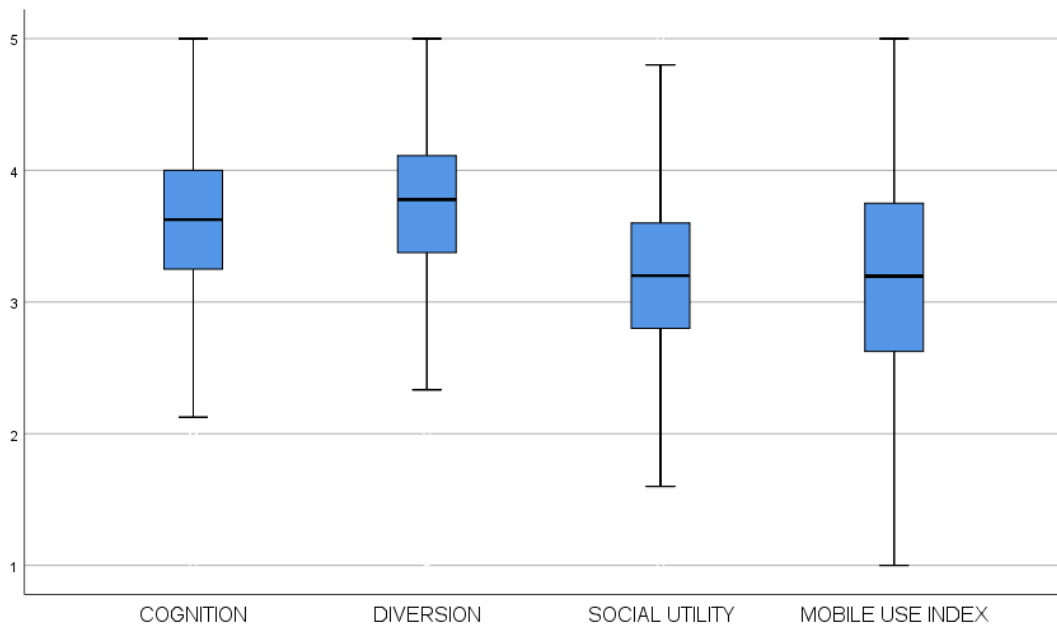
Figure 4.9: Boxplots of the Study Variables to Test Outliers

Figure 4.9 showed that the values in all the variables fell within the overall distribution pattern indicating the absence of outliers. This was used to carry on study analysis.

Frequency of mobile phone technology use was the dependent variable. The respondents who were undergraduate students were asked to indicate the percentage of their time that is occupied by mobile phone technology use. The percentages were divided into intervals of 20 totaling to five segments of between 0-20%, 20-40%, 40-60%, 60-80% and 80-100%. There were eight items that the respondents were tested on as found in table 4.15.

Table 4.15: Frequency of Mobile Phone Use

	0-20%	20-40%	40-60%	60-80%	80-100%	Mean	Std. Deviation
How often you use mobile phone to convey an urgent message to classmates	9.0	13.2	18.4	22.6	36.8	3.65	1.330
How often you use mobile phone to search for academic information	3.2	6.7	21.4	33.3	35.3	3.91	1.059
How often you use mobile phone to inform others about a class assignment	11.2	13.5	23.9	23.7	27.7	3.43	1.321
How often you use mobile phone for receiving/sending money	9.3	10.8	19.9	23.2	36.8	3.67	1.318
How often you use mobile phone as a personal organizer	15.0	18.0	25.8	23.8	17.3	3.10	1.306
How often you use mobile phone as a peer locator	25.6	19.5	26.8	15.5	12.5	2.70	1.337
How often you use mobile phone to play games	34.7	21.2	16.7	16.5	11.0	2.48	1.391
How often you use mobile phone to watch movies	36.1	18.7	17.2	12.7	15.4	2.53	1.468

From the results, majority of the students, 36.8%, said they use 80-100% of their time to convey urgent messages to classmates using a mobile phone. 22.6% of the students said that they used 60% to 80% of their time, 18.4% used 40-60%, 13.2% used 20% to 40% while 9.0% of the students said they used 0-20% of their time on the same item. On average the students were seen to use 60% - 80% of their time to

convey an urgent message to classmates using mobile phones as indicated by a mean value of 3.65 and a standard deviation of 1.330. The second item was on the frequency one uses mobile phone to search for academic information. Majority of the students, 35.3%, said they use 80-100% of their time, 33.3% of the students said that they used 60% to 80% of their time, 21.4% used 40-60%, 6.7% used 20% to 40% while 3.2% of the students said they used 0-20% of their time on the same item. On average the students were seen to use 60% - 80% of their time to search for academic information as indicated by a mean value of 3.91 and a standard deviation of 1.059. The item that was ranked highest as it occupied a huge chunk of students' time – searching for academic information. However, there is danger that the students just mentioned educational information in order to appear scholarly being in the university otherwise, it should have been leading instead of conveying urgent messages to fellow students that was leading. The urgent message is not specified. From the results, it was also clear that some students, 27.7%, said they use 80-100% of their time to inform others about a class assignment using a mobile phone. 23.7% of the students said that they used 60% to 80% of their time, 23.9% used 40-60%, 13.5% used 20% to 40% while 11.2% of the students said they used 0-20% of their time on the same item. On average the students were seen to use 40% - 60% of their time to inform others about a class assignment as indicated by a mean value of 3.43 and a standard deviation of 1.321. On how often they use mobile phone for receiving/sending money, majority, and 36.8% said they used 80% to 100% of their time transacting money while using mobile phones. This shows that on average, the respondents used 60% to 80% of their time as indicated by a mean value of 3.67 and a standard deviation of 1.318. The students also responded on the frequency they use mobile phone as a personal organizer based on time. On average, the students said that they used 40% to 60% of their time on mobile phones to do a personal organization as indicated by a mean value of 3.10 and a standard deviation of 1.306 with the majority, 25.8% saying that they used 40-60% of their time. Averagely, the students said that they used mobile phone devices as a peer locator and spent 40% to 60% of their time. Equally was the frequency by which the students used mobile phones to watch movies. They indicated that they used 40% to 60% of their mobile

phone time to watch movies on phone. This was indicated by a mean value of 2.53 and a standard deviation of 1.468.

The respondents' use of mobile phone was least occupied by playing games at 11.0% in an upper segment of 80-100%. This is rather strange considering that deviation was given priority over cognition. Playing games falls under deviation as it is distracting the mind from other serious pursuits and helps the mind relax.

4.6 Pull Factors to Spend Time Online on Phone

Respondents were asked to give their suggestions of three issues that mainly pull them to spend time online using their mobile phones. Table 4.16 shows their views. However, among the views aired, it was interesting to note some of what the respondents spend their time on, considering that they are students at university level. For instance, the results showed that some students spent time online in search of academic information at 57.9%, communication at 41.4%, social media at 34.6%, doing google research at 26.8% and news at 18.6%. The fact that a significant percentage of respondents were pulled to spent their time online and also doing google search could suggest that mobile phones were used mainly to do cognition work. As opposed to diversion which could be represented by social media at only 34.6% and social utility was represented by such activities as WhatsApp conversations at 1.4%, downloading music at 0.7% and games at 1.8%. Interestingly some university students used the mobile for evangelization and reading the Bible at 0.7% each among other uses. This points to the spirituality among the students which they help nurture using mobile phone technology.

Table 4.16: Pull Factors to Spend Time Online on Phone

I spend time online to:	Responses		Percent of Cases
	N	Percent	
To search for academic information	162	23.2%	57.9%
To download music	2	0.3%	0.7%
To communicate	116	16.6%	41.4%
For entertainment	54	7.7%	19.3%
Games	33	4.7%	11.8%
To research on Google	75	10.8%	26.8%
Taking pictures and uploading them	1	0.1%	0.4%
Boredom	22	3.2%	7.9%
Social media	97	13.9%	34.6%
YouTube	9	1.3%	3.2%
Music	16	2.3%	5.7%
Cheating up conversations on WhatsApp group	4	0.6%	1.4%
What's trending	21	3.0%	7.5%
For leisure	2	0.3%	0.7%
Marketing	6	0.9%	2.1%
To get news	52	7.5%	18.6%
Online working	9	1.3%	3.2%
Reading Bible	2	0.3%	0.7%
Evangelizing	2	0.3%	0.7%
Reading devotional books	1	0.1%	0.4%
Group presentation	2	0.3%	0.7%
Free Wi-Fi	2	0.3%	0.7%
Seeking counsellor	2	0.3%	0.7%
Sending and receiving money	1	0.1%	0.4%
Security issues	1	0.1%	0.4%
Addiction	1	0.1%	0.4%
Kenyan politics	1	0.1%	0.4%
Reading news on my phone	1	0.1%	0.4%
Total	697	100.0%	248.9%

4.6.1 Number of Hours Spent Online on Mobile Phone

This section in the questionnaire asked the respondents to state the number of hours they would spend online using their mobile phone on average in a 24-hour day. The results were presented in Table 4.17.

Table 4.17: Number of Hours Spent Online on Mobile Phone in a 24-Hour Day

		Frequency	Percent	Cumulative Percent
	1-less than one hour	17	6.2	6.2
	2-4 hours	110	40.3	46.5
Valid	5-10 hours	100	36.6	83.2
	11 and above hours	46	16.8	100.0
	Total	273	100.0	

The results indicated that majority of the undergraduate students, 40.3%, spent 2-4 hours in a 24-hour day online using a mobile phone, following closely were 36.6% of the respondents who said they used 5-10 hours daily, 16.8% of them said they used 11 hours and above while the least, 6.2% said they used one (1) hour or less online. That a university student can choose to use 11 hours of 24 hours online should be alarming taking into account that what the student is doing online is unknown.

4.6.2 Feelings on Mobile Phone Use Online

This section saw the researcher measure motivation of the respondents on use of mobile phones online, that is, what motivates the students to use their mobile phones online. A Likert scale with five items ranging from strongly agree to strongly disagree was used to measure the responses where 1 represented strongly disagree and 5 represented strongly agree. The results were then presented in Table 4.18.

Table 4.18: Feelings on Mobile Phone Use Online

	SD %	D %	N %	A %	SA%	Mean	Std. Deviation
My desire to maintain relationship greatly influences my use of mobile phone online	6.2	8.8	17.5	32.7	34.8	3.81	1.183
My desire to learn greatly influences my use of mobile phone online	1.3	3.6	11.9	37.1	46.1	4.23	.888
My desire to socialize greatly influences my use of mobile phone online	1.6	6.5	20.2	38.7	33.0	3.95	.967
My desire to search for information greatly influences my use of mobile phone online	1.0	2.8	10.3	37.0	48.8	4.30	.844
My desire to share feelings greatly influences my use of mobile phone online	9.2	19.4	31.8	23.6	16.0	3.18	1.188
My desire to distract my mind from loneliness greatly influences my use of mobile phone online	8.9	11.7	26.4	33.4	19.6	3.43	1.187
My desire to escape from unwanted others greatly influences my use of mobile phone online	13.5	16.6	25.7	23.1	21.0	3.22	1.318
My desire to harass others greatly influences my use of mobile phone online	57.1	14.5	9.9	9.9	8.6	1.98	1.357
My desire to communicate greatly influences my use of mobile phone online	3.1	3.9	14.4	38.4	40.2	4.09	.987

The results showed that the desire to search for information was a dominant feeling among other motivations to use a mobile phone with majority of the students, 48.8% strongly agreeing and 37.0% of the respondents agreeing. On average the students agreed that their desire to search for information greatly influences their use of mobile phone online as indicated by a mean value of 4.30 and a standard deviation of 0.844. The information sought is not specified and most likely it is not academic as the desire to learn was treated differently. It was followed by the desire to learn with a mean of 4.23 and a standard deviation of 0.888. In an ideal situation in a learning institution, the desire to learn should have been given first position being university students. Majority of the respondents, 46.1% and 37.1% of the students strongly agreed and agreed that their desire to learn greatly influences their use of mobile phone online. The desire to learn was given position three instead of position one by students whose primary reason for being in a university is ostensibly to learn and the mobile phone technology should be assumed to be for aiding learning activities. The respondents again said that their desire to maintain relationship was a great motivation on their use of mobile phones online. This was indicated by a mean value of 3.81 and a standard deviation of 1.183. Majority of them, 34.8% strongly agreed. Majority of the students, 38.7% and 33.0% said that their desire to socialize greatly influenced their use of mobile phone online. This was also indicated by a mean value of 3.95 and a standard deviation of 0.967. The students were also found to be indifferent, that is, they were neutral on whether their desire to share feelings greatly influenced their use of mobile phone online. This was indicated by a mean value of 3.18 and a standard deviation of 1.188. Equally the respondents were indifferent on whether their desire to distract their mind from loneliness greatly influenced their use of mobile phone technology online, their desire to escape from unwanted others greatly influenced their use of mobile phone technology online as indicated by mean values of 3.43 and 3.22 respectively and standard deviations of 1.187 and 1.318 respectively. The desire to escape from unwanted others could help explain why there is always a mobile phone in front of most university students even in situations that do not warrant the carrying of the gadget in the hand. The device is held in the hand as if one is consulting it but the real reason could be to hide from the unwanted others. The sampled students agreed that their desire to communicate greatly

influences their use of mobile phone technology online. This was indicated by a mean value of 4.09 and a standard deviation of 0.987 with majority of the respondents, 40.2% and 38.4% strongly agreeing and agreeing respectively. On the other hand, the respondents strongly disagreed with the suggestion that their motive to harass others led them to spend time on their mobile phones online. 57.1% of the respondents strongly disagreed with the suggestion of harassing others online. This is a consolation in that it is assuring that there are few "online bandits" among public university students waiting to ambush and harass other mobile phone users. As Karl Max had said, technological development determines the kind of society that emerges while Marshall McLuhan, a proponent of media technology determinism theory said that technological invention could lead to the development of the modern world (Chandler, 1995). This is suggestive of the possibility of new development in the habits of mobile phone users which could cumulatively lead to a new culture fostered by the use of mobile phone technology.

4.6.3 Number of Hours Spent on the Phone Carrying out Activities Related to Cognition, Diversion and Social Utility per Week

The respondents were asked to indicate the number of hours spent on the mobile phone carrying out activities related to cognition, diversion and social utility per week based on a day of 10 hours, from 8am to 6pm. The results were presented in Table 4.19. Cognition Activities - convey urgent message to classmates, search for academic information, and inform others about a class assignment. Diversion Activities - to play games, to watch movies, to gossip, to keep in relationships. Social Utility Activities - receiving/sending money, a personal organizer, a peer locator.

Table 4.19: Descriptive Analysis of Hours of Use

	N	Minimum	Maximum	Mean	Std. Deviation
Hours (Social Utility Activities- Receiving/sending money, a personal organizer, a peer locator)	395	.00	109.00	16.6272	14.77852
Hours (Cognition Activities- convey urgent message to classmates, search for academic information, inform others about a class assignment)	395	.00	50.00	8.1024	7.94499
Hours (Diversion Activities- to play games, to watch movies, to gossip, to keep in relationships)	367	.00	70.00	7.9937	9.28265

From the results in table 4.19, the respondents indicated that on average, they spent 16.63 hours per week based on a day of 10 hours, from 8am to 6pm on the phone carrying out activities related to social utility with a minimum of 0 and a maximum of 109. On average, the respondents were found to spend 8.1 hours on activities related to Cognition and spent 7.9937 on activities related to diversion per week. From the questionnaire, the activities were given without indicating under which category they fall so that a respondent was not in a position to answer in a manner that could suggest he/she wanted to please or displease the researcher that as students they do not appear to spend more time on one variable more than the other. However, items (a)-(c) in the questionnaire were under cognition, (d)-(f) were under social utility while (g)-(j) were under diversion variable. For social utility and cognition N=395 while for diversion N=367.

4.7 Examining Significant Difference in the Number of Hours Spent in Activities Related to Cognition, Diversion and Social Utility

The study sought to examine significant differences in the number of hours spent on the phone carrying out activities related to, cognition, diversion and social utility per

week based on a day of 10 hours, from 8am to 6pm. To determine the significance, one-way analysis of variance (ANOVA) with Tukey post hoc test was used and 5% significance level ($\alpha = 0.05$) was assumed. The results were considered to be significant whenever the probability value is less than 0.05 (p<0.05). The results were then presented in table 4.20.

Table 4.20: Analysis of Variance to Examine Significance Differences

	N	Mean± Std. Deviation	F-value	P-value
Social Utility	395	16.6272 ±14.77852a	77.525	0.0001
Cognitive	395	8.1024 ± 7.94499b		
Diversion	367	7.9937 ±9.28265b		

Notes: The means, followed by the same letter in a row are not statistically different at (P<0.05) using one-way ANOVA with Tukey test on post-hoc t-tests. * indicates significance (p<0.05).

From the results, the number of hours spent on activities related to social utility (M= 16.6272, SD = 14.77852) was found to be significantly higher as compared to those spent in cognitive activities (M=8.1024, SD = 7.94499) and those spent in diversion activities (M= 7.9937, SD = 9.28265), F (2, 1154) = 77.525, p = 0.0001.

This was also demonstrated in Figure 4.10. There is a significant difference in the number of hours spent on social utility related activities more than cognitive related activities, an indication that mobile phone technology use could be robbing academic (cognition) activities time in the public universities and giving it (time) to social utility activities because:

F (2,115A) = X < 77.525 & p = 0.0001 < 0.05
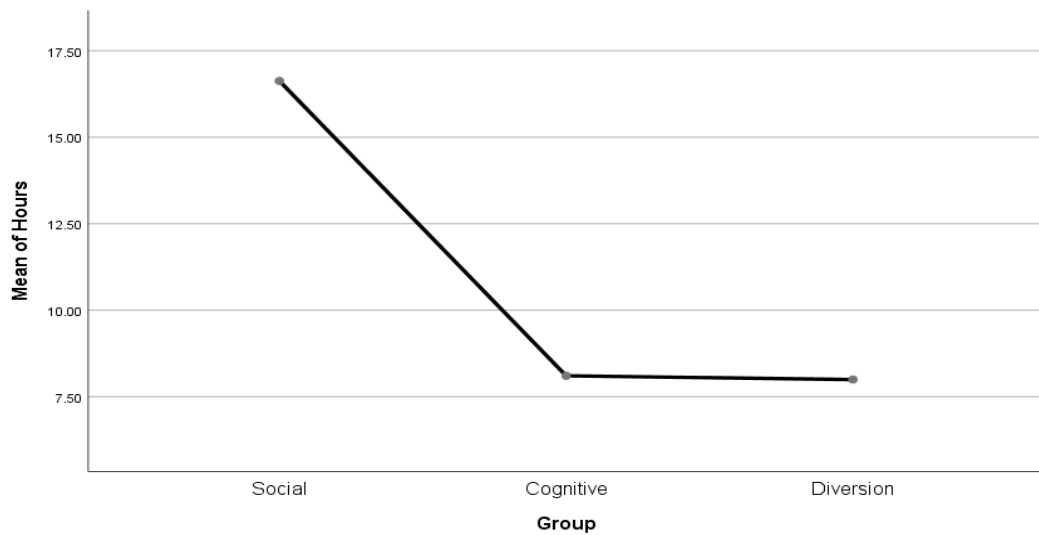
Figure 4.10: Trend in means of the number of hours spent in activities related to Cognition, Diversion and Social utility.

4.8 Analysis of Study Variables

In this section descriptive and inferential statistics were used to present and analyze quantitative data collected with regard to study variables and triangulation of the same with interviews from qualitative data for the purpose of interpretation of study results and findings. The variables were categorized as independent variables and dependent variable. The independent variables were: Cognition, Diversion and Social utility. The dependent variable was frequency of mobile phone use.

4.9 Cognition

This independent variable addressed objective one of this study.

4.9.1 Descriptive Analysis for Cognition

This section looks at the cognition variable which addressed objective one of the study which was to investigate the influence of cognition on undergraduate university students' use levels of mobile phones. There were eight items in this section on cognition variable that used a 5-point Likert scale to measure the

respondents' response to the areas being examined. The ninth item was a qualitative type, an open-ended statement, which elicited the respondents' opinion of other uses of smart phones. The results are presented in Table 4.21.

Table 4.21: Descriptive Analysis for Cognition

	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean	SD
I coordinate class meetings/activities	6.1	10.2	22.7	33.2	27.8	3.66	1.163
I sometimes refer/check hard concepts when not prepared for examination	21.0	12.2	18.1	27.6	21.0	3.15	1.436
I regularly search for educational information on the web	1.2	3.4	12.7	34.9	47.8	4.25	.890
I frequently share in-class media	3.9	13.0	22.7	33.5	26.9	3.67	1.121
I sometimes get distracted in class	11.8	14.0	27.5	29.2	17.6	3.27	1.241
I frequently get distant privileges of libraries	13.3	15.6	24.9	28.9	17.3	3.21	1.276
I frequently carry out in-class surveys	12.0	18.4	26.0	27.8	15.7	3.17	1.244
I frequently transfer files/photos/other data	5.6	3.9	13.9	35.0	41.6	4.03	1.104

The first item asked respondents whether they use mobile phones to coordinate class meetings/activities. The response was high at a mean of 3.66 with a standard deviation of 1.163 meaning the respondents agreed. Majority of the students, 33.2% agreed that they used mobile phones to coordinate class meetings and activities while 27.8% of them strongly agreed. This implies that many respondents use the mobile phone for coordination of class activities. It was again found that majority of the

students, 27.6% agreed and 21% strongly agreed that they sometimes use mobile phones to refer or check hard concepts when not prepared for exams. A good number of them, 21% strongly disagreed and 12.2% disagreed on using mobile phones to check hard concepts. Therefore, the students were indifferent on average as they neither agreed nor disagreed as indicated by a mean value of 3.15 and a standard deviation of 1.436. In the United States, sophisticated mobile phones are used by students to cheat in examinations (Katz, 2012). In this study, the students were noncommittal on whether they use the phones to engage in examination irregularity or not. However, their ambivalence can be understood when it is considered that examination cheating is an offence which students strive to conceal whenever it occurs. What is significant here is that the students use their phones to support their cognition activities.

About searching for educational information on the web, a high number of respondents were found to use their mobile phones to do the searches at a mean of 4.25 with a standard deviation of 0.890. Nearly half of the students, 47.8% strongly agreed to use mobile phones to regularly search for educational information on the web while 34.9% agreed. The study found that a good number of the students, 33.5% who agreed and 26.9% who strongly agreed, frequently share in-class media. It was confirmed that students on average frequently shared in-class media as indicated by a mean of 3.67 and a standard deviation of 1.121. The respondents were neutral on getting distracted while in class by the mobile phone use at a mean of 3.27 and a standard deviation of 1.241. However it was found through a study in the United States that examined both faculty and students' attitudes about the mobile phone, that the technology is a source of distraction during class, and that it is a potential resource for cheating in examinations leading to a policy being sought to ban the usage of the mobile phone technology in classrooms and school grounds (Campbell, 2012). The sampled students seemed to have been shy and avoided to admit to anything that could jeopardize their continued freedom to use their mobile phones on campus otherwise a ringing or buzzing mobile phone is distracting to anyone anywhere.

It was surprising, however, that a purely academic activity like getting distance privileges of using library services could receive ambivalent response from respondents just like carrying out in-class surveys. The students were neutral on these two items as indicated by mean values of 3.21 and 3.17 respectively and standard deviations of 1.244 and 1.104 respectively.

Transferring files, photos and other data received high endorsement at a mean of 4.03 and a standard deviation of 1.104. Majority of the respondents were found to strongly agree and agree, at 41.6% and 35.0% of the respondents respectively.

The researcher went ahead and asked the students to indicate uses of mobile phones for academic work and their responses included uses such as for research and taking photos with 3 (18.8%), while playing games was 2 (12.5%), transferring data, coming up with new programs and applications, listening to music, social media, taking online courses, share class assignments, download movies each had 1 (6.3%).

The study also used in-depth interview where twelve students participated. The study had targeted an over-sample of 573 undergraduate students out of (two from each of the six universities) whom twelve (12) students from the six participating universities were selected for the in-depth interview. From the in-depth interviews, it was found that most of the students did not highly rate cognition in the use of mobile phone technology as illustrated by the summary and narration that follows.

Interviewer: Ok, how about academic. Do you think students use mobile phones in class for academic purpose?

Participant: Ah, I don't think 100%. It is 50/50.

And yet another said:

Interviewer: How frequently do you use your mobile phone for learning activities?

Participant: Well, it depends but rarely.

Another said:

Interviewer: What frequency do you think students use their mobile phones for academic compared to other activities?

Participant: If I were to rate it in terms of percentage, I would say out of 100%, I'd give it 40% for academic purpose only, the rest 60%.

This agrees with the quantitative data that cognition as a mobile phone use at an average level.

4.9.2 Correlation Statistics for Cognition

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and cognition as the independent variable. The results were as presented in table 4.22.

Table 4.22: Pearson's Correlation Analysis

		Cognition	Mobile use index
	R	1	.120[*]
Cognition	*P*		.016
	N		405

From the results, it was observed that there was a positive significant linear relationship between cognition and mobile phone technology use levels by public university students, $r = 0.120$, $p = 0.016$. This was signposted by significant probability values found to be less than 0.05 at 95% confidence level. This implied that cognition was significantly related to mobile technology use levels by public university students.

4.9.3 Regression Statistics for Cognition

A simple linear regression was performed with cognition as the independent variable and mobile phone technology use levels by public university students as the response

or dependent variable. This was aimed at investigating the influence of cognition on undergraduate university students' use levels of mobile phones. The model was meant to establish whether there was a statistically significant relationship between mobile phone use and cognition and then later be used to establish a predictive model. The findings are presented in two tables, Table 4.23 and Table 4.24.

Table 4.23: Model Summary for the regression model of Cognition and mobile phone use

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.120^a	.014	.012	.78206

a. Predictors: (Constant), COGNITION

From the results in table 4.23, cognition was found to explain 1.4% of the change in mobile phone use technology. This was indicated by a coefficient of determination value of 0.014 indicated this (R^2=0.014)

Table 4.24: Model coefficient for the regression model of Cognition and mobile phone use

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.596	.245		10.594	.000
	Cognition	.165	.068	.120	2.421	.016

a. Dependent Variable: mobile use index

The model below has been obtained from the study results in table 4.24.

Mobile phone technology use = 2.596 + 0.165 * Cognition

The association between cognition and mobile phone technology use was found to be significant and positive, $\beta = 0.165$, $t = 2.421$, $p = 0.016$. This means that there was a significant association between cognition and mobile phone technology use. In addition, the findings indicate that a unit increase in cognition increases the level of mobile phone technology use by 0.165 units. The scatter diagram in Figure 4.11 further illustrated this relationship between cognition and mobile phone use.
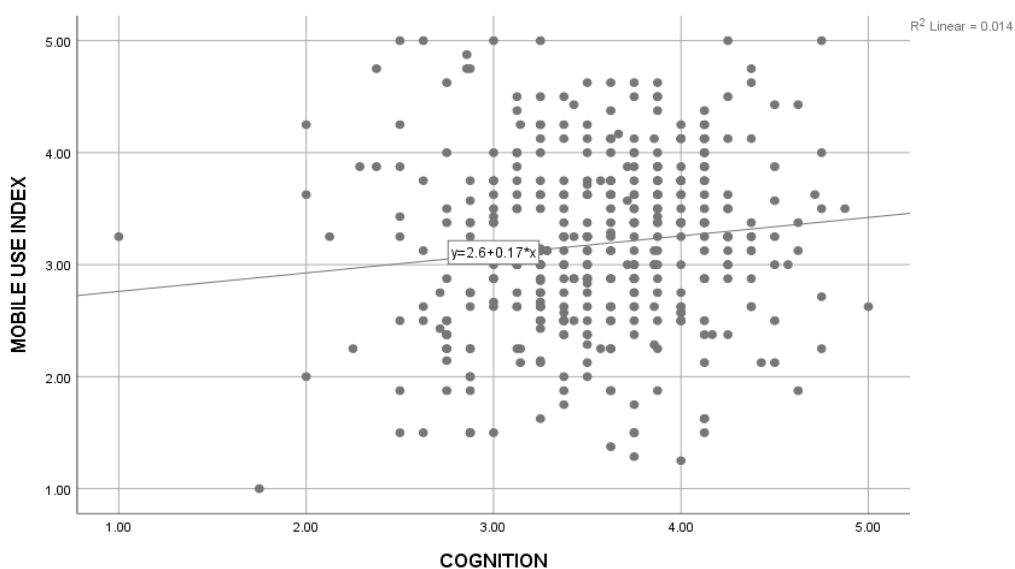
Figure 4.11: Scatter diagram showing the relationship between cognition and mobile phone technology use

4.9.4 ANOVA for the Regression Model of Cognition and Mobile Phone Use

Analysis of variance (ANOVA) was used to test the research claim for the first objective of this study. The null and the alternative hypothesis were stated as follows:

H0: There is no significant influence of cognition on mobile phone use levels among undergraduate university students

Ha: There is significant influence of cognition on mobile phone use levels among undergraduate university students

Table 4.25: ANOVA for the regression model of Cognition and mobile phone use

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.585	1	3.585	5.861	.016[b]
	Residual	246.484	403	.612		
	Total	250.069	404			

a. Dependent Variable: mobile use index

b. Predictors: (Constant), cognition

The results in Table 4.25 on analysis of variance in the case of regression between cognition and mobile phone technology use among university students, was used to test whether the model with cognition as the explanatory factor was statistically significant in predicting mobile phone use. The results again were used to test the hypothesis of the study which entailed testing whether the coefficient of cognition in the model was equal to zero or not (H_0: $\beta_1 = 0$ vs H_1: $\beta_1 \neq 0$).

The results proved that there was sufficient proof or evidence to reject the null hypothesis concluding the alternative which stated that there was a significant influence of cognition on mobile phone use levels among undergraduate university students, ($F = 5.861$, $p = 0.016$). Therefore, cognition was a statistically significant predictor of mobile phone technology use.

4.9.5 Discussion of Cognition

The first objective of the study aimed at investigating the influence of cognition on undergraduate university students' use levels of mobile phones. Pearson's and Spearman rho correlation analysis were used. It was established that the statements asked on cognition did have a relationship with mobile phone use levels by university undergraduate students. University students can use the phone to access academic information in an affordable manner and allow them to get information

available on the Internet. It agrees with a research done by Napolitano, (2010) that students use mobile phone technology for cognitive activities.

In in-depth interviews, one of the students interviewed disclosed that:

Interviewer: *Now what about academic purposes?*

Informant: *For academic purposes I can say they do research using their phones, they Google Wikipedia*

Interviewer: *What about cheating in exams?*

Informant: *Yeah, they also do.*

What Napolitano (2010) said was corroborated by the informant who admits that mobile phones are useful for academic work however when probed further the student admits that the mobile phone is also employed for negative uses such as cheating in examinations.

4.10 Diversion

This variable addressed the second objective of the study.

4.10.1 Descriptive Analysis for Diversion

The second objective of the study was to assess the influence of diversion on mobile phone technology use by undergraduate university students. This section seeks to descriptively analyze diversion variable. The variable had nine items on a Likert scale. The results were presented in Table 4.26.

Table 4.26: Descriptive Analysis for Diversion

	SD%	D%	N%	A%	SA%	Mean	S. Dev
I often want to know what others are doing	6.2	10.4	21.8	31.0	30.5	3.69	1.186
I frequently communicate with family/friends	1.2	3.4	10.1	36.2	49.0	4.28	.873
Most of the time relaxation motivates me to use devices	2.0	5.4	17.5	40.6	34.5	4.00	.957
I frequently contact friends who are far off	3.0	9.6	26.1	36.2	25.1	3.71	1.040
I usually share feelings	11.9	17.5	29.4	25.9	15.3	3.15	1.225
I regularly consult about difficulties or problems	4.0	8.0	19.2	41.9	26.9	3.80	1.050
I frequently distract my mind form loneliness	5.0	8.7	19.9	41.0	25.4	3.73	1.086
I usually find solace in playing games	11.3	11.3	24.8	30.5	22.1	3.41	1.262
Most often, I keep my hands and mind busy	2.5	4.5	17.6	37.9	37.6	4.04	.977

Key: SD=Strongly Disagree, D=Disagree, N= Neutral, A=Agree, SA=Strongly Agree

The first item sought to find out whether the students use mobile phones to know what others were doing and how they were fairing on. The results proved that most students, 31.0% and 30.5% who agreed and strongly agreed respectively, used mobile phones to know how others were fairing on or doing. On average the students seemed to agree as their mean value was high, at 3.69 and a low standard deviation of 1.186. The results also indicated that undergraduate students were motivated to use the mobile devices for relaxation with 40.6% agreeing and 34.5% strongly agreeing. On average the students agreed as indicated by a high mean value of 4.00 and a standard deviation of 0.957. As Dominick, (2001), observed, diversion can take many forms where some of the most common include stimulation, relaxation, and emotional release of pent-up energy. Cumulatively, the studied university students

agree and strongly agree totaling to a value of 75.1%, that is, 40.6% plus 34.5%. This was a very high value suggesting that the mobile phone use for diversion and especially relaxation, was really significant among the students. This is an indication that diversion significantly influences mobile phone use among university students. The students after being asked whether they used the mobile phones frequently to communicate with family members and relatives, majority of them, 49% strongly agreed while 36.2% agreed. On average the students agreed to use the devices to communicate with family and relatives as indicated by a high mean value of 4.28 and a standard deviation of 0.873. Majority of the respondents who were undergraduate students, 36.2%, when asked whether they used mobile phones to frequently contact friends who are far off agreed while 25.1% of them strongly agreed. This implied that the students used the devices to share and talk to friends. This was again indicated by a mean value of 3.71 and a standard deviation of 1.040. The students were neutral on whether they used mobile phones to share feelings as indicated by a mean value of 3.15 and a standard deviation of 1.225. On whether the students regularly consult about difficulties or problems, majority, 41.9% agreed and 26.9% strongly agreed. On average they agreed as indicated by a mean value of 3.80 and a standard deviation of 1.050. The respondents again agreed on average that they frequently distract their mind from loneliness as indicated by a mean value of 3.73 and a standard deviation of 1.086 but they were neutral on whether they usually find solace in playing games as indicated by a mean value of 3.41 and a standard deviation of 1.262. Finally, the last item asked to the undergraduate students was whether most often, they keep their hands and mind busy when using mobile devices. Majority of the respondents, 37.9% responded to the affirmative and 37.6% strongly agreed. On average they agreed as indicated by a mean value of 4.04 and a standard deviation of 0.977.

4.10.2 Correlation Statistics for Diversion

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and diversion as the independent variable. The results were presented in Table 4.27.

Table 4.27: Pearson's Correlation Analysis for Diversion

		Mobile use index
	R	.322**
Diversion	*P*	.000
	N	402

From the results, it was observed that there was a positive significant linear relationship between diversion and mobile phone technology use levels by public university students, $r = 0.322$, $p = <0.001$. This was signposted by significant probability values found to be less than 0.05 at 95% confidence level. This implied that Diversion was significantly related to mobile technology use levels by public university students.

4.10.3 Regression Analysis for Diversion

A simple linear regression was performed with diversion as the independent variable and mobile phone technology use levels by public university students as the response or dependent variable. This was aimed at investigating the influence of diversion on undergraduate university students' use levels of mobile phones. The model established whether there was a statistically significant relationship between mobile phone use and cognition and then later establishing a predictive model. The findings are presented in two tables, Table 4.28 and Table 4.29.

Table 4.28: Model Summary for the Regression model of Diversion and Mobile Phone Use

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.322a	.104	.102	.74685

a. Predictors: (Constant), diversion

From the results in Table 4.28, diversion was found to explain 10.4% of the change in mobile phone use technology. This was indicated by a coefficient of determination value of 0.104 indicated this (R^2=0.104)

Table 4.29: Model Coefficient for the Regression Model of Diversion and Mobile Phone Use

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.480	.253		5.848	.000
	Diversion	.454	.067	.322	6.806	.000

a. Dependent Variable: mobile use index

The model below has been obtained from the study results in Table 4.29.

Mobile phone technology use = 1.480 + 0.454 * Diversion

The association between diversion and mobile phone technology use was found to be significant and positive, $\beta = 0.454$, $t = 6.806$, $p = < 0.001$. This means that there was a significant association between diversion and mobile phone technology use. In addition, the findings indicate that a unit increase in diversion increases the level of mobile phone technology use by 0.454 units. The scatter diagram in Figure 4.12 further illustrated this relationship between diversion and mobile phone use.
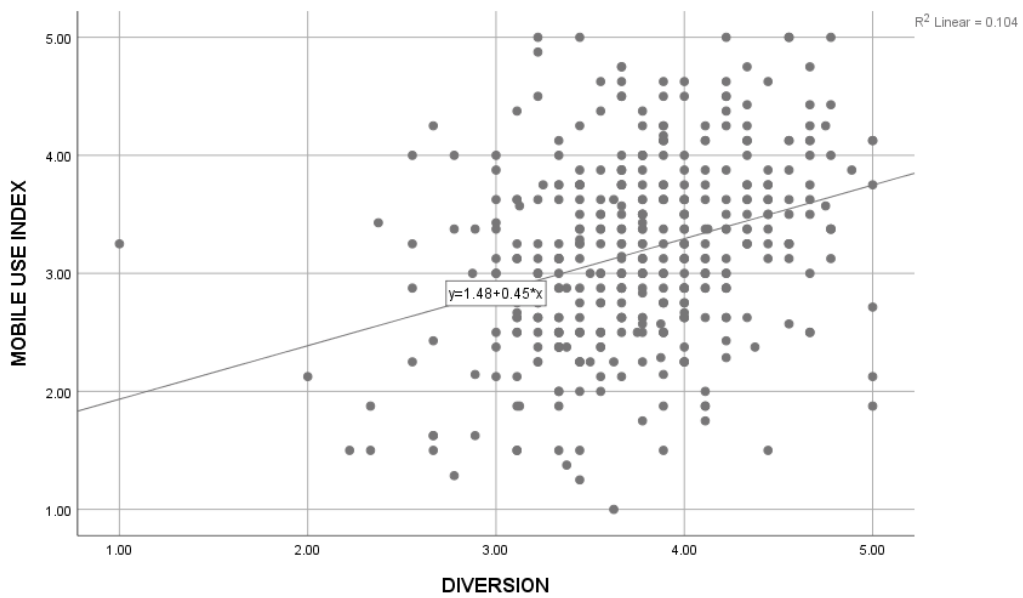
Figure 4.12: Scatter Diagram Showing the Relationship between Diversion and Mobile Phone Technology Use

4.10.4 ANOVA for the Regression Model of Diversion and Mobile Phone Use

Analysis of variance (ANOVA) was used to test the research claim for the second objective of this study. The null and the alternative hypothesis are stated as follows:

H0: There is no significant influence of diversion on mobile phone use levels among undergraduate university students

Ha: There is significant influence of diversion on mobile phone use levels among undergraduate university students

Table 4.30: ANOVA for the Regression Model of Diversion and Mobile Phone Use

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.834	1	25.834	46.315	.000[b]
	Residual	223.113	400	.558		
	Total	248.947	401			

a. Dependent Variable: mobile use index

b. Predictors: (Constant), diversion

The results in Table 4.30 on analysis of variance in the case of regression between diversion and mobile phone technology use among university students, was used to test whether the model with diversion as the explanatory factor was statistically significant in predicting mobile phone use. The results again were used to test the hypothesis of the study which entailed testing whether the coefficient of diversion in the model was equal to zero or not (H_0: $\beta_2 = 0$ vs H_1:$\beta_2 \neq 0$).

The results proved that there was sufficient proof or evidence to reject the null hypothesis concluding the alternative which stated that there was a significant influence of diversion on mobile phone use levels among undergraduate university students, ($F = 46.315$, $p = <0.001$). Therefore, diversion was a statistically significant predictor of mobile phone technology use.

4.10.5 Discussion of Diversion

The second objective of the study aimed at investigating the influence of diversion on undergraduate university students' use levels of mobile phone technology. Pearson's and Spearman rho correlation analysis were used. It was established that the statements asked on diversion did have an influence on mobile use levels by university undergraduate students. Mobile phone as an interpersonal communication medium can be used to create diversion through stimulation, relaxation, emotional release or catharsis (Dominick, 2001). A key informant when asked how he uses his mobile phone in a day responded as follows:

Interviewer: Explain how you use your mobile phone in a day of ten hours.

Respondent: Ok, mostly in the morning when I wake up I just open my social media platforms, then after that if I am in school if something comes up like strange topics that am not sure about mostly I do Googling to confirm some few details, then in the evening, I just use it for entertainment like listening to music and watching movies.

This response from the student agrees with what Dominick (2001), who says media, mobile phones, can be used for diversion.

4.11 Social Utility

This variable addressed the third objective of this study.

4.11.1 Descriptive Statistics for Social Utility

This section looks at the social utility variable which was the third objective of the study. There were five items in this section on the social utility variable that used a five-point Likert scale to measure the respondents' response to the areas being examined where 1 represented strongly disagreed and 5 represented strongly agreed. The results were presented in Table 4.31.

Table 4.31: Descriptive Analysis for Social Utility

	SD %	D %	N %	A %	SA %	Mean	Std. Deviation
I usually depend on my medium for my communication needs	2.2	4.0	11.1	42.6	40.1	4.14	.923
I regularly send and receive e-mails/SMS	3.0	2.5	7.4	37.0	50.1	4.29	.927
I frequently use my medium to harass others	59.7	20.3	8.2	8.4	3.5	1.76	1.127
My privacy is frequently exposed	39.3	24.8	20.0	10.0	6.0	2.19	1.225
Frequently notifies me of security issues	5.2	11.2	29.9	35.4	18.2	3.50	1.075

Key: SD=Strongly Disagree, D=Disagree, N= Neutral, A=Agree, SA=Strongly Agree

From the results, the respondents were asked whether they usually depend on their medium for their communication needs. Many of the respondents, 42.6% agreed and 40.1% of them strongly agreed. On average the respondents agreed. Majority of the respondents, 50.1%, strongly agreed that they regularly send and receive e-mails/SMS and 37.0% agreed. On average, the students agreed as indicated by a mean value of 4.29 and a standard deviation of 0.927. This dependency on the device tends to agree with Tessa (2014), who says that it is particularly true when people use the mobile phones excessively in public, they are signaling that they have got this shiny object, this status symbol, their iPhone or Android or Blackberry and that they have got important people to talk to or text, who are, may be, even more important than the people right in front of them.

The respondents did not admit to using the device to harass others with 80% strongly disagreeing and disagreeing with that suggestion. On average the students disagreed as indicated by a mean of 1.76 and a standard deviation of 1.127. So, harassment of others and exposing privacy were some of the least influencers of mobile phone use among university students in Nairobi, Kenya. A study done by Ugur (2015), found that most mobile phone users use the device to fight boredom, entertain themselves and stay connected to the outside world. This study tends to agree with Ugur (2015). Equally, the respondents denied that their privacy was frequently exposed by use of mobile phone technology at 64.1% strongly disagreeing and disagreeing and also indicated by a mean value of 2.19 and a standard deviation of 1.225. However, an overwhelming 53.6% admitted that mobile phone technology frequently notifies them of security issues. This was also indicated by a high mean value of 3.50 and a standard deviation of 1.075. The respondents were asked to state their other social utility mobile phone needs in their lives and the responses were captured in Table 4.32. The question in Table 4.32 was an open question (multiple question) where an individual could respond more than once.

Table 4.32: Other Social Utility Mobile Phone Needs

	Responses		Percent of Cases
	N	**Percent**	
I use computer for class issues	2	2.4%	3.3%
To communicate to friends and family	7	8.2%	11.5%
Privacy	3	3.5%	4.9%
Sending and receiving funds	3	3.5%	4.9%
Conferencing	2	2.4%	3.3%
Opera news	1	1.2%	1.6%
Chatting	10	11.8%	16.4%
You tube	2	2.4%	3.3%
Games	4	4.7%	6.6%
Music	4	4.7%	6.6%
Online lectures	1	1.2%	1.6%
Entertainment	11	12.9%	18.0%
Trending news	1	1.2%	1.6%
Television	1	1.2%	1.6%
Laptops	2	2.4%	3.3%
Money	1	1.2%	1.6%
Homestead	1	1.2%	1.6%
Social hall	1	1.2%	1.6%
Projectors	1	1.2%	1.6%
Social media	15	17.6%	24.6%
For business ideas	1	1.2%	1.6%
Creating job networks	1	1.2%	1.6%
I do research	3	3.5%	4.9%
Education	3	3.5%	4.9%
Trainings	1	1.2%	1.6%
Gym	1	1.2%	1.6%
Co-curricular activities	1	1.2%	1.6%
Health services	1	1.2%	1.6%
Total	85	100.0%	139.3%

Among other mobile phone needs, social media was listed by a bigger percentage of respondents at 17.6%, followed by entertainment at 12.9%, chatting at 11.8% and communicating to friends and family had 8.2%. The fact that social media led when the respondents were asked to state their other uses of mobile phones points at the central role social media is playing in university students' use of their mobile phones.

As students, one would have normally expected cognition issues to lead the list but strangely they were the least influencers of mobile phone use at 1.2% for online lectures, 1.2% for training and another 1.2% for co-curricular activities. This also suggests to the priority usage the undergraduate university students put their mobile phones.

The in-depth interview found that:

Interviewer: From your own opinion, why do students use mobile phones?

Informant: Okay, according to me, the reason why students use mobile phones is for communication and also like in school you want to know where classes are and want to communicate with the lecturer. There are also other uses like using the internet to surf and also seeing new stuff like things that are trending.

Another student participant observed that:

Interviewer: Explain how you as a student use the mobile phone in a day of 24 hours.

Informant: First of all, I use it, it helps to wake up as an alarm, and then after I'll go to my WhatsApp to see the communication of the class, thirdly, we share ideas about projects through the phone, again recording for example, the studio is full and the lecturer want some work. So for a day, I'll use it for recording, for taking pictures for memories like you have to take a picture for memory of the day, for communication.

The significant factor that comes out from this conversation is that a mobile phone is employed by university students to carry out many social obligations in addition to basic communication.

The researcher went further and asked the students to indicate other reasons influencing the use of mobile phone technology and their responses were recorded in Table 4.33. This was done to enable the respondents indicate what else they use mobile phone for apart from what was listed as options in the questionnaire.

Table 4.33: Other Reasons Influencing the Use of Mobile Phone Technology

	Responses		Percent
	N	Percent	of Cases
Get news	1	9.1%	9.1%
Communication	1	9.1%	9.1%
Social media	1	9.1%	9.1%
Reading spiritual books	1	9.1%	9.1%
Listening to music	2	18.2%	18.2%
Always motivate others	1	9.1%	9.1%
I always go for recollection in prayer houses	1	9.1%	9.1%
Watching other videos	1	9.1%	9.1%
Total	11	100.0%	100.0%

Majority of the students, 18.2% indicated that listening to music was a factor influencing students to use mobile devices. Other reasons were: getting news, communication, social media, reading spiritual books, always motivate others, recollection in prayer houses and watching other videos. Each was indicated by 9.1% of the respondents. Only 11 respondents out of 416 responded to the item on other reasons influencing the use of mobile phone technology.

On the in-depth interview findings, it was found that most of the respondents use social utility as an area where mobile phone became useful. One of them said:

Interviewer: From your own opinion what do university students use their mobile phones for?

Informant: In my own opinion, there are various reasons students use their mobile phones. First thing, mostly on social media, students are all over social media, tweeter, WhatsApp, Instagram etc. Then the second thing may be for M-pesa services, how you connect your parents and other people outside there via M-pesa services. Three, for games, some are interested in games via their phones and for

others they reach their phones to read their novels in their phones. A good example is me. Another reason is downloading various things, you can download music, anything games news. Yeah.

And another said:

Interviewer: *In your opinion, what do you think students use their mobile phones for?*

Informant: *To do their research, assignments given by lecturers and to do their social media life, through face booking, WhatsApp, Instagram, majorly only communication.*

These responses also indicate that the students employ their mobile phones to help them divert from other activities more than anything else.

4.11.2 Correlation Analysis for Social Utility

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students as the dependent variable and social utility as the independent variable. The results were presented in Table 4.34.

Table 4.34: Pearson's Correlation Analysis

		Social utility	Mobile use index
	R	1	.171[**]
Social utility	*P*		.001
	N		402

From the results, it was observed that there was a positive and statistically significant linear relationship between social utility and mobile phone technology use levels by public university students, $r = 0.171$, $p = 0.001$. This was indicated by significant

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probability values found to be less than 0.05 at 95% confidence level. This implied that social utility was significantly related to mobile technology use levels by public university students.

4.11.3 Regression Statistics for Social Utility

A simple linear regression was performed with social utility as the independent variable and mobile phone technology use levels by public university students as the response or dependent variable. This was aimed at investigating the influence of social utility on undergraduate university students' use levels of mobile phones. The model established whether there was a statistically significant relationship between mobile phone use and social utility and then later establishing a predictive model. The findings are presented in two tables, Table 4.35 and Table 4.36

Table 4.35: Model Summary for the regression model of Social Utility and Mobile Phone use

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.171ᵃ	.029	.027	.77724

a. Predictors: (Constant), social utility

From the results in Table 4.35, cognition was found to explain 2.9% of the change in mobile phone use technology. This was indicated by a coefficient of determination value of 0.029 indicated this (R^2=0.029)

Table 4.36: Model coefficient for the regression model of Social Utility and Mobile Phone use

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.508	.198		12.653	.000
Social utility	.213	.061	.171	3.477	.001

a. Dependent Variable: mobile use index

The model below has been obtained from the study results in table 4.36.

Mobile phone technology use = 2.508 + 0.213 * social utility

The association between social utility and mobile phone technology use was found to be significant and positive, $\beta = 0.213$, $t = 3.477$, $p = 0.001$. This means that there was a significant association between social utility and mobile phone technology use. In addition, the findings indicate that a unit increase in social utility increases the level of mobile phone technology use by 0.213 units. The scatter diagram in Figure 4.13 further illustrated this relationship between social utility and mobile phone use.
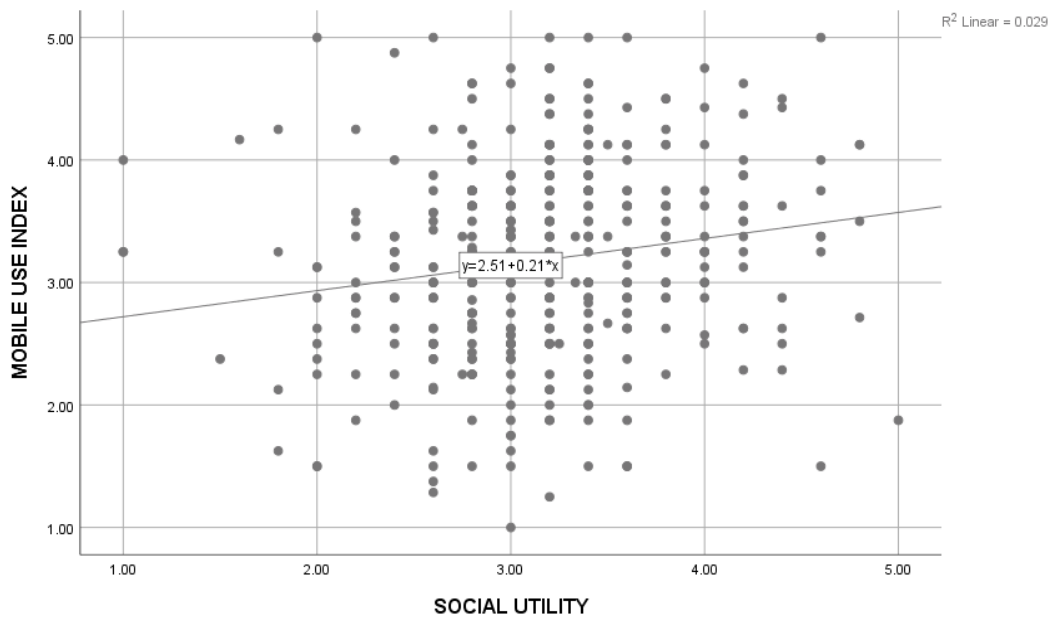
Figure 4.13: Scatter diagram showing the relationship between social utility and mobile phone technology use

4.11.4 ANOVA Analysis for the Regression model of Social Utility and Mobile Phone Use

Analysis of variance (ANOVA) was used to test the research claim for the first objective of this study. The null and the alternative hypothesis are stated as follows:

H0: There is no significant influence of social utility on mobile phone use levels among undergraduate university students

Ha: There is significant influence of social utility on mobile phone use levels among undergraduate university students

Table 4.37: ANOVA Analysis for the Regression Model of Social Utility and Mobile Phone Use

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.304	1	7.304	12.091	.001[b]
	Residual	241.642	400	.604		
	Total	248.947	401			

a. Dependent Variable: mobile use index

b. Predictors: (Constant), social utility

The results in Table 4.37 on analysis of variance in the case of regression between social utility and mobile phone technology use among university students, was used to test whether the model with social utility as the explanatory factor was statistically significant in predicting mobile phone use. The results again were used to test the hypothesis of the study which entailed testing whether the coefficient of social utility in the model was equal to zero or not ($H_0: \beta_3 = 0$ vs $H_1: \beta_3 \neq 0$).

The results proved that there was sufficient proof or evidence to reject the null hypothesis concluding the alternative which stated that there was a significant influence of social utility on mobile phone use levels among undergraduate

university students, (F = 12.091, p = 0.001). Therefore, social utility was a statistically significant predictor of mobile phone technology use.

4.11.5 Discussion of Social Utility

The third objective for the study aimed at examining the influence of social utility on undergraduate university students' use levels of mobile phone technology. Pearson's and Spearman rho correlation analysis were used. It was established that the statements asked on social utility did have an influence on mobile use levels by university undergraduate students. Mobile phones can also be of social utility where the need to strengthen contact with family, friends and others in society is fulfilled (Dominick, 2001). The student interviewed about mobile phone use responded:

Interviewer: *How do you use your mobile phone to achieve your social life?*

Informant: *For example, I use Facebook to connect with friends to chat.*

4.12 Combined Regression Model

A multiple linear regression was performed with mobile phone technology use levels by public university students, which is the dependent variable, and cognition, social utility and diversion which are the independent variables. The results were presented in the Tables 4.38, 4.39 and 4.40.

According to Table 4.38, cognition, social utility and diversion which are the independent variables were found to explain 10.1% of the variation in mobile phone technology use levels by public university students in Kenya as indicated by a coefficient of determination (R^2) value of 0.101. Adjusted R-square is reported as opposed to R-square value as it corrects for an overestimation experienced in R-square.

Table 4.38: Model Summary for the Combined Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.329[a]	.108	.101	.74688

a. Predictors: (Constant), social utility, cognition, diversion

Table 4.38 shows model coefficients table and tests for individual significance of the model parameters.

Table 4.39: Model Coefficients Table for the Combined Regression Model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.(p-value)
		B	Std. Error	Beta		
1	(Constant)	1.407	.300		4.689	.000
	Cognition	-.038	.073	-.028	-.524	.600
	Diversion	.433	.075	.308	5.772	.000
	Social utility	.090	.065	.072	1.388	.166

a. Dependent Variable: mobile use index

The model below has been obtained from the study results in table 4.39

Mobile phone technology use = 1.407 - 0.038 * Cognition + 0.433*Diversion+0.090*Social Utility

The association between Diversion and mobile phone technology use was found to be significant and positive, $\beta = 0.433$, $t = 5.772$, $p = <0.001$. However, under the combined model, cognition and social utility were found to be insignificant in predicting Mobile phone use.

4.12.1 ANOVA Analysis for the Combined Regression Model

Table 40 shows results of ANOVA for the combined regression model.

Table 4.40: ANOVA Analysis for the Combined Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.931	3	8.977	16.093	.000[b]
	Residual	222.015	398	.558		
	Total	248.947	401			

a. Dependent Variable: mobile use index

b. Predictors: (Constant), social utility, cognition, diversion

The results in Table 4.40 on analysis of variance in the case of regression between Cognition, Diversion and Social Utility on mobile phone technology use among university students, was used to test whether the model with the explanatory factors was statistically significant in predicting mobile phone use. The results proved that there was sufficient proof or evidence to reject the null hypothesis concluding the alternative which stated that the model was significant in predicting mobile phone use levels among undergraduate university students, ($F = 16.093$, $p < 0.001$).

4.13 Moderating Variable

The fourth objective aimed to establish the moderating effect of demographic characteristics on the independent variables of cognition, diversion, and social utility in undergraduate university students' use levels of mobile phones.

A moderator variable is a third variable that affects the strength of the relationship between a dependent and independent variable. Moderation suggests an interaction effect, where upon introduction of a moderating variable leads to changes in the direction of the relationship between the predictor and the response variables.

A moderation effect could lead to one of the following three things:

a. Enhance a relationship. This, means that when a moderator is introduced it leads to an increase in the strength and significance of the predictor variable on the dependent variable.

b. Buffering. This, means that when a moderator is introduced it leads to a decrease in the strength and significance of the predictor variable on the dependent variable.

c. Lastly, antagonistic, where an introduction or an increase in moderation reverses the effect of the independent variable on the response variable.

A hierarchical multiple regression is used to examine the moderation effect while examining the relationship between independent and dependent variable. In simple words, testing moderation means assessing the interaction effect between a predictor and moderating variable and whether or not that effect is significant in predicting the response variable.

This study used the hierarchical multiple linear regression to examine the moderation effect of demographic characteristics on the relationship between independent variables and undergraduate university students' use levels of mobile phones. The demographic characteristics were gender of the respondents, their age, year of study and their area of study. Each has been examined separately.

4.13.1 Moderating Effect of Respondent's Gender on the Relationship between Independent Variables and Undergraduate University Students' Use Levels of Mobile Phones

Correlation analysis of gender and mobile phone technology use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and as the independent variable. The results were presented in Table 4.41.

Table 4.41: Correlation analysis of gender and mobile phone technology use

		Mobile use index	Gender
Mobile use index	Pearson Correlation	1	-.112[*]
	Sig. (2-tailed)		.025
	N	405	400
Gender	Pearson Correlation	-.112[*]	1
	Sig. (2-tailed)	.025	
	N	400	411

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

From the results, it was observed that there was a negative and statistically significant linear relationship between gender and mobile phone technology use levels by public university students, $r = -0.112$, $p = 0.025$. This was indicated by significant probability values found to be less than 0.05 at 95% confidence level. This implied that gender was significantly related to mobile technology use levels by public university students. This agrees with a study titled "Mobile Phone Usage among University Students in Kenya: A Case Study of the University of Nairobi", which found out that gender played an insignificant role in their usage of the device (Ogutu et al., 2016).

4.13.2 Gender Moderated Regression Model

The results from moderated hierarchical regression analyses where gender was introduced as a moderator are displayed in Table 4.42. The results have two models.

Table 4.42: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Gender

Model Variables	Model 1		Model 2	
	$\hat{\beta}$ (SE)	t (p-value)	$\hat{\beta}$ (SE)	t (p-value)
(Constant)	1.359	4.471(<0.001)	1.339	4.395(<0.001)
	(0.304)		(0.305)	
Cognition	-.024	-0.322 (0.748)	0.020	.206 (0.837)
	(0.074)		(0.099)	
Diversion	.427	5.627(<0.001)	.353	3.255 (0.001)
	(0.076)		(0.109)	
Social utility	.098	4.471 (0.132)	.172	1.785 (0.075)
	(0.065)		(0.096)	
Cognition_X_Gender			-.064	-.470 (0.639)
			(0.135)	
Diversion_X_Gender			.113	.848 (0.397)
			(0.133)	
S.Utility_X_Gender			-.114	-.900 (0.369)
			(0.127)	
R^2	0.108		0.121	
F	15.899*	<0.001	8.978*	<0.001
ΔR^2			0.013	0.122

* Significant at 5% level of significant

The results in model 1 showed that there was a statistically significant positive and moderate relationship between mobile phone technology use and diversion ($\hat{\beta}$ = 0.427, t = 5.627, p= <0.001). However, there was no significant relationship with the rest of the independent variables that is cognition and social utility. In model 2, gender is introduced and the model's coefficient of determination (R^2) changes from

0.108 to 0.121 indicating a change of 0.013 (p-value = 0.122). From the results, the change is not significant indicating absence of overall moderation of gender.

From model 2, the results show that gender does not moderate the relationships between mobile phone technology use and cognition ($\hat{\beta}$ = -0.064; p-value = 0.639), mobile phone technology use and diversion ($\hat{\beta}$ = 0.113; p-value = 0.397), mobile phone technology use and social utility ($\hat{\beta}$ = -0.114; p-value = 0.369). Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's gender on the relationship between independent variables and undergraduate university students' use levels of mobile phone technology.

4.13.3 ANOVA for the Gender Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the gender moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phones. The results in Table 4.42 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the gender moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phones, ($F = 8.978$, $p = <0.001$).

4.13.4 Moderating Effect of Respondent's Age on the Relationship between Independent Variables and Undergraduate University Students' Use Levels of Mobile Phones

Correlation analysis of gender and mobile phone technology use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and age as the independent variable. The results were presented in Table 4.43.

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Table 4.43: Correlation analysis of gender and mobile phone technology use

		Mobile use index	Age
Mobile use index	Pearson Correlation	1	-.066
	Sig. (2-tailed)		.198
	N	405	377
Age	Pearson Correlation	-.066	1
	Sig. (2-tailed)	.198	
	N	377	388

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

From the results, it was observed that there was a statistically insignificant linear relationship between age and mobile phone technology use levels by public university students, $r = -0.066$, $p = 0.198$. This was indicated by insignificant probability values found to be greater than 0.05 at 95% confidence level. This implied that age was not significantly related to mobile technology use levels by public university students.

4.13.5 Age Moderated Regression Model

The results from moderated hierarchical regression analyses where age of the students was introduced as a moderator are displayed in Table 4.44. The results have two models**.**

Table 4.44: Hierarchical linear regression analyses results for testing moderation effect of age of the students

Model Variables	Model 1		Model 2	
	$\hat{\beta}$ (SE)	t (p-value)	$\hat{\beta}$ (SE)	t (p-value)
(Constant)	1.334	4.227	1.286	4.075
	(0.316)	(<0.001)	(0.316)	(<0.001)
Cognition	-.034	-.448	-.421	-2.135
	(0.075)	(0.655)	(0.197)	(0.033)
Diversion	.440	5.694	.497	2.577 (0.01)
	(0.077)	(<0.001)	(0.193)	
Social utility	.095	1.407	.549	2.565
	(0.068)	(0.160)	(0.214)	(0.011)
Cognition_X_Age			.153	2.164
			(0.071)	(0.031)
Diversion_X_Age			-.034	-.528
			(0.064)	(0.598)
S.Utility_X_Age			-.158	-2.267
			(0.070)	(0.024)
R^2	0.113		0.139	
F	15.731*	<0.001	9.895*	<0.001
ΔR^2			0.026	0.012

* Significant at 5% level of significant

The results in model 1 showed that there was no statistically significant relationship between mobile phone technology use and the independent variables that is cognition, diversion and social utility. In model 2, age group is introduced and the model's coefficient of determination (R^2) changes from 0.113 to 0.139 indicating a change of 0.026 (p-value = 0.012). From the results, the change is statistically significant indicating an overall moderation of age.

From model 2, the results show that age moderated the relationships between mobile phone technology use and cognition ($\hat{\beta}$ = 0.153; p-value = 0.031), mobile phone technology use and social utility ($\hat{\beta}$ = -0.158; p-value = 0.024). Therefore, the researcher rejected the hypothesis indicating that there was a moderating effect of respondent's age on the relationship between the independent variables and undergraduate university students' use levels of mobile phone technology.

4.13.6 ANOVA for the Age Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the age moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phones. The results in Table 4.44 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the age Moderated Regression model was significant in predicting the undergraduate university students' use levels of mobile phones, (F = 9.895, p = <0.001).

4.13.7 Moderating Effect of Respondent's Year of Study on the Relationship between Independent Variables and Undergraduate University Students' Use Levels of Mobile Phones

The following section looks at the moderating effect of respondents' bio-data on mobile phone technology use.

4.12.7.1 Correlation Analysis of Year of Study and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and year of study as the independent variable. The results were presented in Table 4.45.

Table 4.45: Correlation Analysis of the Year of Study and Mobile Phone Technology Use

		Mobile use index	Year of study
Mobile use index	Pearson Correlation	1	.022
	Sig. (2-tailed)		.710
	N	405	297
Year of study	Pearson Correlation	.022	1
	Sig. (2-tailed)	.710	
	N	297	305

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

From the results, it was observed that there was a statistically insignificant linear relationship between the year of study and mobile phone technology use levels by public university students, $r = 0.022$, $p = 0.710$. This implied that the year of study was insignificantly related to mobile technology use levels by public university students. This implied it agrees with a study done by Yan, Chen and Yu in 2013 which said the strength of the mobile phone device lies in its 4E feature, that is, it is everywhere, every time for everything and everyone. This meant that the year of study could not be an issue as far as the usage of mobile phone is concerned.

4.12.7.2 Age Moderated Regression Model

The results from moderated hierarchical regression analyses where year of study of the respondents was introduced as a moderator are displayed in Table 4.46. The results have two models as shown.

Table 4.46: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Year of Study

Model Variables	Model 1		Model 2	
	$\hat{\beta}$	t (p-value)	$\hat{\beta}$	t (p-value)
(Constant)	.986	2.700 (0.007)	1.000	2.696 (0.007)
Cognition	-.014	-.167 (0.867)	.076	.405 (0.686)
Diversion	.516	5.641(<0.001)	.436	2.209 (0.028)
Social utility	.097	1.180 (0.239)	.082	.427 (0.670)
Cognition_X_ Year of study			-.034	-.549 (0.583)
Diversion_X_ Year of study			.029	.446 (0.656)
S. Utility_X_ Year of study			.005	.074 (0.941)
R^2	0.144		0.145	
F	16.381*	<0.001	8.172*	<0.001
ΔR^2			0.001	0.952

* Significant at 5% level of significant

The results in model 1 showed that there was a statistically significant positive and moderate relationship between mobile phone technology use and diversion ($\hat{\beta}$ = 0.516, t = 5.641, p= <0.001). However, there was no significant relationship with the rest of the independent variables, that is, cognition and social utility.

In model 2, gender is introduced and the model's coefficient of determination (R^2) changes from 0.1445 to 0.145 indicating a change of 0.001 (p-value = 0.952). From the results, the change is not significant indicating absence of overall moderation of the year of study. From model 2, the results show that the year of study does not moderate the relationships between mobile phone technology use and cognition ($\hat{\beta}$ = -0.034; p-value = 0.583), mobile phone technology use and diversion ($\hat{\beta}$ = 0.029; p-value = 0.656), mobile phone technology use and social utility ($\hat{\beta}$ = 0.005; p-value = 0.941). Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's year of study on the relationship between independent variables and undergraduate university students' use levels of mobile phone technology.

4.13.7.3 ANOVA for the Respondent's Year of Study Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the year of study's moderated regression model was significant in predicting the undergraduate university students' use levels of mobile phones. The results in Table 4.46 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the year of Study's Moderated Regression model was significant in predicting the undergraduate university students' use levels of mobile phones, (F = 8.172, p = <0.001).

4.13.8 Moderating Effect of Respondent's Area of Study on the Relationship between Independent Variables and Undergraduate University Students' Use Levels of Mobile Phones

This section looks at the area of study of the respondents on the mobile phone technology use.

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4.13.8.1 Correlation Analysis of Area of Study and Mobile Phone Technology Use

A Pearson's correlation analysis was performed using mobile phone technology use levels by public university students and the area of study as the independent variable. The results were presented in Table 4.47.

Table 4.47: Correlation Analysis of the Area of Study and Mobile Phone Technology Use

		Mobile use index	Area of study
Mobile use index	Pearson Correlation	1	.018
	Sig. (2-tailed)		.771
	N	405	271
Area of study	Pearson Correlation	.018	1
	Sig. (2-tailed)	.771	
	N	271	277

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

From the results, it was observed that there was a statistically insignificant linear relationship between the area of study and mobile phone technology use levels by public university students, $r = 0.018$, $p = 0.771$. This implied that the area of study was insignificantly related to mobile technology use levels by public university students. This agrees with a study by De Gouveia, (2013) which found that the capabilities value of the mobile phone technology was embedded in the fact that it (mobile phone) provides an outlet for self-expression, examination and entertainment such that area of study cannot be a hindrance to the use of mobile phone technology.

4.13.8.2 Area of Study Moderated Regression Model

The results from moderated hierarchical regression analyses where area of study of the respondents was introduced as a moderator are displayed in Table 4.48. The results have two models**.**

Table 4.48: Hierarchical Linear Regression Analyses Results for Testing Moderation Effect of Area of Study

Model Variables	Model 1		Model 2	
	$\hat{\beta}$	t (p-value)	$\hat{\beta}$	t (p-value)
(Constant)	1.115	3.202	1.151	3.298
		(0.001)		(0.001)
Cognition	-.031	-.376 (0.707)	-.255	-1.112
				(0.267)
Diversion	.499	5.892	.644	2.865
		(<0.001)		(0.004)
Social utility	.100	1.296	.244	1.085
		(0.196)		(0.279)
Cognition_X_ Area of study			.168	1.060
				(0.290)
Diversion_X_ Area of study			-.116	-.765
				(0.445)
S.Utility_X_ Area of study			-.108	-.697
				(0.486)
R^2	0.131		0.145	
F	16.421*	<0.001	9.196*	<0.001
ΔR^2			0.015	0.139

* Significant at 5% level of significant

The results in model 1 showed that there was a statistically significant positive and moderate relationship between mobile phone technology use and diversion ($\hat{\beta}$ = 0.499, t = 5.892, p= <0.001). However, there was no significant relationship with the rest of the independent variables that is cognition and social utility. In model 2, area of study is introduced and the model's coefficient of determination (R^2) changes from 0.131 to 0.145 indicating a change of 0.015 (p-value = 0.139). From the results, the change is not significant indicating absence of overall moderation of the area of study.

From model 2, the results show that the area of study does not moderate the relationships between mobile phone technology use and cognition ($\hat{\beta}$ = 0.168; p-value = 0.290), mobile phone technology use and diversion ($\hat{\beta}$ = -0.116; p-value = 0.445), mobile phone technology use and social utility ($\hat{\beta}$ = -0.108; p-value = 0.486). Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's area of study on the relationship between independent variables and undergraduate university students' use levels of mobile phone technology.

4.13.8.3 ANOVA for the Area of Study's Moderated Regression Model

Analysis of variance (ANOVA) was used to test whether the Area of Study's Moderated Regression model was significant in predicting the undergraduate university students' use levels of mobile phones. The results in Table 4.48 proved that there was sufficient proof or evidence to reject the null hypothesis concluding that the Area of Study's Moderated Regression model was significant in predicting the undergraduate university students' use levels of mobile phones, (F = 9.196, p = <0.001). Just like was found in the study by Robyn-Jay Bage (2012) that students use their mobile phones irrespective of their area of study, this study has also found out that area of study does not play a significant role in determining whether to use or not to use mobile phone device by university students.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The purpose of this study was to examine the gratification factors influencing mobile phone technology use levels by public university undergraduate students in Nairobi City County, Kenya. The study was based on the following objectives: (1) investigate the influence of cognition on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya (2) assess the influence of diversion on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya (3) examine the influence of social utility on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya (4) establish the moderating effect of demographic and area of study on mobile phone technology use levels among public university undergraduate students in Nairobi City County, Kenya. The following section presents the summary of the findings.

5.2 Summary of the Findings

This part is divided in segments guided by the objectives of the study to facilitate a closer summary look at the findings.

5.2.1 Demographic Characteristics of Undergraduate University Students

Out of the sampled respondents, slightly more than half were male while the rest were female. This was considered a favorable comparison between the genders. The majority were in the fourth year of study, followed by those in their first year of study, followed by second years, then by third years and finally the least were in their fifth year of study.

In terms of age, majority of the respondents were aged 23-25 years, followed by those who were aged 20-22 years then followed by those who were aged 17-19 years,

while those aged 29 years and above followed and finally, those who were the least were aged 26-28 years.

5.2.2 Influence of Cognition on Undergraduate University Students' Use Levels of Mobile Phone Technology

The first objective of this study was to investigate the influence of cognition on undergraduate university students' use levels of mobile phone technology. The study found out that cognition was seen to have an influence on mobile phone technology use. This implied that the undergraduate students agreed to the statements on cognition in that it influences their mobile phone technology use levels, therefore, the study found that there was a correlation between extent of mobile phone use and cognition activities. When the hypothesis was tested and it was found that there was influence of cognition on undergraduate university students' use levels of mobile phones. The null hypothesis was rejected.

These findings imply that cognition influences mobile phone use among undergraduate university students in Nairobi, Kenya. Mobile phone technology use influences learning activities and therefore mobile phones aid in cognitive endeavors among the students. This is agrees with Katz (2012) who did his study in the US and found that students used sophisticated mobile phones to cheat in examinations. Cheating in examination by candidates is a cognition activity meant to falsify the outcome of an examination. Equally, in the same US, it was found that mobile phone was a potential resource for cheating in examination leading to a policy being sought to ban the usage of mobile phone technology in classrooms and school grounds (Campbell, 2012). It agrees with a research done by Napolitano, (2010) that students use mobile phone technology for cognitive activities.

5.2.3 Influence of Diversion on Undergraduate University Students' Use Levels of Mobile Phone Technology

The second objective of the study was to assess the influence of diversion on undergraduate university students' use levels of mobile phones. The study found out that statements on diversion on the Likert scale were also agreed upon by the

students to have an influence on mobile phone technology use. This was indicated by a high mean value. Equally, the use of mobile phone was found to be highly correlated with diversion activities. This implied that the higher the usage of mobile phone the more likely the user was to be in diversion activities. In essence, this meant that mobile phones have become very essential in the diversion activities among undergraduate university students in Kenya. The hypothesis was tested and the result was that there was no influence of diversion on undergraduate university students' use levels of mobile phones. The null hypothesis was rejected. These results implied that diversion greatly influences mobile phone use among university students in Nairobi, Kenya. This agrees with Dominick (2001), who said that a medium can be used to create diversion. Mobile phone being an interpersonal communication medium can be used for stimulation, relaxation, emotional release or catharsis. A study done by Ugur (2015), found that mobile phone can be used to fight boredom, entertainment and stay connected to the outside world.

5.2.4 Influence of Social Utility on Undergraduate University Students' Use Levels of Mobile Phone Technology

The third objective of the study was to examine the influence of social utility on undergraduate university students' use levels of mobile phones. The study found out that social utility had a high mean. This implied that there was an influence of social utility on mobile phone technology use levels by public university students. Also, it was found that there was a correlation between mobile phone use and social utility activities. The hypothesis was tested and the results were that, there was no influence of social utility on undergraduate university students' use levels of mobile phones. The null hypothesis was rejected. These results indicated that social utility influences mobile phone use among undergraduate university students in Kenya. Tessa (2014) said that people use mobile phone device in public to signal that they have got this shiny object, this status symbol, their iPhone or Android or Blackberry and that they have got important people to talk to or text who may be more important than the people in front of them. On the same, Campbell (2012) said that mobile phone was now a common artifact in different public places where it offers a means of social

connection for the user and unsolicited, chirps and half-conversation for the co-present others.

5.2.5 Moderating Influence of Cognition, Diversion and Social Utility on Mobile Phone Technology Use

The results show that gender does not moderate the relationships between mobile phone technology use and cognition, mobile phone technology use and diversion, mobile phone technology use and social utility. Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's gender on the relationship between independent variables and undergraduate university students' use levels of mobile phones.

However, there was no significant relationship with the rest of the independent variables that is cognition and social utility. Gender was introduced and the model's coefficient of determination changed. The change was not significant indicating absence of overall moderation of gender.

The results showed that gender does not moderate the relationships between mobile phone technology use and cognition, mobile phone technology use and diversion, mobile phone technology use and social utility. Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's gender on the relationship between independent variables and undergraduate university students' use levels of mobile phones.

Age group was introduced and from the results, the change was statistically significant indicating an overall moderation of age. The results showed that age moderated the relationships between mobile phone technology use and cognition, mobile phone technology use and social utility, therefore, the researcher rejected the hypothesis indicating that there was a moderating effect of respondent's age on the relationship between the independent variables and undergraduate university students' use levels of mobile phones.

The results showed that there was a statistically significant positive and moderate relationship between mobile phone technology use and diversion. However, there was no significant relationship with the rest of the independent variables, that is, cognition and social utility. The area of study was introduced and the model's coefficient of determination changed. From the results, the change was not significant indicating absence of overall moderation of the area of study. The results showed that the area of study did not moderate the relationships between mobile phone technology use and cognition, mobile phone technology use and diversion mobile phone technology use and social utility. Therefore, the researcher failed to reject the hypothesis indicating that there was no moderating effect of respondent's area of study on the relationship between independent variables and undergraduate university students' use levels of mobile phone technology. A study done in the Philippines by Alson and Misagal (2016) on smartphones usage among college students found that female students use smartphones on socialization especially on networking sites like Facebook, twitter, and Instagram while male students had the tendency to use smartphones on entertainment especially on listening to music and watching videos. However, in Kenya, Crandall, Otieno, Mutuku, Colaco, Grosskurth and Otieno (2012) found that there was no difference in mobile phone usage which they said was dominated by educated male youth.

5.3 Conclusions

This study examined gratification factors influencing mobile phone technology use among public university undergraduate students and in particular focused on cognition, diversion and social utility factors. Multiple regression model was used to determine the effect of gratification factors influencing mobile phone technology use among public university undergraduate students. The model was found to be significant. The three gratification factors were found to explain variation in mobile phone use. It is worth concluding that gratification factors influence mobile phone technology use levels among university students.

The high percentage of university students using mobile phone technology for cognition shows the significance of mobile phone technology in higher learning

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institution of the education system in Kenya such that the technology cannot just be wished away but adjustments should be made to accommodate the technology as an aid in learning.

The fact that diversion as a gratification factor leads in mobile phone technology use levels is an indication that students who need some way of relaxation after rigorous academic work find that relaxation in mobile phone technology. This goes to underscore the importance of mobile phone technology among university students. At the same time, the need to keep in touch with those significant others within and without the campus is important hence social utility as a gratification factor is placed highly among university students. Mobile phone provides an avenue for students to be in touch with the significant others while in the university.

However, these gratification factors are affected by factors such as age, gender and area of study. Area of study did not seem to affect use levels of mobile phone technology hence it can be concluded that what is important in mobile phone technology use is the fact being a university student irrespective of field of study.

Overall, null hypothesis was rejected leading the researcher to conclude that when other variables were not controlled, cognition factor influences mobile phone technology use. However, when diversion and social utility were not controlled the usage was not influenced significantly.

When all the other effects of the other variables were controlled, only diversion was found to influence mobile phone technology use significantly, in other words, diversion was slightly different because when cognition and social utility were controlled, the variable still influenced mobile phone technology use among public university undergraduate students in Nairobi, Kenya. However, each variable on its own influenced mobile phone technology use. Therefore, from the foregoing it can be concluded that the higher the need for cognition, the higher the need for mobile phone technology use, the higher the need for diversion, the higher the mobile phone technology usage and the higher the need for social utility, the higher the need for mobile phone usage. This could be taken to mean that gratification factors drive the

mobile phone technology use among public university undergraduate students in Nairobi, Kenya.

5.4 Recommendations

The following section gives recommendations to the various players in the new media field of mass communication.

5.4.1 Recommendation for Researchers

This research was done based on a mixed research design. Arising from that, this study would recommend this approach of research especially in the emerging field of new media technologies in mass communication. This design, mixed design, provides the researcher with a rich supply of data that then can be used to draw information to enable a confident and firm foundation on which to base conclusions.

5.4.2 Recommendation for Behavior Change Communicators

This study has established that undergraduate university students in public universities do use mobile phone technology to gratify their need for cognition, diversion and for social utility. Behavior change advocates could latch on to this technology to provide and / or avail platforms and messages directed at university students using this kind of technology. The advocates would be sure that their messages would be well received as their targets are only too eager to use mobile phone technology whether for cognition, diversion or social utility and in the process consume the advocator's message.

5.4.3 Recommendation for Policy Makers

The study dealt with undergraduate university students who were aged between ages 17 and 29 years. The policy makers who target the youth in this age group who are in learning institutions could design policies to regulate mobile phone technology use by the youth in learning institutions. The policy could help in the recognition of mobile phone technology as legitimate learning/teaching aid tool that should be freely used by students in learning institutions.

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5.4.4 Recommendation for Software Developers

This study found that university students use mobile phone technology for cognition, diversion and social utility. Following this understanding, software developers could develop some software that is targeted at university students for their use for cognition, diversion and social utility.

5.5 Suggestions for Further Research

This researcher's work targeted undergraduate university students in public universities in Nairobi, Kenya. Further research could be done among undergraduate university students in private universities in the same locality to see if there is any difference. Equally, another research could be done among post-graduate university students to see if the gratification factors influence their use of mobile phone technology differently.

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Appendix I: Introduction Letter

Department of Media Technology and Applied Communication, School for Communication and Development Studies, Jomo Kenyatta University of Agriculture and Technology,

P.O. BOX 62000-00200,

Nairobi,

Dear Sir/Madam,

I am a Ph.D. candidate in Mass Communication at the Department of Media Technology and Applied Communication in the School for Communication and Development Studies, Jomo Kenyatta University of Agriculture and Technology, conducting a research on the Gratification Factors Influencing Mobile Phone Technology Use Levels by Public University Undergraduate Students in Nairobi County, Kenya.

Kindly assist me by completing this questionnaire. Any information provided will be used purely for academic purpose and will be treated with utmost confidentiality.

Thank you.

Yours faithfully,

Christopher Wasiaya

Tel.: 0725-280-749

E-mail: cwasiaya@yahoo.com

Appendix II: Student's Questionnaire

University………………………………………………………………………..

Please tick [√] in the boxes provided besides your chosen answer

1. **SECTION A: BIODATA**

    1. Gender: [   ] Male   [   ] Female
    2. Year of study: …………………..
    3. Age: [   ]17-19   [   ] 20-22   [   ] 23-25 [   ] 26-28   [   ] 29 and above
    4. State area of study:

       …………………………………………………………………..
       School/Faculty……………………Department………………………
       ………Others (state)……………………...

    5. Do you have access to a smart phone? [   ]Yes   [   ]No
    6. How frequently do you use a smart phone? [   ] Daily   [   ]Thrice a week
       [   ] Twice a week   [   ] Once a week   [   ] Rarely

2. **SECTION B: COGNITION AND MOBILE PHONE TECHNOLOGY**

Please tick [√] the response that most closely reflects the level to which you agree with each statement on mobile phone technology use. *[Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)]*

Using my phone:	SA	A	N	D	SD
(a) I coordinate class meetings/activities					
(b) I sometimes refer/check hard concepts when not prepared for examinations					
(c) I regularly search for educational information on the web					
(d) I frequently share in-class media					

(e) I sometimes get distracted in class					
(f) I frequently get distant privileges of libraries					
(g) I frequently carry out in-class surveys					
(h) I frequently transfer files/photos/other data					

In a scale of 1-5 rate extent of your cognition needs 1 (Very low) [ ] 2 (Low) [ ] 3 (neutral) [ ] 4 (high) [ ] 5 (very high)

Suggest others

…………………………………………………………………………………………

3. SECTION C: DIVERSION AND MOBILE PHONE TECHNOLOGY

Please tick [√] the response that most closely reflects the level to which you agree with each statement on mobile phone technology use *[Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)]*

With my phone:	SA	A	N	D	SD
(a) I often want to know what others are doing					
(b) I frequently communicate with family/friends					
(c) Most of the time relaxation motivates me to use devices					
(d) I frequently contact friends who are far off					
(e) I usually share feelings					
(f) I regularly consult about difficulties or problems					
(g) I frequently distract my mind from loneliness					
(h) I usually find solace in playing games					

	SA	A	N	D	SD
(i) Most often, I keep my hands and mind busy					

Suggest others

…………………………………………………………………………………

4. SECTION D: SOCIAL UTILITY AND MOBILE PHONE TECHNOLOGY

Please tick [√] the response that most closely reflects the level to which you agree with each statement on mobile phone technology use *[Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)]*

	SA	A	N	D	SD
(a) I usually depend on my medium for my communication needs					
(b) I regularly send and receive e-mails/SMS					
(c) I frequently use my medium to harass others					
(d) My privacy is frequently exposed					
(e) Frequently notifies me of security issues					

Suggest other social utility needs in your life.

(a)…………………………………………………………………………………

(b)…………………………………………………………………………………

5. SECTION E: FREQUENCY OF MOBILE PHONE TECHNOLOGY USE

Based on time, indicate the percentage occupied by mobile phone technology use

How often do you use your mobile phone:	0-20%	20-40%	40 - 60%	60 - 80%	80-100%
(a) To convey an urgent message to classmates?					
(b) To search for academic information?					
(c) To inform others about a class assignment?					
(d) For receiving/sending money?					
(e) As a personal organizer?					
(f) As a peer locator?					
(g) To play games?					
(h) To watch movies					

For what reasons do you use mobile phone for academic work?

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

………………………

What three issues mainly pulls you to spend time online on your mobile phone?

(a)…………………………………………………………………………………

(b)…………………………………………………………………………………

(c)…………………………………………………………………………………

How many hours on average in a 24-hours-day do you spend online using your phone?

[ ] 11+ hours   [ ] 5-10 hours   [ ] 2-4 hours   [ ] 1-less than an hour

Based on a day of 10 hours, from 8am to 6pm, indicate the number of hours you spent on the mobile phone technology carrying out the following activities per week.

Activity	No of hours
(a) Convey urgent message to classmates	
(b) Search for academic information	
(c) Inform others about a class assignment	
(d) Receiving/sending money	
(e) A personal organizer	
(f) A peer locator	
(g) To play games	
(h) To watch movies	

		SA	A	N	D	SD
(i)	To gossip					
(j)	To keep in relationships					

On a scale of 5-1 indicate by a tick (√) what most closely approximates your feelings on mobile phone technology use online *[Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)]*

	SA	A	N	D	SD
(a) My desire to maintain my relationship greatly influences my use of mobile phone online					
(b) My desire to learn greatly influences my use of mobile phone online					
(c) My desire to socialize greatly influences my use of mobile phone online					
(d) My desire to search for information greatly influences my use of mobile phone online					
(e) My desire to share feelings greatly influences my use of mobile phone online					
(f) My desire to distract my mind from loneliness greatly influences my use of mobile phone online					
(g) My desire to escape from unwanted others greatly influences my use of mobile phone online					
(h) My desire to harass others greatly influences my use of mobile phone online					
(k) My desire to communicate greatly influences use of my mobile phone online					

Thank you for participating!

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Appendix III: In-Depth Interview Guide

The purpose of this research is to investigate the gratification factors influencing mobile phone technology use by public university students in Nairobi County, Kenya. Please feel free to express yourself fully as this information is for research purposes only and will be treated with utmost confidentiality.

Date…………………………………

Place……………………………….

Interviewer…………………............

Interviewee…………………………………………………

Instructions- Please ensure the interviewee answers the questions exhaustively and the answers recorded.

1. In your opinion what do university students use mobile phones for?
2. In you view, what use is a mobile phone to academic work?
3. What is the frequency of using the mobile phone for learning activities?
4. How does it feel as a student to concentrate on the mobile phone instead of the lecture/lesson in your class? Why?
5. Have you ever, as a student, observed fellow students hiding behind a mobile phone screen to avoid an unwanted situation? Why?
6. Please explain how you use your mobile phone in the university in a day of 10 hours.
7. What do you as a student use mobile phone socially for? Why?

THANK YOU

Appendix IV: Research Permit

NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref.No. **NACOSTI/P/18/35069/21986**

Date: **7th June, 2018**
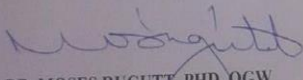
Christopher Wasiaya Onyango
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Gratification factors influencing mobile phone technology use levels by public university students in Nairobi, Kenya,"* I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **7th June, 2019.**

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

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

DR. MOSES RUGUTT, PHD, OGW
DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

National Commission for Science, Technology and Innovation is ISO9001: 2008 Certified

Appendix V: Respondent's Gender

	Frequency	Percent	Cumulative Percent
Female	182	44.3	44.3
Male	229	55.7	100.0
Total	411	100.0	

Appendix VI: Respondents by Year of Study

Year of Study	Frequency	Percent	Cumulative Percent
1st year	73	23.9	23.
2nd year	55	18.0	42.
3rd year	81	26.6	68.
4th year	92	30.2	98.
5th year	4	1.3	100.
Total	305	100.0	

Appendix VII: Respondents by Age

Years (Age)	Frequency	Percent	Cumulative Percent
17-19	38	9.8	9.8
20-22	135	34.8	44.6

Appendix VIII: Respondents by Area of Study

Area of Study	Frequency	Percent	Cumulative Percent
Accounting	20	7.2	7.2
Business Management	84	30.3	37.5
Information science	10	3.6	41.2
Civil Engineering	5	1.8	43.0
Communication	3	1.1	44.0
Human resource Management	2	0.7	44.8
Procurement	3	1.1	45.8
Microbiology and Biotech	3	1.1	46.9
Actuarial Science	3	1.1	47.7
International studies	1	0.4	48.0
Geospatial Engineering	4	1.4	49.5
Monitoring and Evaluation	2	0.7	50.2
Quantity survey	1	0.4	50.5
Medicine and Surgery	3	1.1	51.6
Microprocessor Technology and information	1	0.4	52.0
Electrical Engineering	4	1.4	53.4
DLIS	2	0.7	54.5
Mechanical Engineering	4	1.4	56.0
Political Science and Public Administration	2	0.7	56.7
Creative Arts	82	29.6	86.3
Environmental Science	4	1.4	87.7
Literature	2	0.7	88.4
Dry land Agriculture	4	1.4	89.9
Biochemistry	1	0.4	90.3
Community health management	1	0.4	90.6
Bachelor of Education	18	6.5	97.1
Security	8	2.9	100.0
Total	277	100.0	

Appendix IX: Respondents by School/Faculty

School/Faculty			Cumulative
Arts	99	28.8	28.8
Business Information &	4	1.2	29.9
Information Science	6	1.7	31.7
Arts and Humanities	1	.3	32.0
Tourism	3	.9	32.8
Business and economics	54	15.7	48.5
BBM	8	2.3	50.9
Food and beverage	1	.3	51.2
SBE	1	.3	51.5
Education	19	5.5	57.0
Human resource	6	1.7	58.7
Hospitality	4	1.2	59.9
Physical science	6	1.7	61.6
Engineering	16	4.7	66.3
Mathematics	8	2.3	68.6
Biological sciences	6	1.7	70.3
Nursing	4	1.2	71.5
Humanities and Social	4	1.2	72.7
CBPS	2	.6	73.3
Health sciences	10	2.9	76.2
CHSS	2	.6	76.7
Built environment	1	.3	77.0
Medicine	1	.3	77.3
Environment	4	1.2	78.5
Agriculture	12	3.5	82.0
SPAS	4	1.2	83.1
SATD	1	.3	83.4
Public health	1	.3	83.7
COHRED	27	7.8	91.6
FEDCOS	20	5.8	97.4
FASS	9	2.6	100.0
Total	344	100.0	

Appendix X: Respondents by Department

Department	Frequency	Percent	Cumulative Percent
Tourism	4	1.2	1.2
Arts & Humanities	4	1.2	2.5
Applied science	3	.9	3.4
Economics and Statistics	4	1.2	4.6
Communication studies	7	2.2	6.8
Accounting and Finance	24	7.4	14.2
Business and Economics	18	5.6	19.8
Hospitality	5	1.5	21.4
Library science	11	3.4	24.8
Developmental Studies	2	.6	25.4
Information science	3	.9	26.3
Management science	13	4.0	30.3
Food and nutrition	2	.6	31.0
Education	3	.9	31.9
Human resource	5	1.5	33.4
Meteorology	1	.3	33.7
Geology	2	.6	34.4
Civil & Construction	1	.3	34.7
Geography	3	.9	35.6
Electrical engineering	6	1.9	37.5
Sociology	2	.6	38.1
Actuarial science	4	1.2	39.3
Biology	3	.9	40.2
Geospatial and space Technology	3	.9	41.2
Physics	5	1.5	42.7
Chemistry	5	1.5	44.3
PSRI	2	.6	44.9
Real Estate and Construction	1	.3	45.2
Medicine	4	1.2	46.4
History	3	.9	47.4
Mechanical	4	1.2	48.6
Anthropology	1	.3	48.9
Film and Theatre Arts	79	24.5	73.4
Environmental science	5	1.5	74.9
Linguistics	1	.3	75.2
Education psychology	1	.3	75.5
A.S.T	2	.6	76.2
Special needs	2	.6	76.8
Zoology	1	.3	77.1
A.R.M	7	2.2	79.3
Biochemistry and Biotech	1	.3	79.6
Animal science	3	.9	80.5
Kiswahili	1	.3	80.8
Community health	1	.3	81.1
English	1	.3	81.4
Public policy & administration	1	.3	81.7
Purchase and supply chain	1	.3	82.0
CIEM	18	5.6	96.6
AFMS	4	1.2	97.8
PSS	7	2.2	100.0
Total	**323**	**100.0**	

Appendix XI: Respondents by Other Areas

Other Areas	Frequency	Percent	Cumulative Percent
Institute of Diplomacy and International Studies	2	25.0	25.0
Physical Sciences	1	12.5	37.5
Physics	1	12.5	50.0
History	2	25.0	75.0
Philosophy and Religious Studies	1	12.5	87.5
Statistics and Actuarial Science	1	12.5	100.0
Total	8	100.0	

Appendix XII: Introductory Letter

KENYATTA UNIVERSITY

OFFICE OF DEPUTY VICE-CHANCELLOR, RESEARCH, INNOVATION AND OUTREACH

Ref: KU/DVCR/RCR/VOL.3/251

Christopher Onyango,
JKUAT
P. O. Box 62000 - 00200
NAIROBI

P. O. Box 43844 - 00100
Nairobi. Kenya
Tel. 254-20-810901 Ext. 026
E-mail: dvc-rio@ku.ac.ke

17th September, 2018

Dear Mr. Onyango,

RE: REQUEST TO COLLECT RESEARCH DATA AT KENYATTA UNIVERSITY

This is in reference to your letter dated 5th September, 2018 requesting for authorization to collect research data at Kenyatta University on the topic *"Gratificaton Factors Influencing Mobile Phone Technology Use by Public University Students in Nairobi, Kenya"* towards a PhD degree of Jomo Kenyatta University of Agriculture and Technology.

I am happy to inform you that the Vice-Chancellor has approved your request to collect data. It has been noted that your data will be collected mainly from among third year students in the University. You are advised to report to the office of the Director, Students' Affairs to obtain direction on how to proceed before you commence your data collection.

The University requires that, upon completion of your research, you submit a hard copy of your project report to the Deputy Vice-Chancellor, Research who shall forward it to the University Library. Kindly therefore complete Form RIO3 and return it to my office prior to the commencement of collection of data.

Yours Sincerely,

Prof. F. Q. Gravenir
Deputy Vice-Chancellor
Research, Innovation & Outreach