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THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN DISTANCE EDUCATION: A COMPARATIVE STUDY OF KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY AND UNIVERSITY OF EDUCATION, WINNEBA-KUMASI.

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DECLARATION

I hereby declare that this submission is my own work toward the award of MASTER OF PHILOSOPHY DEGREE IN INFORMATION STUDIES. References to other people's work have been duly acknowledged.

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DATE	**DATE**

DEDICATION

This project is dedicated to God, my beloved Family and Mr. Osei Antwi who have always been my greatest inspiration.

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LIST OF ABBREVIATIONS

B.Ed – Bachelor of Education

CDE – Centre for Distance Education

DBE – Diploma programme in Basic Education

DE – Distance Education

DFID – Department for International Development

ICT – Information and Communication Technology

IDeL – Institute for Distance and e-Learning

IEDE – Institute for Educational Development and Extension

IRI – Interactive Radio Instruction

KNUST – Kwame Nkrumah University of Science and Technology

MoE – Ministry of Education

MTTP – Modular Teacher Training Programme

MUD – Multi User Dimension

ODA – Overseas Development Administration

SPSS – Statistical Package for Social Scientist

TAM – Technology Acceptance Model

UEW-K – University of Education, Winneba-Kumasi

UG – University of Ghana

UNESCO – United Nations Educational, Scientific and Cultural Organization

ABSTRACT

Information and Communication Technologies (ICTs) have become a central pillar for the world, as the world is now tagged as 'digital' and 'global village'. The usefulness of ICTs transcends to all sectors including education. Distance education per se, rests heavily on ICTs. ICTs have the potential to foster interaction and communication between instructors and students as well as the outside world. The main objectives of the study are: To ascertain ICTs usage among distance learners at KNUST and UEW-K; and to investigate the factors influencing the use of ICTs in distance education at KNUST and UEW-K.

The study adopted the survey research methodology with a sample size of 210. This was done using a census approach, which ensures that all members were enrolled. The students were selected from Business Administration programme, specifically, Accounting and Human Resources Management from both KNUST and UEW-K. Data collection was done using questionnaires which were administered to the students. The responses were analyzed and results were presented in the form of graphs and tables. It was based on these data collected that valid conclusions and recommendations were drawn.

The key findings of the study in relation to the usage of ICT facilities and services. The study identified that the number of times of ICT usage varied among students from the two universities. Students in KNUST used ICT more frequently than students in UEW-K. Again, in KNUST, ICT usage was tilted more to learning in courses, whilst in UEW-K, students used ICT mainly for their research. The study also unraveled specific factors that were socio-cultural, technological, political

and economic in nature to have influential role on the use of ICTs. These factors include cultural influence in the use of ICT, the quality of facilities and services, political ideology on ICT, high cost of ICT facilities and services.

It is recommended that, there should be planning and tracking of ICT facilities and services in order to serve as the basis for upgrading the available ICT infrastructures and facilities. This should be coupled with periodic needs assessment as well as training for students in to cope with technological transformation. For further research, work on a comparative study of public and private universities which will provide findings for policy options should be considered.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Educational digitization through technological advancement has long been predicted, on the premise of emergence globalization which has affected the educational sector (Joint, 2008). New approaches and concepts for learning have risen through digital technology, making the use of Information and Communication Technologies (ICTs) fundamental in contemporary education (Dhanarajan and Abeywardena, 2013). The undeniable advancements in technology in the world have led to multiple convergences of content, computing, telecommunication and broadcasting. Mswanyama (2004) mentions that these advancements have led to information Communication Technologies. Kagugu (2011) posits that the role of Information Communication Technologies (ICTs) is enormous. These roles cut across social, political, economic, developmental, educational and environmental sectors. Manjulika et al., (2010) put across that, ICTs have the potential in fostering the interaction and communication between learners and tutors and also among learners themselves. It is argued by Trucano (2005) that information communication technologies in its diverse practices and types have to a great deal facilitated the acquisition of literacy skills.

Over the years, the rise in the pace of technology in this modern era has attracted the attention of educational researchers especially concerning the impacts Information and Communication Technology have on distance education delivery and knowledge acquisition. Education all over the world undoubtedly, has been identified as an important means for promoting economic and social development from the individual, institutional and the national levels. The growth of the global

economy and the information-based society has pressurized education systems around the world to use technology to teach students the knowledge and skills they need (UNESCO, 2002).

Higgins et al., (2012) have attested to the significant role Information and Communication Technology can play in education, notably, distance education. Technology is a powerful contributor to learning if it is used to deepen students' engagement in meaningful and intellectually authentic curriculum. Technology is a tool. It should be selected as best option when it is weighed as best tool for students to learn (Costley, 2014). Studies conducted by Kirschner and Karpinski (2010) and Junco and Cotton (2012) have unravelled significant positive relationship between ICT and students' academic performance and achievements.

Amidst the diverse roles of ICT on education and its performance, it is of no doubt that digital technology has affected distance education massively. According to the California Distance Learning Project (2004), distance education entails a delivery system which connects learners with educational resources and provides educational access to learners not enrolled in educational institutions and can augment the learning opportunities of current students. Thus, in distance education, there is separation of instructor and learning in most of the instructional processes and involves the use of educational media such as digital tools like computer and internet resources to carry out course content. As emphasized in the Californian Distance Learning Project (2004), distance education is dependent on digital instruments and processes such as interactive tele-courses, teleconferencing, web conferencing, internet chats, emailing, lit serves, audiocassette courses, videotaped courses, correspondence courses and online courses.

ICT in distance education can be used for preparing and presenting lectures and again a witness to the fact that Ghana as a developing country recognizes the importance of ICT in development (Ooskerlaken, 2009). However, Morris et al., (2005) consider that online distance learning is all about self- discipline and self-direction, as students have to do much on their own by working out to complete their assignments. Gupta (2017) revealed that, the existence of distance education has not only decreased the early fear of students but has rather given way for various dimensions in education. He also attested to the fact that the use of ICT tools has various roles performed at higher educational levels. According to Manjulika et al (2010), Information and Communication Technology has the potential to enhance and facilitate the communication and interactions between instructors and learners as well as among the learners themselves within the distance education setting. ICT's have been explained to be assists in the provision of literacy skills. Trucano (2005) posits that, information and communication technologies in different types have been used and have proven to be of a major contributor to the acquisition of literacy skills.

In this study, the researcher emphasized on Information and Communication Technologies and their use in distance education. Inputs from distance education students, and experts in digital technology and educationalists in the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and University of Education, Kumasi campus were solicited to inform the outcomes of the use of ICT on contemporary distance education.

1.1.1 Distance Education in Ghana

Awidi (2013) puts forward that, distance education has been in existence from the nineteenth century. The entire concept of distance teaching and learning is based on the opposite course of the status-quo in the campus-based university. Mensah and Owusu-Mensah (2012), emphasize that distance education is not new in the Ghanaian educational system. Distance education rather took a down turn during the period of the 2000's after it was very vibrant three decades before. It was previously referred to as correspondence education which provided the opportunity for a lot of workers and other professionals to upgrade themselves. The economic condition after independence was quite difficult and this cut off some workers from upgrading themselves.

Mensah and Owusu-Mensah (2012), further attested that the educational authorities in the country upon the earlier challenges faced in the Modular Teacher Training Programme (MTTP), still felt the need to re-establish distance education especially at the tertiary level. Another need that necessitated the reestablishment of distance education was the fact that the universities were not able to enroll even half of the qualified applicants. Efforts that were made by the Ministry of Education to get distance education vibrant were through conducting a survey and as a recommendation, the universities agreed to start the distance programmes. The universities that agreed included the University of Ghana, University of Cape Coast, Kwame Nkrumah University of Science and Technology and the University College of Education of Winneba.

1.1.2 Distance Education at Kwame Nkrumah University of Science and Technology (KNUST)

The Kwame Nkrumah University of Science and Technology has since 2005 offered Distance Learning programmes and was established as the Faculty of Distance Learning under the then Faculty of Science. This was to help build both on-going and new programmes of study from all faculties of the University in the distance learning mode. The Faculty of Distance Learning was separated from the College of Science in 2007 and is now an independent or autonomous institute called the Institute of Distance Learning. The Institute of Distance Learning came into being to support the University's Strategic Plan thus PLAN 2K14 which aimed at enrolling fifty thousand (50, 000) students by the year 2015. The institute was estimated to cater for about 40-50% of the total populace of the projected 50, 000 students. One of the numerous aims of the Institute is to provide greater access to different categories of people who desire to have university education but are unable to gain access through the regular mode. The Institute provides face-to-face sessions at thirteen (13) learning centres.

In addition, the Institute presently runs a total of seventeen (17) undergraduate and twenty (20) postgraduate programmes to which seven (7) new programmes have been added. The vision of the Institute of Distance Learning, KNUST is "*increasing access to relevant and flexible tertiary and continuing education and training anytime, anywhere through the Distance Learning Mode using multimedia*" (KNUST, 2017).

1.1.3 Distance Education at University of Education, Winneba (UEW)

In the year 2002, after the then University College of Education, Winneba had become a full- fledged university thus University of Education, Winneba, the institution introduced a three year-diploma programme in Basic Education (DBE) by distance. It is the sole mandate of the Centre for Distance

Education's (CDE) under the Institute for Distance and e-learning (IDel) of the University of Education, Winneba, in producing highly qualified teachers for pre-tertiary institutions in Ghana through the Distance Learning delivery system. The centre serves professional and non-professional teachers by providing distance education programmes at the Diploma, Post Diploma degree, Postgraduate Diploma and Masters' degree levels. The centre has currently thirty-seven (37) learning centres across the country. Students get to meet colleagues and also make use of the reference facilities as they attend tutorials at the learning centres during weekends. As distance students there is the availability of the Moodle Learning Management System to enable interactive teaching and learning (IEDE, 2017).

1.2 Statement of Problem

The rising spate of the utilization of ICT in this contemporary world underscores the relevance of ICT, particularly in relation to tertiary education (Unwin, 2005; Robinson, 2008). ICT has thus, become a '*sine qua non'* in modern day education and development efforts in general (Leach et al., 2006). Despite the enormous contributions of ICT in the transformation of higher education in the global south to meet the manpower needs of such countries, their counterparts in the global north, especially in Africa have only made a '*snail*' progress in concretizing ICT and distance education. With critical emphasis on Ghana, Dzisah (2006) identified that ICT is not extensively used principally in relation to distance education, and as such studies on ICT and distance education have been disjointed. For instance, a study conducted by Stuart (2003), focused on only distance education courses whilst that of Rajesh (2003) paid attention to only ICT and its potentials in advancing technological education in developing countries including Ghana. The findings of Rajesh's study revealed that countries, including Ghana, have paid minimal attention to ICT, thus education has

lagged behind in terms of technology. Ghana has become an information-poor country, making the impact of ICT on distance education adequately sparse (Ankrah, 2014). In order to inform policy options and actions, sound empirical and scientific studies are needed to fill the existing gap which aligns with the connection between ICT and distance education in Ghana (Kagugu, 2011; Beebe, 2004). This underscores the need to advance scientific and though-provoking research efforts to fill the current information gap by looking at the use of ICT within the context of distance education at higher learning institutions in Ghana through comparative lens.

1.3 Purpose of the Study

The purpose of the study was to examine the use of ICT in distance education in Ghana and also identify the challenges hindering the use of the technology as well as making recommendations on improving its application in the field of distance education.

1.4 Objectives

The objectives of the study were as follows:

1. To determine ICT facilities and services available for distance education at the KNUST and UEW-K;
2. To ascertain ICTs usage among distance learners at KNUST and UEW-K;
3. To find out the usefulness of ICTs for distance learners at KNUST and UEW-K;
4. To investigate the factors influencing the use of ICTs in distance education at KNUST and UEW-K;

5. To determine the challenges faced in the accessibility and utilization of ICTs for distance education and;
6. To propose measures based on the findings of the study to improve the effective application of ICTs on distance education.

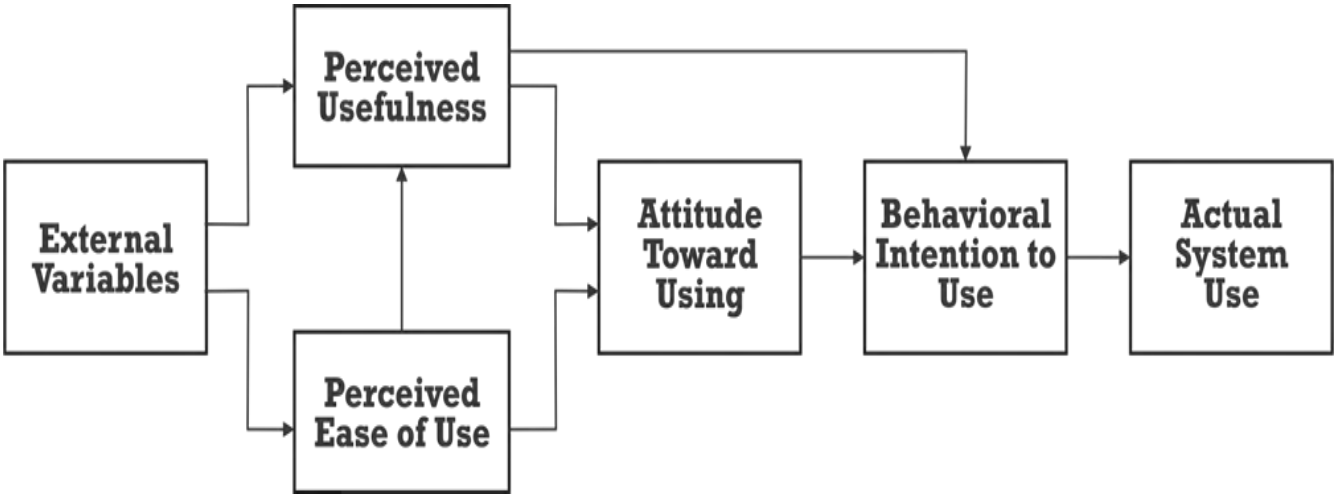
1.5 Scope of the Study

The study was limited to two public universities located in the Kumasi Metropolis in the Ashanti Region of Ghana. They are the Kwame Nkrumah University of Science and Technology (KNUST) and the University of Education (Kumasi). The study focused on level 300 students of both institutions. The two universities were selected on the basis that, both are representative part of the group of the public universities which offer distance education programmes in Ghana, and have similar characteristics of all other universities in Ghana.

1.6 Theoretical Framework

The study adopted the Technology Acceptance Model (TAM).

Figure 1.1: Technology Acceptance Model



Source: Adopted from Park, (2009)

A trend observed in the educational sector is the setting up of Electronic Learning systems to provide students with online access and educational content (Park, 2009). According to Legris, Ingham, and Collerette (2003), the model that has been able to aid the explanation and prediction of user behaviour of information technology is the Technology Acceptance Model and as such the theory that underpins this research. The Technology Acceptance Model (TAM) was originally proposed by Davis in 1986 (Park, 2009). This theory has been the main theory in explaining how well technology is accepted by a group of people. The theory hinges on four main concepts which are the "perceived ease of use", the "perceived usefulness", "behavioural intentions" and "attitude toward using" (Chuttur, 2009; Park, 2009).

According to Park, (2009), in the Technology Acceptance Model, the perceived usefulness and perceived ease of use was defined respectively as:

"The degree to which an individual believes that using a particular system would enhance his or her job performance, and, *the degree to which an individual believes that using a system would be free of physical and mental effort."*

Using this model, the perceived usefulness would connote the degree to which an individual believes that using the e-learning opportunities would enhance his or her studies. Moreover, the perceived ease of use would signify the degree to which an individual believes that using the e-learning opportunities would be free of physical and mental effort. This model feeds into the attribute of "Acceptance".

1.6.1 Strength of the Model

The Technology Acceptance Model covers all aspects that deal with technological appreciation on the path of the user. It also appeals to the perceived attitude and behaviour of the user of the technology.

The theoretical framework highlights the perceived usefulness of ICT facilities and technology, their perceived ease of use and the attitude toward using these facilities. The framework also considers the behavioural intension to use and actual use of ICT facilities. As highlighted in the framework, the behavioural intention of use is determined by the attitude toward using and the perceived usefulness of technology in general. Both perceived usefulness and ease of use of ICT technology are affected by external variables. The perceived usefulness is also determined by the ease of use of the ICT technology. The perceived attitude serves as another attribute of ICT usage.

Selim (2003) concludes based on the above information that, the Technology Acceptance Model (TAM) is an important model that helps determine the acceptance and use of effective and efficient learning technology. It therefore stands to reason that the TAM fits a research study that examines or investigates the usage of ICT within the Ghanaian tertiary educational setting.

1.6.2 Relationship between Theoretical Framework and Study Objectives

The objectives of the study are summarized as: the Information and Communication Technologies (ICTs) facilities and services available for distance education (Objective 1), how students use ICTs in distance education (Objective 2), the usefulness of ICTs to distance students (objective 3), the factors influencing the use of ICTs (objective 4), the challenges faced in utilizing and accessing ICTs for distance education (Objective 5) and the measures to improve effective application of ICTs on distance education (Objective 6).

There is a direct relationship between the theoretical framework of the study and the objectives. The theoretical framework talks about perceived usefulness of ICT, and this dimension has a direct link with the objective which seeks to assess the usefulness of ICT facilities and services for distance education. The usefulness of ICT facilities makes it legitimate and laudable for the study to investigate whether the selected universities have adequate ICT facilities available for delivery of distance education for effective outcome. The theoretical framework (i.e. TAM) emphasizes on ease of use of available ICT facilities. This component directly aligns with the study's objective two which seek to find out ICTs usage among distance learners in the selected universities. Attitude toward the use of ICT facilities and technology which is a critical component of TAM is influenced by the usefulness of ICTs to distance students (Objective 3). Once students accept that ICT is very useful to

their studies, they are likely to show positive attitude toward its use and vice versa. The perceived ease of use is also an important component of TAM and serves as a factor that may influence the use of ICTs by students (Objective 4), thus, the objective 4 assesses the perceived ease of use, attitude to, and behavioural intention to use or continue to use ICT by students. Distance students are more likely to use ICTs in distance studies if they have ease of use of ICT facilities and services. Both the ease of use of ICTs and attitude towards the use of ICTs have direct linkage to the behavioural intension to use and actual use of ICT facilities (components of TAM). The challenges faced in the utilization and accessibility of ICTs for distance education refers to all blockages in the linkages in the theoretical framework. The challenges faced in the use of ICTs (Objective 5) can be ascertained through the actual system (ICTs) use which is a component of TAM. Once students start with the usage of ICT facilities, challenges could be identified and measures can subsequently be proposed to improve the effective application of ICTs in distance education (Objective 6).

1.7 Significance of the Study

The research is significant as it would expand the frontier of knowledge on the outcomes of use of ICT in distance education. The study will also provide information for further studies which might be conducted on this critical issue in the educational sector. The findings of this study could be used by students and other educational actors as future reference material. More importantly, this study could also be considered for planning and policy making for distance education in Ghana and across the world. The recommendations that would be proposed in this study could provide inputs to inform effective and efficient use of ICT in distance education.

1.8 Organization of Study

The report of the study has been organized into six (6) main chapters.

Chapter One presents a background to the study, statement of the problem that necessitated the study, purpose of the study, objectives, scope and limitations, theoretical framework, significance of the study and organization of the study.

Chapter two of the report is basically about literature review. Literature was reviewed in the following areas thus, Definition of key terms, ICT facilities and Services for Distance Education and Usage, the Usefulness of ICT for Distance Education, Factors influencing the use of ICTs for Distance Education and Challenges faced in the utilization and accessibility of ICT for Distance Education.

Chapter Three of the report discussed the Research Methodology. The chapter discussed the research approach, sampling procedure and techniques as well as data collection.

The fourth chapter of the study dealt with the presentation of the study results and findings.

Chapter five of this research work consist of the discussion of major findings.

Chapter six presents a summary of key findings, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Over the years, distance education has become a *'sine qua non'* in promoting quality education for a large range of people at the tertiary levels across the globe. In fact, governments around the world are increasingly embracing distance education as a tactical approach in enhancing local economic development as well as holistic development of their respective countries for the betterment of their human resource base (Ololube, 2011; Feeney, 2010). Studies conducted by Waycott et al. (2010) tend to indicate that distance education programmes are becoming relevant in this contemporary time as the '*hub*' for the development of knowledge in the world. Efforts seem to be strengthened in many countries, especially the developed ones vis-à-vis in embracing a coherent approach to echo strategically distance education for the large number of people who have difficulties to attend conventional institutions at the tertiary level (Olulabe et al., 2012).

The United Nations Educational, Scientific and Cultural Organization (UNESCO), which is an agency of the United Nations, has revealed its acceptance of and support for distance education by member countries. According to UNESCO (2018), the world's educational delivery at the higher level should adopt diversification of contents and methods, innovation, infusion of information and communication technologies, flexibility as well as incorporation of best practices and policy dialogues which allow all and sundry to pursue their education without difficulties. Hence, the use of distance education which ensures full incorporation of information and communication technologies and methods is a pre-requisite, and this aligns with UNESCO's approach to quality education at the higher levels.

In Africa, the current development agenda is centered on 'people' as the focal potentials for Africa's development. This aligns with the strategic long term initiative of the Africa Union (2015) entitled "*Agenda 2063: The Africa we want*". In relation to Africa's current commitment to enhancing the skills, abilities and knowledge of its human resource in order to tap into it to create desirable change by 2063, concerns for quality distance educational programmes have received enormous attention. In Ghana for instance, universities are encouraged to open their doors wider to embrace more distance education students in order to improve their capacity to contribute to national growth and development, and to support the over-arching aim of the Africa Union (Africa Union, 2015).

In this chapter of the research, the author takes a look at various facets of distance education as an attempt to comprehensively understand the effects of information and communication technologies on distance education from empirical viewpoints. Key issues considered in this chapter include: the definitions of key terms such as Information and Communication Technologies (ICTs) and Distance Education (DE); Brief history of distance education, ICT facilities for distance education and their uses, the usefulness of ICT for distance education, the factors spearheading the use of ICT for distance education as well as the challenges in the utilization and accessibility of ICT for distance education.

2.2 Definition of Key Terms

In order to enhance effective understanding of the study, key terms have been explained. These terms are Information and Communication Technologies (ICTs) and Distance Education which serve as the bedrock of the research.

2.2.1 Information and Communication Technologies (ICTs)

ICTs has increasingly become a vital aspect of human existence and its relevance transcends across varying sectors including education. Distance education is premised fundamentally on ICTs. *But what at all are ICTs or what is the meaning of ICTs*?. Several definitions have been offered, which are directly related and critically mean the same thing, despite the differences in choice of words for the definitions. For instance, Beldarrain (2010) defines ICTs as different sets of technologically driven tools and resources which are embraced in communication, and for creation, dissemination, storage and management of information. Ololube et al, (2012) are also of the view that ICTs literally means an advancement in technology that offers a rich global resource and a concerted society which helps in the dissemination of materials for interactive discussions, research and information exchanges. Chifwepa (2008) has added his perspective by defining ICTs as diverse set of technological tools and materials which are used to communicate, create, disseminate, store and manage information. With insights from these definitions offered, the researcher contextualized the meaning of ICTs within the framework of distance education as a: modern and advanced technological facilities and resources which are adopted by both distance education instructors and learners for teaching and learning and for performing all other related activities which directly have implications on teaching and learning outcomes of distance education students.

2.2.2 Distance Education

The term distance education began to be embraced in the 1970s and was officially adopted in 1982 during the change in name of the International Council for Correspondence Education to International Council for Distance education (currently, the name being used is the International Council for Open and Distance Education). Before distance education, some scholars introduced e-learning and m-learning to describe distance education in relation to its application of electronic communication between stationery computers and communication from and to mobile wireless equipment.

Despite the term 'distance education' becoming very popular term, Paulsen (2007) is of the stance that terms such as e-learning and m-learning should be seen as modern applications of distance education, and not as separate concepts, as they are concerned with media for teaching and learning without face-to-face discussions. In this study, the researcher accepts the definition of distance education given by Ololube et al., (2012) as the same meaning of distance education anywhere it is used in this research. Distance education as defined by Ololube et al., (2012) is any form of education characterized by the separation between the instructors[1] and learners[2], which has thus, incorporated the use of printed and written words, the telephone, computer conferencing or teleconferencing to bridge the physical gap between the instructors and the learners. From the definition, teaching and learning are made possible only through the medium of ICT facilities and resources. That is to say, distance education entails teaching and learning situations in which the instructor and the learner(s)

[1] Instructor is used in this literature to mean the same as teacher or tutor, though they are technically not the same. Hence, for the purpose of this research, the term 'instructor/teacher/tutor' is used to denote a qualified academician who teaches, advises and supports distance education students.

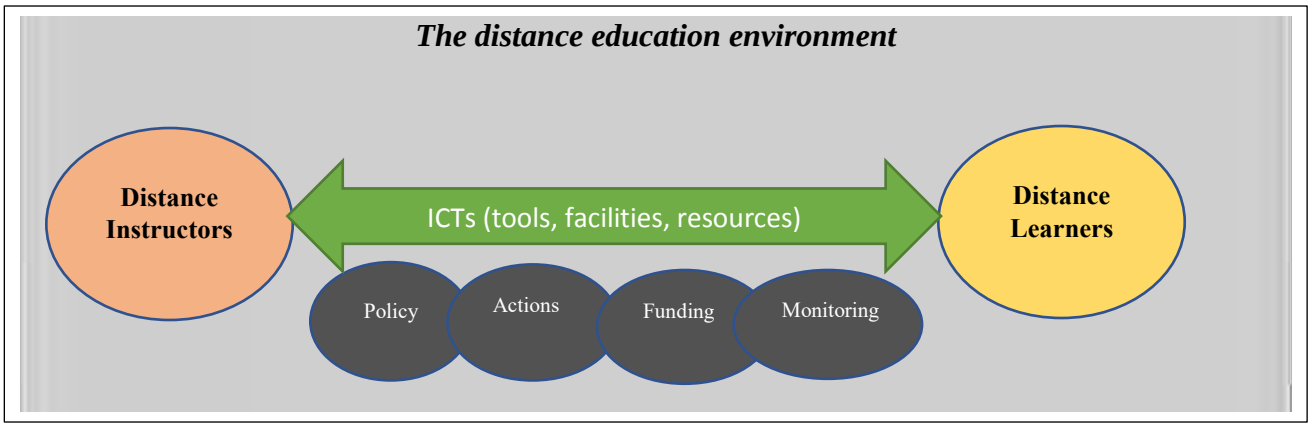
[2] Learner is used in this literature to represent any person who serves as a distance education student, benefiting from an instructor at a higher level of education.

are geographically separated, and therefore, rely on electronic devices and print materials for instructional delivery. This involves the instructor's roles in the distance education delivery process called distance teaching; and the learners' role in the process known as distance learning. Impliedly, distance education can only be possible when both the instructor and the learner are conversant with the use of ICTs, which serve as the bridge to connect the instructor and the learner (see Tinio, 2003; Agyemang and Dadzie, 2010). Ololube et al.(2012) postulated that distance education considers the continuous and immediate supervision of students by their instructors in a dispersed manner with the aid of ICTs.

In a more detailed description of distance education, Ajadi et al., (2008) have made deliberate attempt to identify and document some characteristics or features of distance education that make it quite distinct from the conventional approach to education. They revealed that in distance education, learning is certified by concerned institutions involving the use of differing media facilities both electronic and print; there is an interactive medium which allows for a two-way communication ensuring that there are frequent interactions between the instructors and the learners; in some cases, there can be occasional face-to-face meeting between the instructor and the learners, but this is not mandatory; there exist specialization and division of labour in the delivery of course programme; and finally, education is made to reach out to a large number of students irrespective of their locations from the instructors. This makes participants from dispersed locations to come together within the network of ICTs for knowledge sharing and gaining. In line with the unique features of distance education, diverse academic landscapes around the globe have inculcated distance education programmes in their educational structures (Beebe, 2012). In as much of distance education is underpinned by ICTs, its success is dependent on government's policies, initiatives, supports and

nature of actions which tend to ensure full integration of ICTs in distance educational delivery processes (Ifinedo, 2017). In this regard, full funding is a pre-requisite for effective implementation of distance education structures, monitoring and controlling, and implementation of action-based-results-oriented programmes for distance education (Ololube et al., 2012). Figure 2.1 shows the relationship between distance education and ICTs and how the policy environment could ensure successful outcome.

Figure 2.1: The connection between Distance Education and ICTs through effective measures:



Source: Keegan (2005)

The unique features of distance education that make it quite apart from traditional teaching and learning have been identified by Keegan (2005). These features are mainly five and include the following indicated below:

- In distance education, there is a quasi-permanent separation between the instructor and the learners throughout the length of the learning process.

- In distance education, planning and preparation of learning materials are influenced by an educational institution which also provides student-support service, making it distinct from private study and teach-yourself programmes).
- Distance education extensively employs technical media including print, audio, video or computer to bond instructors and learners and in the carry-out of course content.
- Despite the absence of face-to-face interactions, distance education entails a two-way communication which allows students to benefit from dialogue and as well start their own dialogue.
- There is a quasi-permanent absence of learning group throughout the length of the learning process which allows people to be taught as individuals instead of groups, with the possibility of occasional meetings for both didactic and socialization purposes.

2.3 Historical Antecedence of Distance Education: From the Global Perspective to Ghana's Case

The development of distance education has been incremental, emerging in different ways in different countries. UNESCO-IITE (2018) have visionalized and promoted a simple but powerful belief that information and communication technologies can make it possible for every individual to meet his or her educational right irrespective of the location of such individual. In order words, access to education would be and could be "open" or "distance". UNESCO-IITE have indicated that, the use of conventional face-to-face instruction will not be able to absorb every individual, as it will not be possible for everybody to be in classroom at specific places at specific times in order to be educated. As the conventional face-to-face method of education was not possible to enhance general access to higher learning, there was the need for a strategic instructional method which breaks the barrier of place-time-specific in learning to be implemented. UNESCO-IITEE (2018) started promoting research to refine means to which higher education could be made accessible by taking away the face-to-face approach to imparting knowledge in tertiary education. Subsequently, a system of education was uncovered by a researcher known as Wedemeyer as in UNESCO-ITTE (2018), which he called it "independent study"; the root of distance education in the world. The definition of independent study as given by Wedemeyer is:

"Independent study encompasses several teaching-learning arrangements in which teachers and learners carry out their essential tasks and responsibilities apart from one another, communicating in a variety of ways" (p.2114).

The Independent study which was started by Wedemeyer became the core driving force underpinning the evolution of distance education. This according to UNESCO Institute for Information

Technologies in Education (2005; 2018) first metamorphosed into a philosophy called "open learning". The concept of "open learning" has been studied by Lewis (2010) who supported the perspectives of Wedemeyer with the core aim of unravelling the impediments to open access education, needed in enhancing learning and improving human resource base of countries for advanced economic growth and development.

Lewis (2010) as cited in Institute for Information Technologies in Education (2018) gave insight into open learning by stating that [quoted extract]:

"Open learning has two main thrusts: enhanced student access; and the development of student autonomy. These are achieved through widening student choice over aspects of the learning process. Choice can be widened over the time and place of study……(and) over the curriculum itself, once access has been gained: choices, for example, of content, pace, method media and assessment. These curriculum choices develop great autonomy: through the structured and supported exercise of choice in their learning, students work more independently".

Open learning is broader and incorporates distance education. It is of no surprise therefore, to come along with higher distance education institutions calling themselves as "open" universities such as the Open University of Sri Lanka, the Open University of Tanzania, Open University of Britain, Open University of Bangladesh, the Open University of Hong Kong, just to mention but a few. As unveiled by Lewis (2010), open learning is a philosophy which aims at expanding access and personal choice in learning, and this can be achieved through distance education methods. Despite the strong link between open learning and distance education, UNESCO Institute for Information Technologies in Education (2018) has revealed that in some cases, distance education systems do not necessarily

promote the vision of open learning but in relation to the advancement in digital ICTs, distance education will continually be influenced by the evolution of open learning. For example, it has become adequately easier now to expand access to education through the implementation of wider approaches of ICTs as well as the convergence between telecommunications and computing which has facilitated the greater interoperability among different types of education institutions, with different sources of content, locations of instructors and learner support (UNESCO IITE, 2018).

Looking into the historical antecedence of distance education, UNESCO (2018) have accepted that distance education has passed through evolutionary stages which have been divided into three generations as the 'first generation' distance education, second generation distance education and third generation distance education (IITE, 2018). This implies that distance education did not emerge overnight, rather it passed through systematic processes of gradual incorporation of emerging educational delivery technologies into different distance education systems. This has subsequently resulted in a total multimedia-based distance educational system comprising various generations of distance technology and media. Impliedly, diverse ICTs have gradually emerged to be used in complementing and supporting previously embraced ones, instead of replacing existing ones in order to make education widely open and accessible to cater for large volume of individuals who tend to pursue distance education at a higher level. For instance, the use of the web and the internet has over the years been complemented with other multimedia such as print materials, CD-ROMs containing different media, telecommunicated audio and video clips as well as web's own hypertext and/or hypermedia capabilities. UNESCO-IITE (2018) has espoused on the three generations of distance education in the world. The first generation of distance education was based on the use of written and printed materials which were distributed through postal system which developed in most countries

from the end of the 19th century onwards. During this period, distance education students were provided with study guides and textbooks and in some cases supplementary reading lists through postal systems. Using the same medium of postal communications, students responded to their distant teachers who then read and examined students' performances. This form of distance education was widely known as correspondence study, and its growth became more immense in most countries after the invention of radios in the 1920s and televisions in the 1950s.

Radios and televisions were gradually incorporated to distance education in the form of radio-based study talks and TV-led video-based courses, with incorporation of print and local study groups in some instances. In 1969, the second generation of distance education revealed its head through the setting up of an Open University in the Great Britain. Here, the use of print and medium text and other innovative approaches of first generation distance education was not scrapped off, but maintained with the application of multiple-media approach on a large scale. The Open University of Great Britain was noted for its development of large quantities of high quality media designed for distance studies. This generation saw the use of one-way (from university to students in the form of print, broadcasts, and audiotapes) and two-way communications (involving interactions between instructors and students through correspondence tutoring, face-to-face tutorials, short residential courses, use of telephones, videos and computer conferencing) been applied to distance education delivery processes. The second generation gradually faded off due to advancement in technology, and has currently been replaced with the third generation' distance education. This generation embraces ICTs that are interactive, electronic, and computer-based as the main basis for information distributions and facilitation of communications between students and instructors. At this generation, ICTs provide for two-way communications that are either synchronous ('at the same time' as in

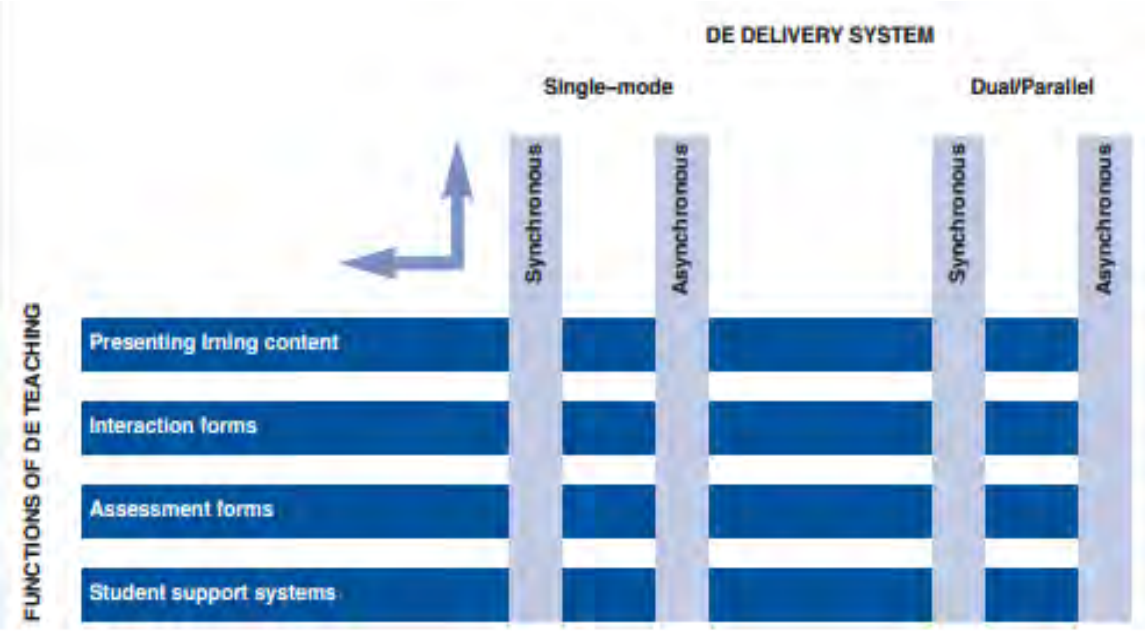
videoconferencing or audioconferencing) or asynchronous ('not at the same time' as in electronic mail or most computer-based discussion forums). Within the third generation, the use of computer-aided instruction was in place, however, the introduction of the World Wide Web stratified and echoed the use of computers and telecommunication systems for distance education. This made distance education in the third generation comparatively the easiest means of imparting knowledge on individuals. The World Wide Web (WWW) which was introduced in 1993 has facilitated interactions and interactivity through networking. This has facilitated faster communications between actors of distance education, leading to tremendous improvement in preceding generations of distance educations. Currently, distance education is still in the third generation, but high level of interactivity has become possible even among instructors and students, making distance education very convenient means of gaining knowledge by wide range of individuals.

Currently, distance education models adopt independent study and remote classroom model (Abdel-Wahab, 2008). Abdel-Wahab (2008) indicated that independent study is based on an approach which allows learners to study independently from the teaching institution at their own pace, using specially prepared printed study guides. With this delivery approach, instructors assess their learners through submissions of written assignments via post or emails. The assignments are marked, graded and returned to learners with a detailed list of comments from the instructor/ lecturer concerned. This mode as indicated by UNESCO-IITE (2018) is an example of an asynchronous delivery system because teaching takes place at different place and at different time from learning. The other model of distance education as it has gradually folded up through generations is the remote classroom model alternatively called the distributed classroom model. This approach involves the use of conventional classroom lesson which is relayed to one or more remote sites using broadcast television or

videoconferencing technologies. This model as unveiled by UNESCO-IITE (2018) is example of synchronous delivery system where learning occurs at different place from teaching, but they occur at the same time or concurrently. Figure 2.2 shows a matrix indicating interaction between four main teaching functions of distance education (presenting learning content, interaction forms, assessment forms and student support systems) and dominant delivery system (single or dual/parallel mode) which can be used to carry out such functions of distance education.

Each of the functions as indicated in the figure can be delivered through the use of synchronous delivery system or instead asynchronous delivery system. The single mode as indicated in Figure 2.2 refers to a system which offers courses only through distance education methods; whilst dual/parallel mode refers to a system which integrates both face-to-face and distance education forms of courses offering. The dual mode is very common in the world, including Africa and Ghana, where several higher educational institutions concurrently embrace course offerings through the use of both face-to-face and distance education.

Figure 2.2: Interactions between Teaching Functions and Delivery Systems in Distance Education (DE)



Source: Adopted from UNESCO-IITE (2018)

In Ghana, distance education is still growing, with higher educational institutions gradually integrating distance studies in to their curriculum. Mensah and Owusu-Mensah (2012) in their report prepared for the World Bank entitled: "*Priorities and Strategies for Capacity Building in Tertiary Distance Education for Human Resources Development in Ghana*" indicated that distance education was more vibrant for the past two-three decades than even now. According to them, distance education used to be known as correspondence education, which provided an avenue for a large number of workers and professionals to upgrade themselves. However, as Ghana's economy started deteriorating after independence in 1957, student-workers found it very cumbersome to afford the cost of upgrading themselves through distance education. The income levels of workers were very low that they were unable to afford distance education. Following this problem, the idea of using

distance education as a tool for manpower development was later strengthened through the introduction of initiatives including the Modular Teacher Training Programme (MTTP) in 1982. This programme was introduced for untrained teachers to academically and professionally upgrade themselves through distance education. The MTTP lead to the training of about 7,537 untrained teachers through distance education to obtain Teachers' Certificate rendering them to become professional teachers to support Ghana's growth and development. This was later abandoned due to financial difficulties. Despite preceding difficulties encountered in the earlier attempts with distance education in Ghana, government regained momentum and conviction to reposition distance education as a viable complement to the conventional education at the higher level of education. This conviction as unraveled by Mensah and Owusu-Mensah (2012) was due to the fact that universities were unable to admit even half of qualified applicants to their limited spaces and facilities to cater for the students. Subsequently, the government through the Ministry of Education provided funds for need assessments of distance education in Ghana between the periods of 1991 to 1994.

The Commonwealth of Learning (COL) and the United Nations Education, Scientific and Cultural Organization (UNESCO) were considered to help in this comprehensive survey by the government. The study proposed certain measures which led universities in Ghana to agree to commence distance education programmes. The four major higher institutions of learning opted to offer courses via distance education programme. These institutions are the University of Ghana, University of Science and Technology, currently, the Kwame Nkrumah University of Science and Technology, the University of Cape Coast and the University College of Education of Winneba, which is currently a full fledge university in Ghana. The premier university, the University of Ghana, opted to open social science entry by offering bachelor degree programmes in Sociology, English, Religious and Political

Science as alternatively a distance education programme in which students can also pursue. The Kwame Nkrumah University of Science and Technology proposed to offer two programmes for distance education and these programmes were Bachelor of Science in Building Technology and Biological Sciences. The University of Cape Coast embraced Bachelor of Education in Primary Education and Post Graduate Diploma in Education as possible avenue for students for distance education. The University of Education of Winneba also had some distance educational courses incorporated within its structures and was able to start distance education programmes in 1996 with support from the Department for International Development (DFID) formerly the British Overseas Development Administration (ODA). The three other universities were unable to start distance education programmes due to funding problems at that period. The University of Education, Winneba admitted the first batch of 196 students to pursue Post-Diploma Bachelor of Education (B.Ed) degree in four subjects' areas: English Education, Life Skills Education, Mathematics Education and Science Education.

Later, the University of Ghana and University of Cape Coast concurrently took off in 2001/2002 academic year with diploma programmes in Youth in Development Work and Basic Education accordingly. Distance education in Ghana is guided by government's policy entitled: "*Ministry of Education, Ghana Distance Education Programme: Policy Document*" which covers three main areas which are: i) Access and Participation; ii) Quality of teaching and learning; and iii) Governance and management. As revealed by the Ministry of Education (MoE, 2014), the key objectives of access and participation in distance education are to: increase access to and participation in education of all types and at all levels for all without disintegrating distance education; facilitate progression through the education system; improve people's capacity to cope with rapid changes in knowledge and skills,

and thereby improve upon their contribution to the economy and society; increase in equality and democratization of education; and make education cost-effective and affordable. In relation to quality of teaching and learning, the objectives are to: improve learner achievement and retention; produce graduates who are independent and more autonomous learners; develop quality assurance processes in all aspects of distance education; make high quality programmes readily accessible to learners at all levels and in relevant areas; make courses relevant to the needs of learners; and to train, develop and equip personnel for course design, development and delivery. The third area of the policy named as governance and management, has the following objectives as to: provide direction to the development of distance education in the country; sustain efficient and effective management, control, monitoring and evaluation of distance education programmes and strengthen the institutions for efficient and effective delivery of distance education in Ghana. Currently, distance education programmes have been embraced by several institutions including private universities. However, the effective implementation of E-learning through distance education still seems problematic and therefore, calls for the need for holistic approach to make distance education very beneficial to Ghana's development (Awidi, 2013).

2.4 ICT Facilities and Services for Distance Education and Their Uses

Distance education makes tremendous use of ICT facilities and services in order to ensure the transfer of knowledge from instructors to learners. These facilities and services keep evolving, as technologies continually upgrade in the world. As indicated by Beldarrain (2013), ICT has become the bedrock of educational transformation, integrating computers, internets, broadcasting technologies (radio and television) and telephony for effective delivery and sharing of information and knowledge. Ultimately, these technologies (computers, internets, broadcasting technologies and telephony) have

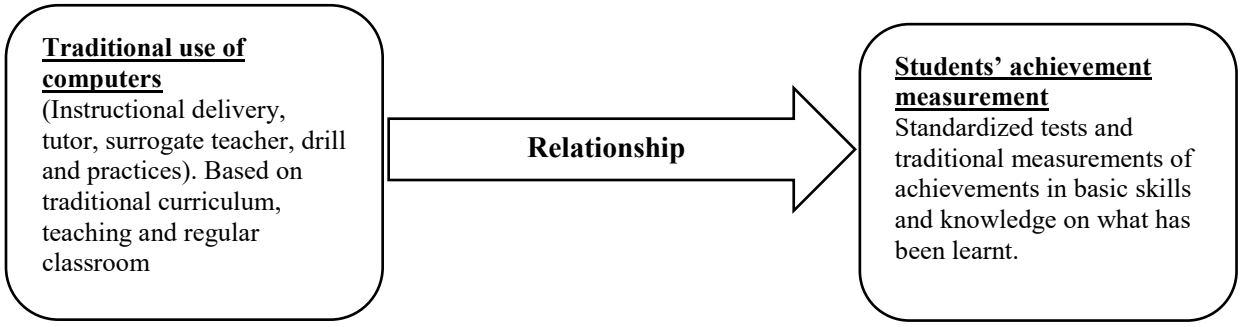
become the widely used technologies for distance education. One integral over-arching aim of UNESCO is to ensure that every country, both advanced and advancing ones, have access to ICTs educational facilities which are pre-requisite for societal modernization and innovative growth and development (UNESCO, 2005). In this regard, UNESCO tends to provide advisory services for countries to ensure optimal balance emerging ICTs and older available educational technologies, and as well provide the much needed support to ensure the development of educational software and materials which enhances modernization and easier transfer of knowledge and communications, in tandem with country-specific national and regional cultures, at all levels, especially, at the tertiary institutions. In accordance with Beldarrain (2013) perspective that ICTs in distance education are generally grouped into four main technologies (computers, internets, broadcasting technologies and telephony), the researcher has grouped all ICT facilities and services for distance education into the four technologies.

2.4.1 Computer

The computer has become an integral component of modern education across the globe (Sharaf et al., 2010). Fout-Zignani (2005) has indicated that the first introduction of the computer in education was in the 1970s. Here, teachers and learners used the computer for programming. Since that period, the contributions and uses of computer in education have expanded for best practices in knowledge gaining within formal education. In fact, as sophisticated software was developed, the computer became more like a tutor or what Fout-Zignani (2005) referred to us “surrogate teacher”. Students learn from the computer by following up on commands displayed on computer screens and receiving reward for precise answers (Wilson et al., 2011). Not only that, students were allowed to have fun on the computers through playing games and simple simulations, so as to allow them to release pressure

culminated through frequent studies (Wilson et al, 2011). Incrementally, instructors started exposing students to word processors for writing and revision. Students also had the opportunity to learn the use of databases, spreadsheets, presentation and research tools across several subjects. Subsequently, internet was developed, and this made the use of computer for education was immense (Liang and Lu, 2010). Students have access to large volume of information for gaining knowledge and a global network was created for students to have enhanced communications and exchanges of ideas through collaborative studies. Online courses became extensively available for students from both rural and urban centres of both the developed and developing countries; hence, leading to the creation of a new environment for learning purposes. However, at this stage, the computer was used in the conventional (traditional) classrooms involving face-to-face interactions as indicated in Figure 2.3. It shows the relationship between the traditional use of computers for instruction and students' achievement measurement.

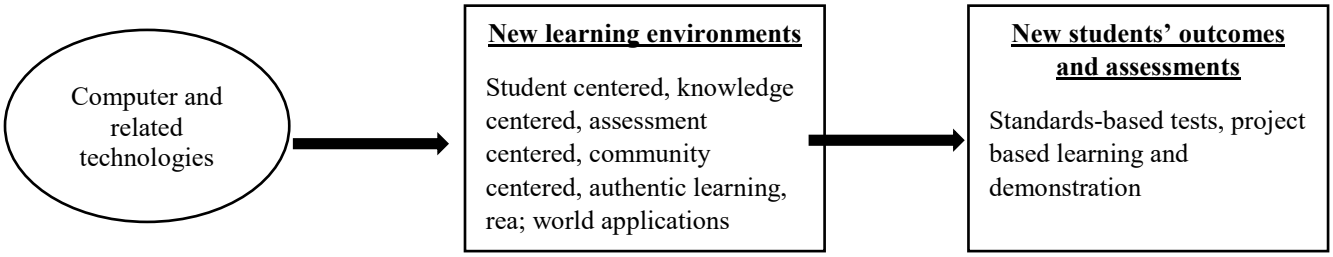
Figure 2.3: Interactions between teaching functions and delivery systems in Distance Education (DE)



Source: Adopted from Fout-Zignani (2005)

As indicated in Figure 2.3, the use of the computer within the educational sector was focused on the teaching of basic skills and content. Educational actors did not employ the computer in different ways of learning and exchanging information. Later, attempts were later made to inculcate 'intelligent tutoring systems' which embraced diagnostic procedures based on knowledge of the learner at any given point (Graesser et al., 2012). During this period, computer-use was gradually expanded from instructional delivery to transformational learning tool forming an important component of the learning environment (Liang and Lu, 2010). Technology has since been seen as a vital element of a new educational paradigm leading to the reconceptualization of the curriculum, teaching methods and learning outcomes in education (Smaldino, 2010). Computer use has therefore embraced new technologies, leading to new learning environments and new students' outcomes and assessments (see Figure 2.4).

Figure 2.4: The Relationship between new use of computer, new learning environments and measurement of students' achievement



Source: Adopted from Fout-Zignani (2005)

As technologies were incrementally implemented within formal education, the need for the use of computer and emerging technologies became very necessary (Graesser et al., 2012). Educational commentators echoed on the need for modernize education through distance learning. Distance education was already part of the educational landscape but it was widely based on the use of postal exchanges, radios, televisions and open universities. Actors realized the need to integrate computer together with new technologies such as internet in order to open wide the gate of education to accommodate large number of people. The computer has since that period become the main facility for teaching and learning (Abdel-Wahab, 2008). Developers have over the years, transformed the computer from the normal Personal Computer system to laptops, palmtops and even tablets which are also used in distance education worldwide.

2.4.2 Internet

The use of the internet in education has led to profound access to information and perspective sharing amongst students, instructors and society. UNESCO-IITE (2018) has pinpointed that the application of the internet in education is widely understood as the usage of internet technologies to find solutions to education tasks including teaching, learning, and management of the educational process. UNESCO conducted a survey in 1995 internet usage in open learning and distance education worldwide using telephone, fax, audio-conference, video conference, electronic mail and access to databases to source for information. Findings attested to differing skill levels of both teachers and learners in the internet use vis-à-vis computer and telecommunication tools. These levels were grouped into low level, medium level, high level and expert level. The low level entailed individuals who used the internet for emails or discussion lists; the medium level considered individuals who using discussion lists and online lecture notes delivered through web; the high level included

individuals with medium level and able to engage in interactive web tutorials and are able to produce their own web pages for studies; and expert level was made up of highly equipped individuals who have the skills of a high level individual, and are able to operate in a virtual environment which give participants the possibility to co-operative activities such as Multi User Dimension (MUD). Within developing countries, majority of the individuals were classified as low-skills-Level people, implying that internet usage in education has, in most cases, been restricted to e-mailing and discussion lists. In distance education in particular Ritzema and Harris (2008) avowed that internet ensures and facilitates three main types of interactions between instructors and learners. They are: i) interpersonal interaction made up of key pals, global classrooms, electronic appearances, electronic mentoring and impersonations; ii) Information collection made up of information exchanges, database creation, electronic publishing, and tele-fieldtrips, pooled data analysis; and iii) problem solving projects composed of information searchers, parallel problem solving, electronic process writing, serials creation, simulation and social action projects.

Other studies such as Moore and Kearsley (2011) have also confirmed on the use of internet for educational contracts, lectures, discussions, self-teaching, tutorship, work in small groups, project method, case-study, electronic mails and forum. Emphasizing on electronic mail, Kearsley (2011) realized that electronic mails can be used in distance education for holding on private e-mail exchange (one to one), sending copies of message to other users of emailing system (one to many), holding discussions, network forums in online (real time) and off-line (postponed) modes, distributing news within groups of special interests. Operating distant information servers and asking them for relevant information, and sending faxes to individuals in distance education.

2.4.3 Broadcasting Technologies (Radio and Television)

Broadcasting Technologies have long been used for distance education around the globe. Bates (2015) for instance has indicated that radio as a broadcasting device has been integrated into education ever since it became available for community use. Contemporary ICT researchers including Anderson and Dron (2011) have revealed that radio is an important ICT tool for distance studies. Transcending the discussions within the African context, the South African Institute for Distance education reiterated that "radio remains the key media to which most rural people have access" (p.45) and educational radio initiatives have been effective in providing topical programmes and reaching large number of learners at a faster rate within Africa, particularly in South Africa. In 2001, the Department for International Development indicated their perspective of the significance of radio in relation to enhancing education within Africa.

Quite apart from the relevance of radio, the use of television for distance education has also been acknowledged. As indicated by Bates (2015), TV programmes help distance learners to get direction about how the courses are expected to be dealt with as well as explanations of some concepts which seem difficult. The use of TV ensures that distance learners obtain information or messages in a more natural and effective way compare to radio instructions. As a medium, television can personalize teaching, which allows distance students to identify the individuality of their instructors and provide a public image of the university's presence in the community. From the global perspective, to Africa and specifically, to Ghana, the use of television for distance education has been very limited due to the emergence of a more advanced means and easier ways of pursuing distance education, especially, through the use of computer systems, internets and other related facilities.

2.4.4 Telephony

The use of telephone services in distance education came immediately after radio and television which allowed for audio and video recordings accordingly. Telephone services integration in distance education has been gradual, and the inception of mobile learning (M-learning) in distance education is based on telephony incorporation in teaching and learning (Keegan, 2005). Using telephones, instructors could contact their students to discuss pertinent course content enhancing their understanding (Bates, 2015). This allowed students to hear the direct voices of their instructors, promoting closeness and social cohesion in a more practical way. Telephone is still useful in distance education as it ensures direct and indirect communication. Distance education students are able to use telephone to dictate their questions based on previous lessons to a recording machine and their instructors later respond precisely to the students after they have listened to and studied their concerns and questions. In a study conducted by Moore and Kearsley (2011) concerning the use of telephone services in distance education, tutors enrolled affirmed that telephone conversations with their students had added a completed new dimension to their work as distance educators. Other studies including Keegan (2005) confirmed that telephone also allowed for telephone conferencing as well as satellite communications enhancing effective teaching and learning. Currently, telephone has evolved technologically to include mobile phones, which could perform functions of a computer system, including connectivity to internet for responding to emails, searching for content materials amongst others whilst at the same time, making calls.

2.5 The Usefulness of ICT for Distance Education

The use of ICT serves as a powerful tool for expanding educational opportunities both formal and informal educations. There are evidences to suggest that ICT facilitates access to experts, resource persons, researchers, mentors and friend across the world for distance studies. ICT entails the use of computers, internet, broadcasting technologies as well as telephony (Traxler, 2010). The use of ICT in distance education has ensured that new pedagogical strategies are implemented in distance learning allowing for more autonomy for distance students. In a study conducted by Luu and Freeman (2011), ICT was pictured as a central pillar for effective presentation of results by students, enhancing peer-to-peer learning for significant academic outcomes. Through ICT, distance education has over the year, been incorporated with voice mail, e-mail, teleconferencing and computer-based integrated telecommunications and multimedia technologies (Traxler, 2010).

This has ensured the enrichment of distance education ensuring the production of highly interactive self-paced learning packages used in distance learning environment. Again, ICT ensures abstract face to face contact through video calls and conferencing (Bates, 2015). It also gives both variety and the change of accommodating different learning styles (Graesser et al., 2012). ICT tools and facilities are widely available and are used concurrently in distance education programmes. This is because, the weaknesses of one are complemented by the strengths of the other, hence, making their use reliable in distance education (Wilson et al., 2011). It is well known that socio-economic, politico-cultural and geographic imbalances could affect learners' abilities to join conventional education system (Pai and Huang, 2011). Through ICT, these barriers are overcome, and students irrespective of their locations can still have access to education services which enhance their quality of life. Paying credence to Africa, Ifinedo (2012) ascertained that ICT has created an environment for both students

and teachers to engage in interactive and collaborating learning and to gain access to wide range of information. Access to information through ICT has increased information accessible to individuals to support them in trying new strategies, thinking and creativity which are in tandem with practices aimed at engaging them to new innovations in their education (Ololube et al., 2012). This shows the indispensable nature of ICT in the contemporary world. It is thus, very vital for all countries to enhance full penetration of ICT facilities and services in order to enjoy the full benefits associated with it for distance education.

ICT can also be used to improve the quality of distance education by increasing learners' motivation and engagement, facilitate the acquisition of basic skills, and can serve as a transformational tool to promote the shift to a learner-centered environment (Rovai and Jordan, 2010). ICTs such as videos, television and multimedia computer software (which integrates text, sound and colorful images) can be used to provide challenging and authentic content that compels and engages students throughout the learning process (Bhattacharya and Sharma, 2007). A visual aural combination per se, when combined successfully with textbooks and syllabus, can help learners to get across abstract concepts and logics within a very short period of time, facilitating knowledge uptake. Findings from Brindley et al., (2010) unveiled the relevance of ICTs in the direction of presentation, demonstration, drill and practice, interaction and collaboration. ICTs has made it possible for distance education instructors and learners to engage in teleconferencing, emailing, audio conferencing, television lessons, radio broadcasting, interactive radio counselling, interactive voice response system, use of audiocassettes amongst others in order to meet their educational requirements during studies.

ICTs enhance the teaching and learning processes by contributing to an increase in the frequency of interaction and reception of information (Cabero and Llorente, 2013). ICT is thus, a catalyst for change in education. ICTs ensures and strengthen independent learning, and students who are abreast of and use ICTs for learning purposes became immersed in the process of learning and they are able to use technology to support their studies (Sharaf et al., 2010). Through the framework of ICTs, students have easy access to learning. That is, students can surf through the internet for electronic books, sample and trial questions, course materials and other relevant documents. Again, they can further have access to resource persons, mentors, experts, researchers, professionals and friends from across the globe to share and learn from them (Sharaf et al., 2010). Seo et al. (2009) pinpointed that through ICTs, wider availability of best practices and best course materials in distance education could be shared to enhance the teaching and learning process. In fact, it is through ICT that higher institutions are able to reach the shores of deprived communities.

Instructors are able to provide learning services at any point in time in tandem with their convenience, and this is gradually bridging the digital divide between urban members and rural folks (Smaldino et al., 2008). Koehler and Mishra (2009) indicated that through ICT, students, for instance, distance education learners are able to keep pace with latest development. Through ICT, communication barriers such as space and time are also taken off. It is through ICT that digital resources such as digital libraries for students, instructors and professionals are created for research and learning (Bhattacharya and Sharma, 2007). There are also evidences to suggest that ICTs provides new educational approaches (Fu, 2013), speedy dissemination of education to several groups of people and enhances international dimension of educational services (UNESCO, 2015).

Distance education students' use of ICTs helps them to develop higher skills which help them to effectively collaborate across time and place and solve real life issues/ practical challenges in society (Fu et al., 2013). Ott and Pozzi (2011) attested that ICT enhance students' understanding of the world and concretize their cultural perceptions through a global lens. In fact, students seeing how their instructors use ICT encourages them to student hard and to gain in-depth knowledge on the use of ICT facilities and services. Noor-Ul-Amin (2013) indicated that ICT improves the quality of education through learning facilitation by self, real time conversation, delayed time conversation, directed instruction, independent problem solving, information seeking and analysis, critical thinking, and the ability to effectively communicate, collaborate and study amongst students and their instructors.

2.6 Factors Influencing the Use of ICTs for Distance Education

The relevance of ICT cannot be over-emphasized, as ICTs has become an integral part of people's lives (Bankole and Babalola, 2012). ICT has transformed methods of teaching and has enabled a large number of aspiring learners across the world to be trained through non-traditional methods of education. Several factors have been ascertained to influence the use of ICTs for distance education, and these factors are broadly grouped into socio-cultural factors, technological factors, political factors and economic factors (Salih, 2004). As indicated by Salih (2004), understanding the sociocultural context of a country is very important in influencing the use of ICTs for distance education. Thus, it is easier for ICTs to be extensively welcomed for distance education in countries where the sociocultural dynamics is characterized by close relationships, the recognition of close ties, obedience, closeness and loyalty compare to countries where the traditional socialization process is characterized by individualistic and anti-social attributions. In terms of technological factors, Salih's

research concurs that in countries where there is technological underdevelopment such as those in the developing world, the use of ICTs for distance education is somewhat slow; and this is further compounded by the lack of technological facilities which are needed to facilitate distance studies.

Again, distance education initiatives work successfully under political policies, requiring the concerned state institutions have to implement sound policies that permit the easy use of ICTs. Once the political system is favorable for ICT integrations, educational actors will have the right attitude and perception to embrace it for distance studies. Cost which is an economic factor is also one important underpinning to the use of ICTs. In fact, in countries where insufficient funds are allocated to the educational sector, the use of ICTs become quite cumbersome and this resultantly affect distance education. This phenomenon is common in the developing countries which are mostly constrained by resource scarcities (as contended by Salih, 2004).

Based on insight from the Technology Acceptance Model, Pai and Huang (2011) indicated that factors influencing the use of ICTs for distance education are the 'perceived usefulness' of ICTs and the 'perceived ease of use' of ICTs. In relation to the 'perceived usefulness', Salari et al., (2009) commented that higher institutions and several other educational stakeholders have come to understand the useful of ICT, and as such, has seen it as a relevant too for distance education worldwide. Other researchers such as Abasalt-Khorasani et al., 2011), and Suleiman and Zarafshani (2011) also accept the position that the usefulness and ease of use of ICTs are the factors that have influenced its use for distance education. Other researchers such as Nazaemin and Mirabi (2011) and Moradi et al., (2010) have also indicated that the need for educational innovation is one significant

reason for the use of ICTs for distance education. These group hold the viewpoint that once education is gradually metamorphosing, the need for incorporation of ICTs has become very pertinent, hence making distance education to move along with ICTs. Pai and Huang (2011) undertook studies individually to ascertain the factors which tend to influence ICTs for distance education. This was done using the Technology Acceptance Model. Their findings were concurrently the same as: i) there was significant relationship between the perceived usefulness of ICT and the decision to adopt it in distance education; ii) there was significant relationship between the perceived ease of use of ICT and the decision to adopt it in distance education; iii) there was significant relationship between the actual use of ICT and the reason to embrace it for distance education; and iv) there was significant relationship between the attitude of people towards the use of ICT and the reason to embrace it for distance education. Inferentially, Pai and Huang (2011) realized that the perceived usefulness of ICT, the perceived ease of using ICT, the actual use of ICT among people and the attitude of people towards the use of ICT are the core pillars which underpinned the decision to use ICT for distance education.

In his study, Beldarrain (2015) also brought out some factors influencing the wide use of ICTs in education, particularly distance education in developing countries. The study revealed that ICT has been developing so rapidly and that in order to balance and reap its full benefits, there was the need to integrate in education, especially, making it the pillar for distance education to allow wide range of learners to upgrade themselves. Again, many individuals have been gaining prominent knowledge in the use of ICT, hence making it the underpinning of distance education was seen to be of no problem. Students in the formal education system in particularly have incrementally gained knowledge in ICT and as such learning activities were seen to be re-oriented and reformulated, from

the manual source centered to open sources of education such as distance education. Beldarrain further realized that in many developing countries, education reforms paid very little attention to the integration of ICT, so educational stakeholders later realized the need for its full integration for distance education. Finally, society was seen to be transforming, and that ICT has already taken the centre-stage for the implementation of distance education in the developed countries. In order to catch up, there was the need to use ICT for distance education, eyeing the front runners (developed countries) in terms of its strategic integration in education in order to enhance academic performances and successes.

2.7 Challenges Faced in the Utilization and Accessibility of ICT for Distance Education

The relevance of ICT in distance education has been acknowledged. Integration of ICT in education, particularly, distance education ensures that instructors and learners work effectively in an information age (Salehi and Salehi, 2012). Nevertheless, the use of ICT for distance education has some barriers which need to be brought on desk for educational actors to make deliberate efforts to handle them effectively. According to Yunus et al. (2009), the use of ICT is quite complicated and needs skills from both teachers and instructors. For instance, access to information can pose a real danger of information overload if instructors and students do not have the requisite skills in filtering relevant information, or are unable to establish a coherent organizing principle. Scheopp (2005) presented the challenges as barriers, and classified them into intrinsic and extrinsic barriers. From his perspective, barriers are conditions which make it difficult to achieve an aim. Highlighting on the differences between intrinsic and extrinsic barriers, Alwani (2005) described intrinsic barriers as those related to instructors, administrators and learners whilst extrinsic barriers are those associated with the institution in question. He further threw more light on the barriers of ICT in distance

education by revealing that such barriers are first-order and cited access, time, support, resources and training whilst intrinsic barriers are second-order cited attitudes, beliefs, practices and resistance.

Other educational researchers alternatively group the barriers into teacher-level barriers and school-level barriers. The teacher-level barriers include the lack of confidence, shortage of time, and resistance to change whilst the school-level barriers include the lack of effective training in finding solutions to technical problems and the lack of access to ICT resources. Yunus et al. (2011) is of the view that inadequate ICT facilities such as computers and copies of software, insufficient knowledge and skills on ICT, the difficulties of integrating ICT in instruction and insufficient teacher time are some of the clear-cut challenges facing the use of ICT for distance education.

Salehi and Salehi (2012) conducted a study specifically on challenges associated with the use of ICT in education, with key attention on instructors. This was done by looking at (i) instructors familiarity with ICT, and (ii) barriers preventing teachers from using ICT. A percentage score with variables as 'never used, limited user, frequent user and confident user' were used to assess instructors' familiarity with ICT. The findings revealed that though, majority of the instructors were frequent users of ICT (about 47%), many agreed that they have limited knowledge on the effective use of ICT for instructional deliveries. These individuals further confirmed that they also think their colleague instructors also have very limited knowledge on the use of ICT for instructional deliveries. The revelation clearly indicates that majority of the teachers are challenged with effective use of ICT to ensure efficient knowledge sharing, and this affects the quality of education instructors give to their students. Highlighting on Africa, Ifinedo (2012) indicated that ICT infrastructure and services are

woefully inadequate to support distance education. For instance, telephone lines which are vital for distance studies are not sufficient even in the urban centres of many African countries. In Ghana, internet penetration is still very poor, and the cost involved in accessing internet services is very outrageous, making distance education very expensive to enroll on.

2.8 Summary of Literature

Distance education has become integral component of the world's educational sector. It came through gradual intrusion of ICT and its innovation depends on emerging technologies. This makes ICT a fundamental component of distance education. ICT facilities and services integrated into distance education include postal services, radio, television, telephony, computers, internet and other innovative facilities and services which are gradually unfolding. These facilities and services make it necessary for instructors and learners to learn from a wide range of resources irrespective of time and space. The use of computer in distance education for instance, has gradually grow to cover facilities such as laptop, palmtop and tablets as well as other accessories needed to complement these ICT tools for distance education. The usefulness of ICT in distance education cannot be over-emphasized. This includes presentation of course-works and assignments, medium for communication, voice mailing, emailing, teleconferencing and many others. The use of ICT for distance education has been influenced by the perceived usefulness of ICT, its ease of use, the gradual transformation of education, people's attitude toward ICT use and others.

Amidst the usefulness of ICT in distance education, its use has some challenges which need the attention of educational stakeholders. Usually, instructors and students are not abreast of emerging

ICT facilities and services, making their use very difficult, limited training and institutional support, failure to effectively deal with technical problems, non-enticing penetration of internet and telephone lines in some countries, especially, in developing countries like Ghana and the huge cost involved in getting access to internet for distance education.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In achieving the research objectives, this chapter examined the research methods with the purpose of finding the right methodology to answer the research questions brought up. According to Rajasekar et al., (2013), research methodology is an organized way to solve a problem. Basically, it can be referred to as the procedures by which researchers go about their work of describing, explaining and predicting phenomena with the aim of giving the research a work plan. This is also to ensure that, the research is scientifically done and can be replicated in other studies using the same methods and variables.

3.2 Research Design

Burns and Grove (2005) define a research design as "a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings". Polit and Beck, (2004) define a research design as "the researcher's overall goal for answering the research question or testing the research hypothesis"

The study adopted the survey research methodology as the research design. The survey method provides a quantitative description of trends and opinions of a population by studying a sample of that population (Creswell, 2009). Researchers such as Saunders, Levis and Thornhill (2009) also describe survey research as a common tool for social and business research. The method allows for making the generalization of findings and conducted at a faster rate (Glasow, 2005). The survey methodology was therefore used in the collection of quantitative data where the researcher solicited information from the respondents using a standardized questionnaire. Driscoll, (2011) also stressed

on the use of surveys as exceptionally helpful to find small amounts of information from a large group of people with the goal of making a general declaration.

Babbie (2015) also posits that, survey research is practically used by researchers who are keen in taking original data to describe a large population to be examined. The study therefore compared the use of ICT in distance education at KNUST and UEW-K.

3.3 Selection of Cases

The selection of case is an important task in every research. According to Gerring (2007), case selection is tough especially, selecting good cases for small samples in a research. Cases could consist of countries, metropolitan areas, a community, an institution/organization or even an object/item (Seawright and Gerring, 2008). Researchers such as Rohlfing (2008) and Sekhon (2004) for instance have asserted that case selection should be guided by a methodological justification for such a case and should not be randomly selected or chosen. In this study, the Kwame Nkrumah University of Science and Technology (KNUST) and University of Education, Winneba-Kumasi (UEW-K) have been chosen as cases and all located in Kumasi in the Ashanti Region. As contended by Sekhon (2004), the selection of both universities as cases was done in a purposive fashion. The justification for the selection of these two institutions was that, both are a representative part of the group of the public universities which offer distance education programmes in Ghana and have similar characteristics of all other universities in Ghana.

3.4 Selection of Cases

Subject selection in research is intertwined with case selection. Dafni (2014) has indicated that subject selection should be unbiased, representative and influenced by the nature of the population understudy. In this research, the level 300 students of both institutions were selected. The justification for the selection of the students is that, they utilize and benefit from Information and Communication Technologies and will therefore be able to tell whether these technologies had an impact on teaching and learning. Again, the recommendations from the studies are beneficial to them since they are still in school.

3.4.1 Population

A population refers to the total number of subjects that fit into the characteristics of respondents needed for a study (Castilo, 2009). For this study, the target population involved distance education students of both KNUST and UEW-K pursuing Business Administration. This is because, they are direct beneficiaries and patronize the e-learning service as their curriculum allows them to widely depend on ICTs instead of the predominant use of conventional classrooms. Students from Business Administration specifically Accounting and Human Resource Management programmes were used because these are programmes commonly run by the two universities. Hence, in order to ensure sound comparison, students from these two programmes were considered. The total target population of this study comprises 210 registered level 300 distance education students of both universities pursuing Business Administration. All the members were considered since the study was based on census approach (illustrated in Table 3.1).

Table 3.1: Student Population

Institution	Programme of study	Option	Target sample
KNUST	Business Administration	Accounting	86
		Human Resource Management	55
UEW-K	Business Administration	Accounting	25
		Human Resource Management	44
TOTAL			210

Source: **Field data, 2018**

3.5 Data Instrumentation

Tools or means through which a researcher measures the variables of interest in a study through the process of data collection is termed instrumentation (Hsu and Sandford, 2010). It is through instrumentation that a researcher is able to obtain the needed information for empirical analysis. This involves the use of instruments which vary depending on the type of research conducted. Instruments are the research devices that are used by researchers in collecting data for their studies. The research instrument used for the data collection in this study was the questionnaire, which was self-administered. Though there are several methods in which questionnaires can be used to collect data such as mailed, individual, group and digital, the self-administered was preferred due to its effectiveness in terms of quick response and obtaining good quality data.

According to Sauders et al., (2009), the design and structure of a questionnaire can influence the validity, reliability and response rate of a study. The questionnaire was the main instrument used to solicit data concerning the availability of ICT facilities and services, ICT usage, the usefulness of ICTs, the factors influencing the use of ICTs and the challenges facing the utilization and accessibility

of ICTs. The questionnaire was mainly semi-structured, but most of the questions were coded to allow for easy analysis of the data. The use of questionnaire was deemed appropriate as Babbie (2010) has indicated that the questionnaire is very effective in assessing a phenomenon and can easily be administered.

3.5.1 Questionnaire

A questionnaire is made up of a set of printed or written questions with a choice of answers, devised for the purposes of a survey or statistical study. It is a key instrument in research and allows a researcher to collect a wide range of data for empirical analysis. A questionnaire could take the form of an open ended or closed ended type. The open-ended questionnaire allows the researcher to collect responses which are suitable to reflect the richness and complexity of views by respondents (Denscombe, 2007). In this regard, the respondents are given the opportunity to answer research questions in their own words. The closed ended questionnaire allows the researcher to collect specific answers which have been provided, thus, respondents are obliged to choose probable answers provided in a questionnaire (Fraenkel and Wallen, 2000).

The questionnaire instrument was used because of the number of subjects involved in the study as well as the elite nature of the respondents which allowed them to easily and conveniently fill the questionnaires. The questionnaire was made up of both open ended and closed ended questions, thus, making it a semi-structured type. With the open ended, the respondents were able to express their views.

The close ended questions provided some control over the respondents concerning the kind of responses they could provide. The use of this questions type ensured easy analysis and interpretation of the results of the study.

The questionnaire for the study was made up of 20 separate but intertwined questions, which started from the demographics of the respondents. Other key areas were ICT facilities and services availability which was made up of open and closed ended questions, the usage of ICT by distance education students which was made up of closed ended questions type, the usefulness of ICT for distance education made up of both open and closed ended questions, factors influencing the use of ICTs for distance education made up of both open and closed ended questions, and finally, challenges students faced in the utilization and accessibility of ICTs for distance education, which also comprised open and closed ended questions. A copy of the questionnaire has been attached to the research report as part of the appendices.

3.6 Pre-test

Pretesting is a method of checking that questions work as intended and are understood by those individuals who are likely to respond to them (Hilton, 2015). Bentil (2011) has stated that pretesting helps to identify and take off ambiguous questions and duplications. This is important in research as it helps the researcher to predict ahead whether questions pose problems for respondents. Pretesting questionnaires is done to bring out unforeseen errors before data collection and this further strengthens the reliability of the research findings. For the purpose of this study, the instrument was pretested in the University of Ghana (UG) using 20 students from the Information Studies

Department. This was done as they had similar characteristics as both Kwame Nkrumah University of Science and Technology (KNUST) and University of Education, Winneba-Kumasi (UEW-K).

3.7 Mode of Data Collection

The study involved the collection of both secondary and primary data. The secondary data were the first collected from the universities' archives, publications and other relevant materials. These data were presented in the literature review chapter of the study. The primary data were collected using the questionnaire designed based on the objectives of the study, helping to get the exact responses to the questions posed. Official letters of introduction were taken from the Department of Information studies, which were sent to the registrars at the departments selected for the study in the two universities. This was done to seek permission for the administration of the questionnaire to the students. It was necessary to do that in order to meet the ethical condition surrounding the conduct of the study. The questionnaire was self-administered taking the form of face-to-face interaction with the students in order to get concrete data for sufficient analysis and drawing of inferences. The administration of the questionnaire was done by the researcher herself, who moved around the campuses of the two universities to administer the questionnaires to them. The data collection exercise took a period of one month for the two universities.

3.8 Data Analysis

Given (2008), gives evidence to the fact that coding is intrinsic in the process of data analysis and defines coding as consisting of identifying potentially interesting events, features, phrases, behaviors, or stages of a process and distinguishing them with labels. The data was thoroughly coded and analyzed by using the Microsoft the Statistical Package for the Social Sciences (SPSS version 22.0), after all necessary information were collected during the field exercise. The responses were analyzed and results were presented in the form of graphs and tables. It was based on these quantitative data that valid conclusions and recommendations were drawn and all these were done after data had been collected.

3.9 Ethical Consideration

In the conduct of the study, entry permit was sought from the managements of both universities thus KNUST and UEW-K. In achieving this, an introductory letter was taken from the Department of Information Studies and delivered to the Dean of Students. The study also complied with the University of Ghana's Code of Ethics. Again, the consent of the respondents was sought before questionnaire was administered. Participation of respondents was highly voluntary and as such attracted no incentives. All necessary literary works, materials and sources were duly acknowledged to prevent academic thievery and plagiarism. Anonymity and confidentiality was ensured in the process of gathering information for the study.

CHAPTER FOUR

ANALYSIS OF DATA AND PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the empirical data obtained from study participants. Data analysis is the accumulation of data for research purposes and forming inferences from the data which will uphold the main tenets of the research. In this research, the data analysis has been expressed in a clear, logical and coherent manner in tandem with the objectives of the study. Data were collected from 205 respondents out of the 210 questionnaires administered at both KNUST and UEW-K. This represented a response rate of approximately 98%. The presentation of results has been organized under the following sub-headings:

i. Demographics
ii. ICT Facilities and Services for Distance Education and their uses
iii. ICT Usage among Distance Education Students
iv. Usefulness of ICTs for Distance Education
v. Factors influencing the use of ICTs for Distance Education
vi. Challenges students face in the utilization and accessibility of ICTs for Distance Education

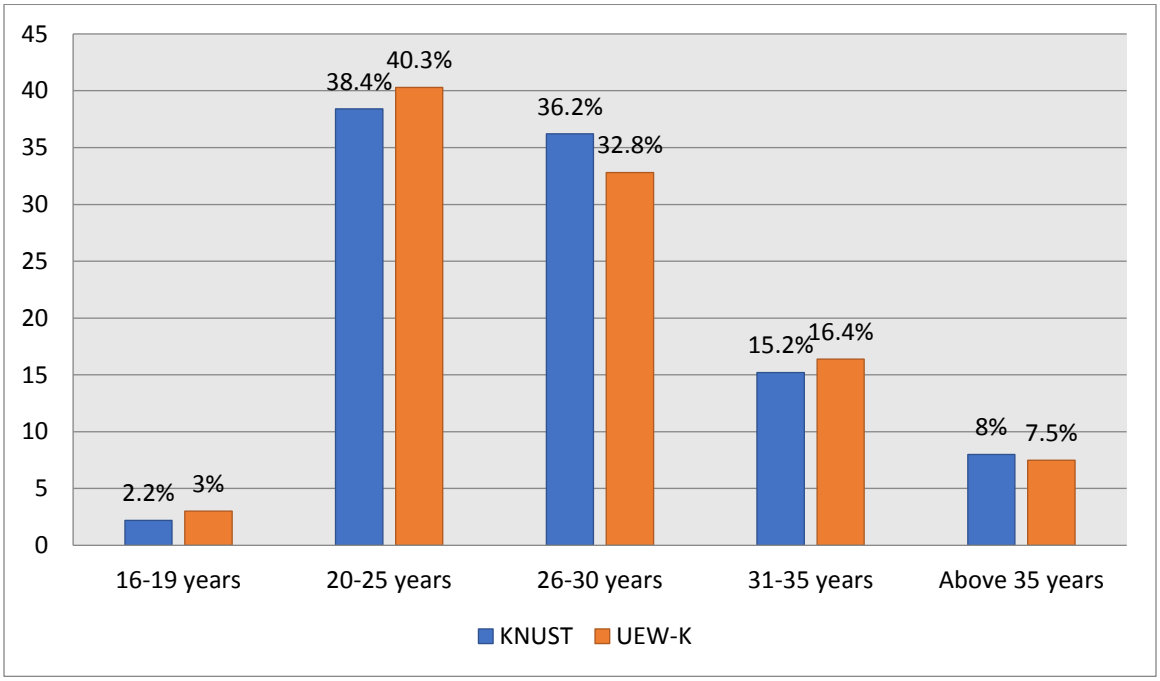
4.2 Demographics

The responses from the questions related to age and gender were used to present the demographics of the students. Demographic information is very vital in social science research. This is because it gives an idea of the kind of respondents engaged, and how their perspectives and findings could be incorporated in policy measures that can advance development.

4.2.1 Age

Age is seen as the period of human life, measured by years from birth, usually marked by a certain degree of mental or physical development and involving legal responsibility and capacity. Therefore, the age of respondents has influences on their level of knowledge and use of ICTs. This made it very necessary for the study to look into the ages of respondents. The respondents were asked to indicate their ages. The responses are presented in Figure 4.1.

Figure 4.1: Age range of respondents



Source: Field data, 2018

In KNUST, out of the 138 distance student respondents, 3(2.2%) were between 16-19 years, 53 (38.4%) were between 20-25 years, 50(36.2%) were within 26-31 years, 21(15.2%) were within 32-35 years, and 11(8.0%) were above 35 years.

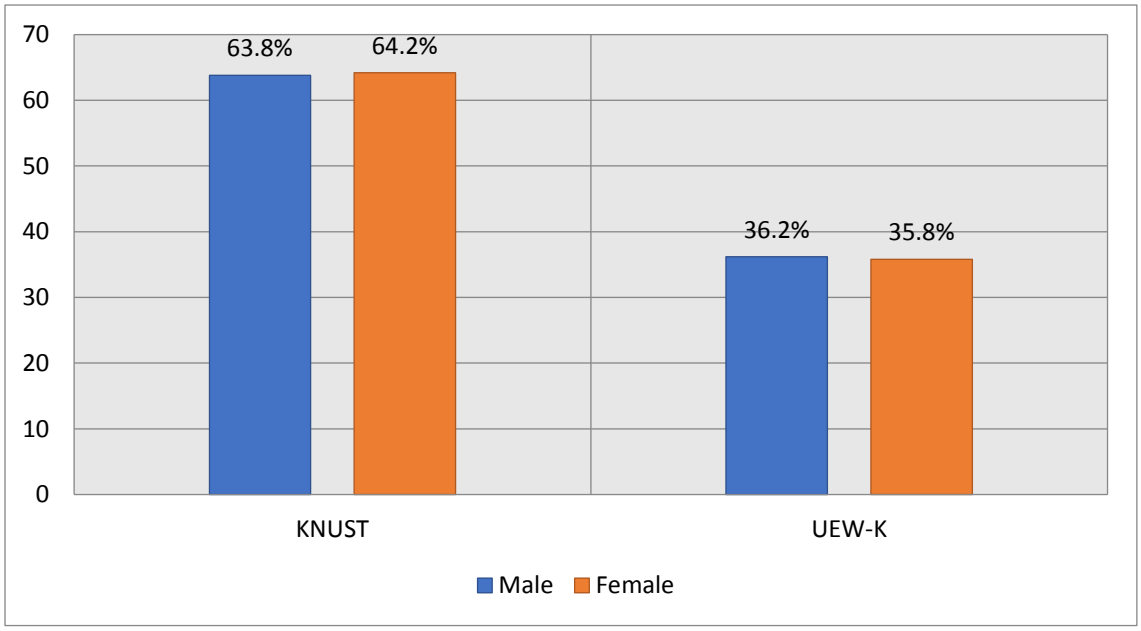
Also, in UEW-K, out of the 67 distance student respondents, 2(3.0%) were between 16-19 years 27 (40.3%) were within 20-25 years, 22(32.8%) were between 26-31 years, 11(16.4%) were within 32-35 years, and 5(7.5%) were above 35 years.

It can therefore be observed that majority of the respondents were within the age range of 20-25 years for both institutions. This implies that many of the students fell within the age bracket of 20-25 years.

4.2.2 Gender

Gender refers to either of the two sexes (male and female), especially when considered with reference to social and cultural differences rather than biological ones. Gender can influence the degree of use of ICTs by individuals, including students. For this reason, it became adequately necessary to investigate into sexes of respondents. The responses have been depicted in Figure 4.2.

Figure 4.2: Gender of respondents



Source: Field data, 2018

Out of the 138 students engaged from KNUST, a total of 88(63.8%) were males whilst 50(36.2%) were females. Also, in UEW-K, out of the 67 students engaged, 43(64.2%) were males vis-à-vis 24 (35.8%) females**.**

It can therefore be ascertained that there were more males than females in distance education in the two universities. This finding confirms in the various universities that the males are more than females. The finding is in accordance with the Gender Parity Index (GPI) of the Ministry of Education which indicates that in Ghana, males are higher in number at the various tertiary institutions compared to females.

4.3 ICT Facilities and Services availability for Distance Education

ICT is an extensional term for Information Technology which stresses the role of unified communications and the integration of telecommunications, computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information. It is an essential pillar for educational transformation, making use of facilities and services including computers, internets, broadcasting technologies (radio and television) and telephony for effective delivery and sharing of information and knowledge. The study examined the availability and use of ICT facilities and services for distance education students in KNUST and UEW-K.

4.3.1 Availability of Micro-Computers for Distance Education

Micro-computers are small computers that contain microprocessors as their central processors. They include Personal Computers (PCs), Laptops, Palmtops and Tablets. These computers are very relevant for distance education students' hence, their availability was examined in the two universities. The responses from the respondents have been indicated in Table 4.1.

Table 4.1: Availability of micro-computers in KNUST and UEW-K

Availability of micro-computers	KNUST		UEW-K	
	Frequency	Percent	Frequency	Percent
Available for use	98	71.0	49	73.1
Available but not usable	12	8.7	14	20.9
Not available	26	18.8	4	6.0
Non-response	2	1.4	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.1, in KNUST, 98 (71.0%) distance education students indicated micro computers were 'available for use', 26 (18.8%) indicated 'not available', and 12 (8.7%) indicated 'available but not usable now'. On the other hand, 49 (73.1%) from UEW-K indicated 'available for use', 14 (20.9%) 'available but not usable now' and 4 (6.0%) 'not available'. From the findings, it can therefore be observed that majority of students from both KNUST and UEW-K admitted that micro-computers were available for their use.

Investigating further, the study sought to find out whether the micro-computers were personal or institutional. The responses from the respondents indicated that in KNUST, 78(56.5%) used personal micro-computers and 20(14.5%) used institutional micro-computers. In the case of UEW-K, 40(59.7%) used personal micro-computers whilst 9(13.4%) used institutional micro-computers.

From the findings, it can be inferred that majority of the students from both institutions depended on personal micro-computers more than micro-computers made available by their institutions. Micro-computers are very useful and should be made available through whatever means either personal or institutional efforts for distance studies.

4.3.2 Availability of the Internet

The internet is a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols. The internet is useful for distance education students because it allows them to have access to a wide range of information and to communicate with their instructors with ease. Internet availability can be established through the use of Wi-Fi, modem and cable connections. Because of the relevance of the internet to distance education, the study found out its availability in the two universities studied. The responses from the respondents concerning availability of internet have been presented in Table 4.2.

Table 4.2: Availability of Internet (Wi-Fi, modem and cable) in KNUST and UEW-K

Availability of internet	**KNUST**		**UEW-K**	
	Frequency	**Percent**	**Frequency**	**Percent**
Available for use	135	97.8	19	28.4
Available but not usable	-	-	8	11.9
Not available	3	2.2	39	58.2
Non-response	-	-	1	1.5
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.2, in KNUST, 135(97.8%) distance education students indicated that internet was 'available for use' while 3(2.2%) indicated 'not available'. None of the students indicated internet

was 'available but not usable now'. In UEW-K, 39(58.2%) indicated internet was 'not available' 19(28.4%) indicated internet was 'available for use', whilst 8(11.9%) revealed internet is 'available but not usable'.

From the findings, it can be inferred that majority of students in KNUST confirmed to the availability of internet for use in their university, whilst in UEW-K, majority rather confirmed that internet was not available. This implies that internet penetration in UEW-K was lower than that of KNUST. Internet use for distance studies is very integral, as without internet connection, distance education will undeniably be hampered.

4.3.2.1 Personal and Institutional Internet in KNUST and UEW-K

Since the availability of internet is very fundamental to distance education students, there was the need to ascertain how students are able to get access to internet either through personal means or through their institutions. Data were solicited from only the students who indicated that internet services are available for use in their universities. This has made the total respondents to be 135 for KNUST and 19 for UEW-K. The responses from the respondents have been presented in Table 4.3.

Table 4.3: Personal and institutional internet

Institution of students	**KNUST**		**UEW-K**	
	Frequency	**Percent**	**Frequency**	**Percent**
Personal	25	18.5	14	73.7
Institutional	110	81.5	5	26.3
Total	**135**	**100.0**	**19**	**100.0**

Source: Field data, 2018

Out of 138 students from KNUST who indicated internet was available for use, 110(81.5%) were institutional internet provision whilst 25(18.5%) were personal. In the case of UEW-K, 14(73.7%) were personal whilst 5(26.3%) were institutional internet connections. From the findings, it can be ascertained that in KNUST, majority of students depended on institutional internet whilst in UEW-K, majority rather depended on personal internet connections.

4.3.3 Broadcasting Technologies for Distance Education

Broadcasting technologies are composed of the distribution of audio or video content to a dispersed audience through any electronic mass communications medium but not typically one using the electromagnetic spectrum, in a one-to-many model. The technology involves transmission of information via radios and television. The use of radio and televisions can help students obtain adequate information about subjects related to their programmes of study. In line with the positive implications of the use of broadcasting technologies on distance education, the availability of such technologies in the two universities was explored. The responses from the respondents have been indicated in Table 4.4.

Table 4.3: Availability of Broadcasting Technologies

Availability of broadcasting technologies	**KNUST**		**UEW-K**	
	Frequency	**Percent**	**Frequency**	**Percent**
Available for use	82	59.4	56	83.6
Available but not usable	13	9.4	2	3.0
Not available	38	27.5	8	11.9
Non-response	5	3.6	1	1.5
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.4, in KNUST, 82(59.4%) indicated broadcasting technologies were 'available for use', 38(27.5%) indicated 'not available' whilst 13(9.4%) indicated 'available but not usable now'. In UEW-K, 56(83.6%) indicated 'available for use', 8(11.9%) indicated 'not available' whilst 2(3.0%) indicated 'available but not usable now'.

In both institutions, majority of the students confirmed that broadcasting technologies were available for use. Probing further, the study sought to investigate into whether broadcasting technologies were personal or institutional. In KNUST, 76(55.1%) indicated they were 'personal' and 6(4.3%) indicated 'institutional'. Also, in UEW-K, 56(83.6%) students indicated that the available broadcasting technologies were 'personal'. None indicated institutional.

Broadcasting technologies for distance studies are very essential, and their availability ensures that students learn from discussions on radios and televisions to inform their studies.

4.3.4 Availability of Telephony for Distance Education

Telephony is the field of technology which involves the development, application, and development of telecommunication services for the purpose of electronic transmission of voice, fax, or data, between two parties or individuals. Telephones were developed through such technology, as well as the emergence of mobile phones. The ICT tools are central in distance education as it helps in the transfer of knowledge and information between students and their instructors. In line with the relevance of telephony, the study investigated its availability for distance education students from KNUST and UEW-K. The responses from the respondents have been indicated in Table 4.5.

Table 4.4: Availability of Telephony

Availability of telephony	KNUST		UEW-K	
	Frequency	Percent	Frequency	Percent
Available for use	135	97.8	66	98.5
Available but not usable	2	1.4	1	1.5
Not available	1	0.7	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.5, 135(97.8%) of the students who were from KNUST revealed that telephony was available for use, 2(1.4%) indicated telephony was available but not usable now and 1(0.7%) indicated not available. In UEW-K, 66(98.5%) indicated telephony was available for use whilst 1(1.5%) confirmed it was available but not usable. None of the respondents indicated that telephony was not available.

The finding implies that telephony is very important for distance education, and perhaps, the reason for majority of the students to confirm to its availability for use. The use of telephony provides the platform for instructors and their students to frequently interact at long distances.

4.3.4.1 Personal and Institutional Telephony in KNUST and UEW-K

In line with the relevance of telephony, the study investigated into whether it is personal tools used by students or instead institutional. Data were solicited from only the students who indicated that telephony was available for use in their universities. This has made the total respondents of 135 for KNUST and 66 for UEW-K. The responses from the respondents have been presented in Table 4.6.

Table 4.5: Personal and Institutional Telephony

Institution of students	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Personal	135	100.0	66	100.0
Institutional	-	-	-	-
Total	**135**	**100.0**	**66**	**100.0**

Source: Field data, 2018

As indicated in Table 4.6, all the 135(100.0%) students from KNUST and 66(100.0%) students from UEW-K who indicated that telephony was available for use revealed that they are personal. These individuals owned either telephones or mobile phones, which they used as a medium for information and educational purposes.

This finding goes to indicate that telephony, especially mobile phones are more personal, and this underpins why they are use personally by all the students. Telephones have gradually metamorphosed in this contemporary era into predominant use of high grade mobile phones which provide multiple unique features for personal use.

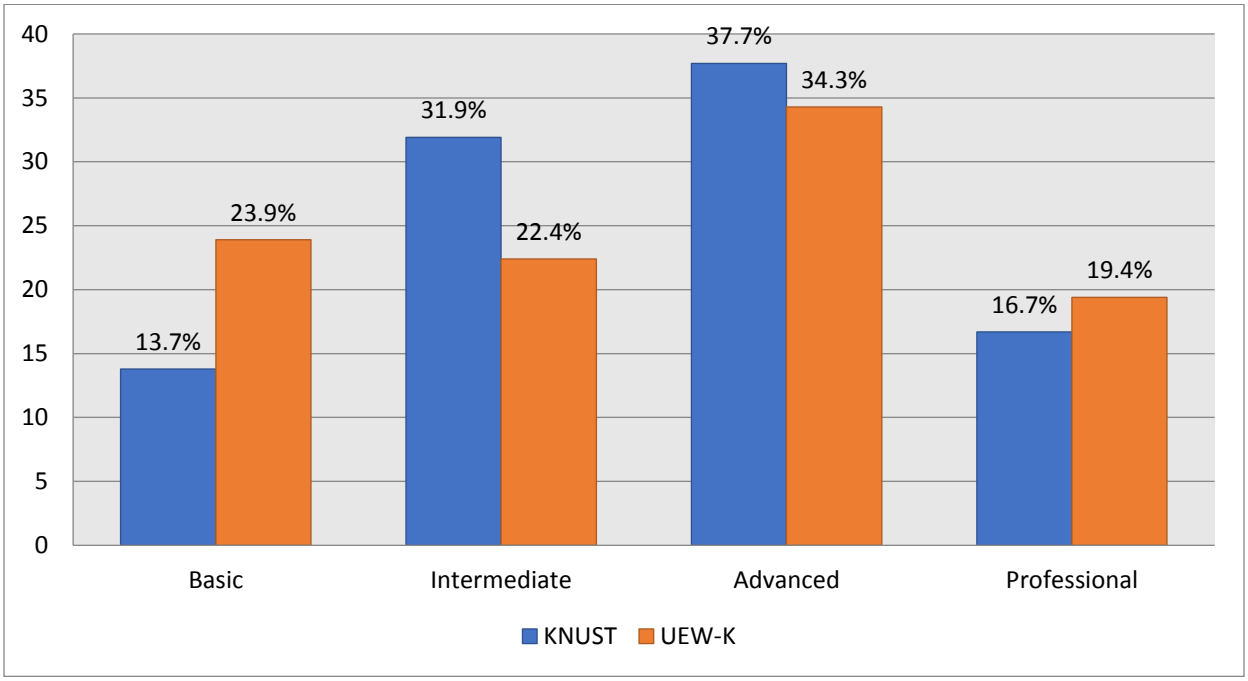
4.4 Usage of ICT by Distance Education Students

ICT is very important and its usage helps to reap the full benefits of ICT. Because usage of ICT is very central to distance education, the study set out to find the following issues interlinked with the usage of ICT among the distance education students from the two universities-KNUST and UEW-K.

4.4.1 Personal rating of Use of ICT

Use refers to the action done mostly in a repeated manner. Thus, knowledge and use of ICT refers to facts, information and skills acquired through persistent actions performed on ICT tools. The use of ICT is integral in distance education, and as such students need to have some level of knowledge and use of ICTs for distance education. This study considered the knowledge and use of ICT among students through a rating system. The responses have been presented in Figure 4.3.

Figure 4.3: Level of Use of ICT



Source: Field data, 2018

As indicated in Figure 4.3, in KNUST, out of the 138 students, 52 (37.7%) rated their level of use of ICT as advanced, 44(31.9%) as intermediate, 23(16.7%) as professional and 19(13.8%) rated their skills in the knowledge and use of ICT as basic. In UEW-K, out of the 67 students, 23(34.3%) also rated their level of use of ICT as advanced, 16(23.9%) rated themselves as basic, 15(22.4%) as intermediate, and 13(19.4%) as professional.

Comparing KNUST and UEW-K, it can be ascertained that, whilst higher proportion of students in UEW-K rated themselves with professional expertise more than KNUST, greater proportion of students from KNUST rated themselves with advanced expertise more than UEW-K.

4.3.2 Perspectives of Students on Distance Education and ICT use

Distance education is expected to be structured in a manner that encourages the use of ICT. This is because, ICT is the central pillar for distance education. Without ICT, there will be no distance education. In line with the strong relationship expected to exist between distance education and ICT, the study investigated how distance education has encouraged the use of ICT in the two universities. The responses from the respondents have been presented in Table 4.7.

Table 4.6: Distance Education and Use of ICT in KNUST and UEW-K

Level of Assessment	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Completely	34	24.6	5	7.5
Greatly	31	22.5	9	13.4
Very well	39	28.3	10	14.9
Somehow	21	15.2	19	28.4
Not at all	10	7.2	24	35.8
Non- response	3	2.2	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.7, in KNUST, 39(28.3%) indicated 'very well', 34(24.6%) indicated 'completely', 31(22.5%) indicated 'greatly', 21(15.2%) indicted 'somehow' and 10(7.2%) indicated 'not at all' when asked how distance education has encouraged their use of ICT.

In UEW-K, 24(35.8%) indicated 'not at all', 19(28.4%) indicated 'somehow', 10(14.9%) indicated 'very well', 9(13.4%) indicated 'greatly', and 5(7.5%) indicated 'completely' when they were asked how distance education has encouraged their use of ICT.

From the results for the two schools, one can attest that, distance education has encouraged the use of ICT in KNUST more than UEW-K. The persistence use of ICTs will improve students' expertise, hence the curriculum of the universities, especially UEW-K should be structured to ensure effective use of ICTs by the students.

4.3.3 Major Uses of ICT tools

The type of use of ICT tools by distance education students influence the extent of benefits these students derive from distance education. The study therefore sought to find out the major use of ICT tools by distance education students. The responses from respondents have been presented in Table 4.8.

Table 4.7: Use of ICT Tools among Students

Major use of ICT tools	KNUST		UEW-K	
	Frequency	Percent	Frequency	Percent
Assignment	39	28.3	14	20.9
Learning	50	36.2	19	28.4
Research	42	30.4	29	43.3
Entertainment	6	4.3	4	5.9
Non- response	1	0.7	1	1.5
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.8, students from both KNUST and UEW-K used ICT tools for assignments, learning, research and entertainment. In KNUST 39(28.3%) used ICT tools for assignments, 50 (36.2%) for learning, 42(30.4%) for research and 6(4.3%) for entertainment. In UEW-K, 14 (20.9%) for assignment, 19(28.4%) for learning, 29(43.3%) for research, and 4(5.9%) for entertainment. Based on the findings, it can be identified that majority of the students from KNUST used ICT tools for learning whilst in UEW-K, majority, rather use the tools for their research works. The diversity of use of ICT by the students from the two institutions indicates that ICT can be used for wide range of activities depending on individuals' interest at a particular period of time.

4.3.4 Number of Times of Use of ICT facilities

The number of times students use ICT facilities has influence on the benefits they can derive from such facilities for their education. It was therefore deemed laudable to investigate into how often students used ICT facilities in their universities. The responses from respondents have been presented in Table 4.9.

Table 4.8: Times of Use of ICT Facilities by Students

Number of times	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Whenever I wish	35	25.3	9	13.4
Frequently	33	24.0	11	16.4
Sometimes	50	36.2	23	34.3
Never	17	12.3	24	35.8
Non- response	3	2.2	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As presented in Table 4.9, in KNUST, out of the 138 students, 50(36.2%) indicated 'sometimes', 35 (25.3%) indicated 'whenever I wish', 33(24.0%) indicated 'frequently', and 17(12.3%) indicated 'never' when asked how often they used ICT facilities in the university.

In UEW-K, out of the 67 students, 24(35.8%) indicated 'never', 23(34.3%) indicated 'sometimes', 11(16.4%) indicated 'frequently' and 9(13.4%) indicated 'whenever I wish'., when they were also asked how often they used ICT facilities in the university.

From the findings, it can be asserted that a greater proportion of students in KNUST used ICT facilities more often than their counterparts from UEW-K.

4.3.5 Ease of Use of ICT

Ease of use of ICT is influenced by the frequency of use and the practical knowledge of individuals concerning ICT. Individuals with ease of use of ICT are able to use it for a wide range of activities that have profound positive implications on their education. It was therefore prudent to investigate into the ease of use of ICT by distance education students.

4.3.5.1 Ease of Use of Micro- Computers

The ease of use of micro-computers was investigated as it has profound outcomes on distance education students. The results from the respondents have been presented in Table 4.10.

Table 4.9: Ease of Use of Micro-Computers in KNUST and UEW-K

Ease of use	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Very easy	75	54.3	33	49.3
Quite easy	43	31.2	26	38.8
Not easy	20	14.5	8	11.9
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As presented in Table 4.10, in KNUST, 75(54.3%) indicated that micro-computers were 'very easy' to use, 43(31.2%) indicated 'quite easy' and 20(14.5%) indicated 'not easy to use'. In UEW-K, it was found that 33(49.3%) indicated 'very easy', 26(38.8%) indicated 'quite easy' and 8(11.9%) indicated 'not easy to use' when asked the ease of use of micro-computers.

From the findings, it can be inferred that many of the students in both universities found it 'very easy' to use micro-computers. Ease of use of ICTs is integral in ensuring effective distance education, thus, it is a positive indication for students to have the ease to use micro-computers.

4.3.5.2 Ease of Use of Internet

The ease of use of the internet influences the rate of information and degree of knowledge transfer among students and their instructors. Since the internet cannot be taken for granted in distance education, it was necessary to investigate into the use of use of the internet among distance education students from the two universities. The responses from respondents have been indicated in Table 4.11.

Table 4.10: Ease of Use of Internet in KNUST and UEW-K

Ease of use	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Very easy	70	50.7	22	32.8
Quite easy	42	30.4	27	40.3
Not easy	26	18.8	17	25.4
Non- response	-	-	1	1.5
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

Results as presented in Table 4.11 indicate that in KNUST, 70(50.7%) found it 'very easy' to use the internet, 42(30.4%) indicated 'quite easy', and 26(18.8%) indicated 'not easy to use'. In UEW-K,

22(32.8%) indicated 'very easy, 27 (40.3%) indicated 'quite easy', and 17(25.4%) indicated 'not easy' when they were posed with the question concerning the ease of use of internet.

From the findings, whilst majority in KNUST found it 'very easy' to use the internet, most of their counterparts in UEW-K rather found the internet as 'quite easy' to use. Internet use should be well encouraged to ensure its ease of use. This is because, it forms the basis of distance education.

4.3.5.3 Ease of use of Broadcasting Technologies

Broadcasting technologies made up of mainly the use of radio and television also present positive implications on distance education when use appropriately. It was therefore vital to ascertain the ease of use of broadcasting technologies. The responses from respondents have been depicted in Table 4.12.

Table 4.11: Ease of use of Broadcasting Technologies

Ease of use	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Very easy	76	55.1	41	61.2
Quite easy	61	44.2	26	38.8
Not easy	1	0.7	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As indicated in Table 4.12, in KNUST, 76(55.1%) indicated 'very easy', 61(44.2%) indicated 'quite easy' and 1(0.7%) indicated not easy when asked about the ease of use of broadcasting technologies. In UEW-K, 41(61.2%) indicated very easy, 26(38.8%) indicated 'quite easy' and none indicated 'not easy' when asked concerning the ease of use of broadcasting technologies.

From the findings, many students from both institutions found broadcasting technologies as 'very easy to use', though quite a significant number revealed as 'quite easy to use'. Broadcasting technologies have been in existence for quite a long period of time and this might underpin why many students find such technologies easy to use.

4.3.5.4 Ease of Use of Telephony

In this contemporary era, telephony, especially mobile phones, have become an integral component of lives, and distance education extensively depends on the use of such ICT tools for effective and efficient outcomes. It was therefore in the right direction to ascertain the ease of use of telephony. Respondents were therefore asked the ease of use of telephony, and the responses have been depicted in Table 4.13.

Table 4.12: Ease of use of Telephony

Ease of use	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Very easy	74	53.6	41	61.2
Quite easy	45	32.6	20	29.9
Not easy	18	13.0	6	8.9
Non- response	1	0.7	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

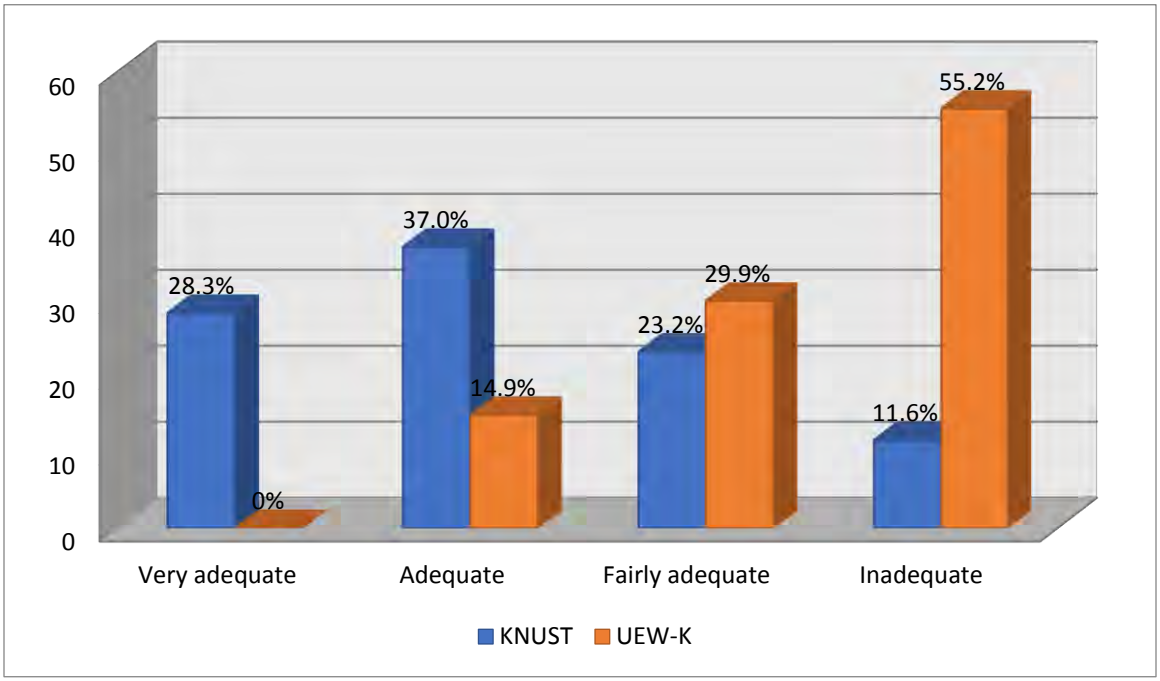
Results as presented in Table 4.13 showed that in KNUST, 74(53.6%) respondents found telephony 'very easy' to use, 45(32.6%) as 'quite easy' to use, and 18(13.0%) as 'not easy' to use. In UEW-K, 41(61.2%) respondents found telephony as 'very easy' to use, 20(29.9%) found it 'quite easy' to use and 6(8.9%) indicated 'not easy'.

Findings from the two universities looked similar, as majority found telephony as 'very easy' to use, followed by 'quite easy' and then 'not easy' to use. Telephones have become the center for easy communication through long distance, as such, students are expected to have the ease of use of such ICTs.

4.3.6 Adequacy of ICT Facilities in KNUST and UEW-K

ICT facilities are said to be adequate for distance education students when the number of facilities is commensurate to the number of students. ICT facilities can be optimally used when they are adequate and meet the needs of students. In tandem with the relevance of adequacy of ICT facilities, the study investigated into it. Respondents were asked about the adequacy of ICT facilities and the responses have been presented in Figure 4.4.

Figure 4.4: Adequacy of ICT Facilities



Source: Field data, 2018

As indicated in Figure 4.4, out of the 138 students from KNUST, 51(37.0%) indicated 'adequate', 39(28.3%) indicated 'very adequate', 32(23.2%) indicated 'fairly adequate; and 16(11.6%) indicated 'inadequate' when asked about the adequacy of ICT facilities in the university.

In UEW-K, out of the 67 students, 37(55.2%) admitted 'inadequate', 20(29.9%) revealed 'fairly adequate', 10(14.9%) confirmed adequate, and with none (0%) of the students indicating 'very adequate' concerning the adequacy of ICT facilities in the university.

From the findings, it can be ascertained that, whilst majority of the students from KNUST indicated that ICT facilities are 'adequate', the majority of those from UEW-K rather indicated that ICT facilities are 'inadequate' in their university.

4.3.7 Payment of ICT Facilities and Services

Access and use of ICT facilities have economic implications. It was therefore seen as relevant to find out whether or not students pay for ICT facilities and services. The responses from the respondents have been presented in Table 4.14.

Table 4.13: Payment for use of ICT facilities and Services

Response	Institution			
	KNUST		UEW-K	
	Frequency	Percent	Frequency	Percent
Yes	67	48.6	41	61.2
No	71	51.4	26	38.8
Total	138	100.0	67	100.0

Source: Field data, 2018

As indicated in Table 4.14, out of the 138 students from KNUST, 71(51.4%) indicated 'no' whilst 67(48.6%) indicated 'yes' whilst in terms of payment for ICT facilities and services. In terms of UEW-K, out of the 67, 41(61.2%) indicated 'yes' whilst 26(38.8%) indicated 'no' in terms of payment of the ICT facilities. From the findings, it can be inferred that in terms of payment of ICT facilities, majority of students from UEW-K paid for ICT facilities compared to KNUST.

Out of the 67 students from KNUST who confirmed 'Yes', 22(32.8%) paid GH¢1-5; 15(22.4%) paid GH¢6-10; 12(17.9%) paid GH¢11-20, and 18(26.9%) paid more than GH¢20. The diversity in the amount paid may depend on the number of times these students access the ICT services and facilities. In UEW-K, 7(17.1%) out of the 41 students who confirmed 'Yes' paid GH¢1-5. A number of 11(26.8%) paid GH¢6-10; 7(17.1%) paid GH¢11-20 and 16 (39%) paid above GH¢20.0. The findings imply that, the use of ICT facilities and services is expensive. Efforts are needed to streamline the use of ICT facilities and services in line with the needs of students without excessive cost burden.

4.4 Usefulness of ICT for Distance Education

ICT for distance education is useful and has implications on distance education. It was therefore deemed necessary to investigate the usefulness of ICT for distance education from the students' perspective. This has been presented in this section of the study.

4.4.1 ICT Use and its Usefulness to Students

In examining the usefulness of ICT for distance education, students were asked how well the use of ICT and its tools had helped them in their education as distance learners. The responses from the respondents have been depicted in Table 4.15.

Table 4.14: ICT Use and its Usefulness

Response	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Extremely well	47	34.1	10	14.9
Well	64	46.4	26	38.8
Somehow	26	18.8	30	44.8
Not well	-	-	1	1.5
Non- response	1	0.7	-	-
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

The findings as indicated in Table 4.15 reveal that in KNUST, out of the 138 students engaged, 64 (46.4%) indicated 'well', 47(34.1%) indicated 'extremely well', and 26(38.8%) indicated 'somehow' when they were posed with how ICT and its tools had helped them. In UEW-K, 30 (44.8%) opted for 'somehow', 26(38.8%) indicated 'well', 10(14.9%) indicated 'extremely well', and 1(1.5%) indicated not well when they were also asked the same question on how well ICT and its tools had helped them.

From the findings, more students in KNUST revealed that ICT and its tools had helped them very well compared to those in UEW-K.

4.4.2 Distance Learners and their ICT literacy Level

Literacy is generally seen as the ability to read and write. ICT literacy is defined as the ability to understand and use ICT tools and services. Distance education students are expected to be ICT literates, hence, there was the need to investigate into how ICT has improved the ICT literacy of the students. The responses from the respondents have been depicted in Table 4.16.

Table 4.15: Usefulness of ICT in Improving ICT Literacy Level of Students

Ease of use	KNUST		UEW-K	
	Frequency	**Percent**	**Frequency**	**Percent**
Yes	73	52.8	19	28.3
Not completely	35	25.4	24	35.8
Maybe	27	19.6	18	26.9
No	3	2.2	6	9.0
Total	**138**	**100.0**	**67**	**100.0**

Source: Field data, 2018

As presented in Table 4.16, in KNUST, out of the 138 students, 73(52.8%) indicated 'Yes', 35 (25.4%) indicated 'not completely', 27(19.6%) indicated 'maybe' and 3(2.2%) indicated 'no' when asked how ICT had improved their ICT literacy level.

For UEW-K, out of the 67 students, 24(35.8%) indicated 'not completely', 19(28.3%) indicted 'yes'. 18(26.9% indicated 'maybe' and 6(9.0%) indicated 'no' when asked similar question related to ICT literacy level.

Comparing the two universities, more students from KNUST confirmed that ICT has significantly improved their ICT literacy compared to their counterparts from UEW-K. ICT literacy is key in distance education and should therefore not be downplayed in any means. This calls for the need to structure distance education curriculum in a manner that allows students to persistently improve their ICT literacy level.

4.4.3 Usefulness of ICT for Distance Studies

It is widely accepted that ICT is very useful for distance education. It was therefore relevant to investigate into the diverse usefulness of ICT for distance studies. The responses based on 'strongly agree' from respondents have been presented in Table 4.17.

Table 4.17: Usefulness of ICT

Usefulness of ICT	Institution	Frequency	Percentage
Autonomy in education	KNUST UEW-K	28 25	20.3 37.3
Effective coordination with instructors	KNUST UEW-K	33 14	23.9 20.9
Unearthed diversity in learning	KNUST UEW-K	48 16	34.8 23.9
Elimination of barriers to quality education	KNUST UEW-K	42 27	30.4 40.3
Enhanced accessibility and innovation	KNUST UEW-K	40 51	29.0 76.1
Enhanced communication	KNUST UEW-K	24 44	17.4 65.7
Skills enhancement	KNUST UEW-K	48 39	34.8 58.2
Enhanced internet know-how	KNUST UEW-K	34 31	24.6 46.3
Increased opportunity to network	KNUST UEW-K	29 22	21.0 32.8
Improved academic and administrative functions	KNUST UEW-K	30 22	21.7 32.8
Increased ability in ICT usage	KNUST UEW-K	28 26	20.3 38.8

Source: Field data, 2018

As presented in Table 4.17, students were asked diverse range of usefulness. In relation to the question on how ICT has allowed for 'autonomy in education', 28(20.3%) respondents from KNUST as compared to 25(37.3%) from UEW-K strongly agreed. Another perceived usefulness of ICT was ICT has ensured students have 'effective coordination with instructors'.

With this, 33(23.9%) students from KNUST strongly agreed whilst 14(20.9%) from UEW-K also strongly agreed.

Information was also gathered on the usefulness of ICT in terms of 'unearthing diversity in learning', and with this, KNUST had 48(34.8%) who strongly agreed vis-à-vis 16(23.9%) students from UEW-K. In terms of the 'elimination of barriers of quality education' as a usefulness to ICT, 42(30.4%) students from KNUST strongly agreed compared to 27(40.3%) from UEW-K.

In relation to the fact that ICT 'enhances accessibility and innovation', in KNUST, 24(17.4%) strongly agreed whilst 44(65.7%) students from UEW-K strongly agreed. Students' views were also gathered on the usefulness of ICT in terms of 'skills enhancement' and with this, 48(34.8%) students from KNUST strongly agreed and 39(58.2%) students from UEW-K also strongly agreed. In relation to the usefulness of 'enhanced internet know-how', whilst in KNUST, 34(24.6%) strongly agreed, 31(46.3%) from UEW-K strongly agreed.

ICT 'increases opportunity to network' was considered perceived usefulness and students' views were consulted on it. The results indicated that 29(21.0%) KNUST students strongly agreed and 22 (32.8%) UEW-K strongly agreed. The other usefulness tested were, 'improved academic and administrative functions' and 'increased ability in ICT usage'. In terms of the former usefulness, 30 (21.7%) from KNUST agreed as compared to 22(32.8%) from UEW-K. Emphasizing on the latter usefulness, 28 (20.3%) from KNUST strongly agreed and 26(38.8%) from UEW-K also strongly agreed.

4.5 Factors Influencing the Use of ICTs for Distance Education

ICT use is influenced by several factors ranging from economic, socio-cultural, political and technological. It was deemed prudent to find out these diverse factors from the students engaged in this research. The responses based on 'strongly agree' from the respondents have been presented in Table 4.18.

Table 4.16: Factors Influencing the Use of ICTs

Factors	Institution	Frequency	Percentage
Socio-cultural factors			
Cultural influence in the use of ICT	**KNUST**	39	28.2
	UEW-K	14	20.8
Attitude and ideological influence in ICT	**KNUST**	33	23.9
	UEW-K	16	23.8
Technological factors			
Quantity of facilities and services	**KNUST**	48	34.7
	UEW-K	51	76.1
Technological Advancement by tutors and students	**KNUST**	44	31.8
	UEW-K	28	41.7
Political factors			
Political ideology on ICT	**KNUST**	65	47.1
	UEW-K	25	37.3
Government policies on ICT	**KNUST**	71	51.4
	UEW-K	27	40.2
Economic factors			
High cost of ICT facilities and services	**KNUST**	48	34.7
	UEW-K	19	28.3
Resource availability on ICT	**KNUST**	57	41.3
	UEW-K	22	32.8

Source: Field data, 2018

As indicated in Table 4.18, in terms of socio-cultural factors, students were asked about 'cultural influence on ICT'. With this, in KNUST, 39(28.2%) responded strongly agreed, whilst in UEW-K 14(20.8%) also indicated strongly agree. Students were also asked on 'Attitude and ideological

influence on ICT'. From KNUST 33(28.2%) indicated strongly agree whilst in UEW-K, 16(23.8%) also indicated strongly agree.

In relation to the technological factors, students were asked the question 'on the quantity of facilities and services'. With this, 48(34.7%) KNUST students, strongly agreed, while in UEW-K 51(76.1%) also strongly agreed. With 'Technological advancement', responses from students were, KNUST 44(31.8%) strongly agreed whilst in UEW-K 28(41.7%) strongly agreed.

For political factors, students were asked on the question "Political ideology on ICT". With this, responses from KNUST revealed 65(47.1%) who strongly agreed as compared to 25(37.3%) from UEW-K who also strongly agreed. Another factor was 'Government policies on ICT' and with this, students from KNUST, 71(51.4%) answered strongly agreed whilst in UEW-K, 27(40.2%) strongly agreed.

The final factors were economic factors, and with that, students were asked whether 'cost of ICT facilities and services' could influence the level of use of ICTs by students and instructors for distance studies'. With this, students from KNUST 48(34.7%) strongly agreed. In UEW-K, 19 (28.3%) also indicated strongly agree. Another factor on economic thus 'Resource availability on ICT' influencing the use of ICT. KNUST 57(41.3%) responded strongly agree whilst in UEW-K, 22(32.8%) also strongly agreed.

In tandem with the findings, key attention should be paid to the aforementioned factors in order to enhance the use of ICT amongst distance education students in the two universities.

4.6 Challenges of Utilization and Accessibility of ICTs

The utilization and accessibility of ICTs for distance education are impeded by certain challenges. These challenges could be intrinsic or extrinsic. The study therefore investigated into the specific challenges facing students in their utilization and accessibility to ICT facilities and services for their distance studies. The section talks about the challenges both intrinsic and extrinsic in nature.

Intrinsic challenges are associated with the difficulties associated with individuals' use of ICT. Whilst the extrinsic challenges are associated with a system or the entire institution. The responses based on 'strongly agree' from the respondents concerning the challenges have been espoused in Table 4.19

Table 4.17: Challenges faced in the Utilization and Accessibility of ICT

Challenges	Institution	Frequency	Percentage
Intrinsic challenges			
ICT is complicated and needs special skills	KNUST UEW-K	45 27	32.6 40.3
Tutors and students` resistance to change	KNUST UEW-K	35 19	25.4 28.4
Difficulties in integration of ICT in course delivery	KNUST UEW-K	20 11	14.5 16.4
Unprofessional ICT tutors	KNUST UEW-K	32 19	23.1 28.4
Limited time to explore emerging technologies	KNUST UEW-K	120 50	87.0 74.6
Extrinsic challenges			
Limited ICT facilities and services	KNUST UEW-K	45 21	32.6 31.3
Difficulties with technical hitches	KNUST UEW-K	27 14	20.0 20.9
High cost of ICT tools	KNUST UEW-K	40 15	29.0 22.4

Source: Field data, 2018

As indicated in Table 4.19, in relation to intrinsic challenges, students revealed several challenges. However, one intrinsic challenge was 'ICT is complicated and needs special skills'. Of this, students from KNUST, 45(32.6%) strongly agreed, whilst in UEW-K, 27(40.3%) strongly agreed.

Regarding the statement 'Tutors and students` resistance to change' of this, 35(25.4%) of students from KNUST strongly agreed. In UEW-K, 19(28.4%) Strongly agreed to this statement.

In relation to the statement 'Difficulties in the integration of ICT in course delivery' Results from KNUST indicated 20(14.5%) Strongly Agreed, whilst in UEW-K 11(16.4%) Strongly agreed. Another intrinsic challenge as 'Unprofessional ICT tutors'. With this, 32 (23.1%) strongly agreed from KNUST, whilst in UEW-K 19 (28.4%), also strongly agreed.

Last on intrinsic challenge is the statement 'Limited time to explore emerging technologies' Responses among the institutions were KNUST, 120(87.0%) strongly greed, and in UEW-K 50(74.6%) also Strongly Agreed.

Among the extrinsic challenges, one of the challenges was 'limited facilities and services'. Responses indicated that from KNUST 45(32.6%) strongly agreed, whilst in UEW-K 21(31.3%) also strongly agreed.

Another statement on extrinsic challenge thus 'Difficulties with technical hitches' Responses include 27(20.0%) strongly agreed from KNUST, and 14(20.9%) strongly agreed from UEW-K. Finally, with 'High cost of ICT tools' Responses indicate from KNUST, 40(29.0%) strongly agreed, whilst in UEW-K 15(22.4%) strongly agreed.

CHAPTER FIVE

DISCUSSIONS OF MAJOR FINDINGS

5.1 Introduction

This chapter principally discusses the major research findings. In order to ensure research logic and coherent flow, the major findings have been discussed based on the objectives of the study which are composed of the following headings:

1. ICT facilities and services availability for distance education
2. Usage of ICT facilities by distance education students
3. Usefulness of ICTs for distance education
4. Factors influencing the use of ICTs for distance education
5. Challenges students face in the utilization and accessibility of ICTs for distance education

5.2 ICT Facilities and Services for Distance Education

Distance education widely depends on the use of ICT facilities and services which are made up of computers, internets, broadcasting technologies and telephony (Beldarrain, 2013). In line with this, all distance education students are expected to have access to the ICT facilities and services for their studies. Sharaf et al. (2010) for instance have reiterated on the significance of micro-computers for distance education, and the need for all universities embracing distance education to have sufficient number of computers provided for distance education students.

The first objective of the study sought to find out the ICT facilities and services available to distance education students of KNUST and UEW-K. Greater number of students from KNUST confirmed to the availability of micro-computers for use as compared to those from UEW-K. The micro-computers were made up of PCs, laptops, palmtops, notepads and tablets. It was observed that in both universities, majority of the students depended on their personal micro-computers instead of institutional. This is an indication that students want unrestricted access to micro-computers for their distance studies. The dependence on institutional micro-computers came with access restrictions, especially after school hours. Fout-Zignani (2005) has indicated that computers are 'surrogate teachers' and form the basis of distance education. Students are expected to have intermittent access and use of computers for their studies. This explains why Wilson et al. (2011) called on the need for all universities around the globe to ensure that computers are widely available for their students. The studies also indicate that institutional micro-computers were very limited in UEW-K as compared to KNUST. More efforts are thus, needed from authorities of UEW-K in making micro-computer widely available for their distance education students.

In a similar study conducted by Ooskerlaken (2009) which described the ICT scene in Ghana and its utilization in distance education, it was realized that many institutions had very limited computers for students, and that students were forced to purchase their own computers for their studies. The findings from this study revealing that micro-computers are mostly personal tend to support Ooskerlaken's (2009) earlier revelation that the limited number of computers forced students to do so, making the use of personal computers more common than the use of institutional computers.

In the scope of the availability of internet service, as the use of micro-computer became very common, students needed access to a wide range of information to ensure effective use of their computers. This

was as a result of technological advancement, making the need for the internet adequately inevitable for distance education students (Graesser et al., 2012; Kearsley, 2011; Liang and Lu, 2010; Ritzema and Harris, 2008). This provision as indicated by Rovai and Jordan (2010) has made distance studies easier ensuring the quick transfer of knowledge from educational actors. In fact, internet availability for use in distance education is now fundamental, implying that universities with distance programmes have no option than to make internet services available for students.

Students from KNUST extensively used internet services made available by the university. On the other hand, those from UEW-K confirmed to the limited availability of internet services and hence used personal internet connection frequently. The findings of the study compare favorably with a similar study conducted by (Agyei and Voogt, 2011). They identified limited internet connections in various institutions in Ghana and how this has forced students to use their own means to get access to internet for their studies. In that particular study, the authors unraveled that students' access to internet has been based on the use of personal broadband data through the use of modem, router or mobile phones. This earlier study underpins why students in KNUST and UEW-K have to mainly depend on their personal internet connections in order to have access to valuable information for their distance studies.

While the use of the internet is gaining prominence due to upgrade in technology, broadcasting technologies for distance education have persistently seen a drop (Bates, 2015). In this study, a greater number of students from both institutions have broadcasting technologies available, and this finding tends to be contrary to Bates (2015) indication of limited use of such technologies. Some students

have personal broadcasting technological tools in their rooms for use, as they admitted to the significance of such ICT tools for their studies. Anderson and Dron (2011) has contended that broadcasting technologies are useful, as programmes and initiatives on such technologies could be useful for students.

Telephony has also become very instrumental for distance education, especially mobile phones (Keegan, 2005; Kearsley, 2011). The study identified that in the two universities, majority had telephony available for use for their distance studies. This obviously indicates how significant telephony is to students. The availability of telephony improves interactions among students and tutors. According to Bates (2015), advanced telephony (smart mobile phone) is a single most important ICT tool, which allows students to perform a wide range of functions at ease needed for successful education. This tool, as he contended, is also the most important in terms of communication between distance students and their tutors. It is therefore not surprising that nearly all the students interviewed had such tool available for use. The study findings run concurrently as the perspectives of Keegan (2005), Kearsley (2011) and Bates (2015).

5.3 Usage of ICT by Distance Education Students

The usage of ICT influences students' ICT skills and knowledge and helps them to be more conversant with approaches involved in the use of ICTs (Brindley et al., 2010). The second objective of the study also investigated the utilization of ICT tools by distance education students.

Distance education students in KNUST and UEW-K greatly rated themselves as advanced in ICT skills. In KNUST, most of the students aligned their advanced skill level in ICTs to the distance

education programme they are engaged in. Distance education students in UEW-K were greatly of the view that their skill level was not influenced by distance education. This was indicated by one of the UWE-K students. Impliedly, these students had already advanced their ICT skills before becoming students. Again, the structure and curriculum of distance education do not well encourage students from UEW-K to make extensive use of ICTs as compared to their counterparts in KNUST. Also, KNUST distance education has more ICT facilities and services to improve their ICT skills unlike UEW-K distance education.

The use of ICT in distance education can ensure students' autonomy, allowing them to learn more on their own (Brindley et al., 2010). Wilson et al. (2011) conducted a study to look into the use of ICT by students in some selected universities. Their findings confirmed the wide array of use of ICT which they grouped into educational use and non-educational use. According to their study, the educational use of ICT has been information searching and research especially when students are given take-home assignments, whilst the non-educational use has mainly been game plays and music downloads. This study confirms both the educational and non-educational use of ICT as Wilson et al., (2011) established.

It was identified that ICT tools were used by students for assignments, learning, research (educational use) and entertainment (non-educational use). There was however, diversities in use of ICT by students from the two universities. Whilst most students from KNUST used ICT tools for learning, most students from UEW-K used the tools extensively for their research. Despite the diversity in use of ICT tools, it was identified that educational uses (assignments, learning and research) were

dominant in both universities as compared to non-educational use (entertainment). According to Ritzema and Harris (2008), the use of ICT tools for educational purposes should be the hallmark of every distance education students. According to them, this is the rightful use of ICT tools as it enhances students' performance which has direct positive implications on human resource development of a country. With inferences from Ritzema and Harris (2008), the rightful use of ICT tools by distance education students from the two universities will thus, have direct positive outcomes on Ghana's human resource development.

The majority of students from KNUST used ICT facilities more often than those from UEW-K and this might explain why distance students from KNUST see ICT to have significant impact on their ICT skills than those from UEW-K. Most of these students see micro-computers as easy to use. Internet, broadcasting technologies and telephony facilities were seen by a wide number of students from both schools as easy to use.

Economic factors influence ICT use (Salih, 2004), and as such the majority of the students from both KNUST and UEW-K incur cost in using ICT facilities and services, with some paying as much as more than GH¢20 per week to use such facilities and services. The cost implications of ICT use could affect effective utilization, which might have negative implications on students' success.

5.4 Usefulness of ICT for Distance Education

The use of ICT serves as a powerful tool expanding educational opportunities both formal and informal education. There are evidences to suggest that ICT facilitates access to experts, resource persons, researchers, mentors and friends across the world of distance studies (Traxler, 2010). The

third objective of the study was to find out the usefulness of ICT for distance education. In the two universities engaged, students attested to varying range of how ICT has been useful to them. Students in KNUST greatly admitted that ICT has helped them 'well' in their distance education programme, whilst those in UEW-K, shared a lower degree of usefulness of ICT, and admitted that ICT has 'somehow' been useful in their distance education programme. The lower degree of usefulness of ICT shown by the UEW-K students can be attributed to the limited availability of ICT facilities and services. Despite the varying degree of usefulness of ICT to distance education students, Brindley et al. (2010) and Traxler (2010) have indicated that ICT forms the basis of distance education, and such its usefulness cannot and should not be downplayed at all.

ICT literacy level of students has increased, and the use of ICTs has somewhat contributed to that. KNUST students widely acknowledged the benefits ICTs have had on their ICT literacy level; but those from UEW-K indicated ICTs has not completely helped them as they expected in this distance education. As Ololube et al. (2012) have admitted, ICT can increase information accessibility to students and can assist them in trying new strategies, thinking and creativity. This revelation was greatly accepted by all students interviewed from the two universities. There were several other usefulness in which students admitted to including the usefulness of ICT in eliminating socio-economic, politico-cultural and geographical imbalances, the acquisition of basic skills and authentic content that compels and engages students throughout their learning process among others.

The findings from this study also indicate that some students admitted that ICT has allowed for autonomy in their education. Since the ICT encouraged long distance student-teacher interactions, it

is clear that there has been some autonomy in how and when students get their education. Students also agreed that ICT has created an effective coordination with their instructors. These aforementioned revelations compare favorably with Brindly et al., (2004) whose research identified such findings. Bernard et al., (2004) have also contended that ICT is useful as it can be incorporated with voicemail, emails, teleconferencing and computer-based integrated telecommunications and multimedia technologies. The students interviewed admitted that through ICT, communication with their instructors and non-academic staff has been enhanced; a revelation which somewhat concurs with Bernard et al.'s (2004) stance.

Other usefulness in which students unraveled included the fact that ICT has unearthed diversity in learning; ICT has eliminated socio-economic, politico-cultural and geographical imbalances which serve as barriers to quality of education; ICT has enhanced accessibility and innovation; ICT has facilitated acquisition of basic skills and has provided challenging and authentic content that compels and engages students throughout the learning process (skills enhancement); students are able to surf the internet for electronic books, trial questions and other relevant documents due to ICT (enhanced internet know-how).

Students also admitted to the fact that, students have access to resource persons, mentors, experts, researchers, professional and friends across the globe to share and learn from them through ICT (increased opportunity to network); and ICT has improved performance and has ensured effective teaching services as well as appropriate administration (improved academic and administrative

functions). The usefulness is in tandem with the stance of the following researchers Bates (2015), Traxler (2010), Pai and Huang (2011), Ifinedo (2012) and Olubabe et al., (2012).

5.5 Factors Influencing the Use of ICTs for Distance Education

Factors influencing the use of ICTs for distance education are composed of socio-cultural, technological, political and economic factors (Salih, 2004). The fourth objective of the study was to investigate factors influencing the use of ICTs for distance education.

On socio-cultural factors in tandem with knowledge and beliefs; and political factors made up of government policies on ICT were other useful factors students believe influenced their use of ICTs for distance education. Although Salari et al., (2009), Abasalt-Kharasani et al., (2011) and Suleiman and Zarafshani (2011) have admitted to the usefulness of ICT as understood by actors are important in influencing its use among students; the presence of unfavorable economic, socio-cultural and political factors as affirmed by Salih (2004) are the most critical ones and as such need appropriate measures to deal with them. Thus, the study probed the factors influencing the use of ICTs for distance education

Distance education students in KNUST and UEW-K accept the usefulness of ICT, but their use of ICT has widely been influenced by economic, socio-cultural and political factors. Specific to the socio-cultural factors, the findings revealed that students admitted that culture (knowledge, beliefs, arts, morals, traditional laws and customs) of geographical locations can influence the use of ICT for distance education. The other socio-cultural factor was students' acceptance that attitude and

ideological influence of ICT. The findings run in the same direction as Pai and Huang (2011) and Luu and Freeman (2011) who have also identified these factors as influencing the use of ICT for distance education.

In relation to technological factors, the students also admitted that the number of ICT facilities and services (quantity of facilities and services) in a learning environment influence the use of ICT. They further attested to the influence of the level of technological development on the use of ICTs by instructors and students for distance education. The level of technological advancement in Ghana affects distance education, since the universities cannot use technologies that does not exist in the country even though other universities around the world might have introduced them in their distance education programmes. Studies such as Beldarrain (2006) and Chifwepa (2008) identified technological progress as instrumental in ICT, but failed to indicate that technology can influence the use of ICT. Salih (2004) argued that technological factors can influence the use of ICT use but was not specific in terms of these factors.

The political factors students admitted to have influence on the use of ICT were; the political ideology of ICT and government policies. These findings are clearly in agreement with Salih's (2004) perspective. According to him, distance education initiatives work successfully under political policies and favorable political system, which ensure that educational actors effectively use ICTs for effective education.

The research also identified economic factors as students clearly admitted to these factors. They are: high cost of ICT facilities and services, resource availability influence how ICTs are used. The cost factor has been highlighted by Salih (2004), when he noted that cost has influenced the level of use of ICTs in developing countries. In terms of resource availability, there seem to be scarcity of research works done to identify such a factor.

5.6 Challenges of Utilization and Accessibility of ICTs for Distance Education

For utilization and accessibility of ICTs for distance studies come with challenges, which need to be identified and dealt with so as to enhance distance education programmes around the globe (Salehi and Salehi, 2012). The fifth objective of the study investigated the challenges students faced in the utilization and accessibility of ICTs for distance education.

Some portions of students from the two universities admitted to challenges such as ICT being complicated and needing special skills, some instructors and students resist change, difficulties in integrating ICT in instructions, lack of time for professional training and the lack of time to explore emerging technologies. These challenges have been admitted in studies such as Yunus et al., (2009) and Scheopp (2005). For Scheopp, these challenges can be treated as intrinsic challenges, which Alwani (2005) defines to mean that such challenges are related to instructors, administrators and learners within the distance education framework. Other challenges identified as widely admitted by students included limited ICT facilities, difficulties in dealing with technical hitches and high cost involved in the use of ICT. All these challenges are further considered as extrinsic in nature by

Scheopp (2005), and Alwani (2005) admits that they are those challenges typically institutional in nature, as such, needs concrete institutional attention to deal with them.

Delving deep into the intrinsic challenges, the majority of the students in both institutions indicated that ICT is complicated and needs special skills from both teachers and instructors who often do not have such skills. They also added that some instructors and students resist change, hence they are unable to effectively use ICT tools for distance education. Again, in some cases, there are difficulties in the integration of ICT in instruction and there is lack of time for professional training. In terms of the lack of time for professional training, Alwani's (2005) study identified similar finding, however, in terms of the others, there are paucity of related studies to confirm to the finding, though Scheopp (2005) treats such challenges as intrinsic.

In terms of the extrinsic challenges, majority of the students confirmed the limited ICT facilities and services, difficulties in dealing with technical hitches in the use of ICT for distance education and huge cost involved in the use of ICT. These findings favorably support researchers such as Ifinedo (2012) and Ooskerlaken, 2009) works on the challenges of ICTs utilization and accessibility. The findings however go contrary to that of researchers such as Beldarrain (2006) and Bankole and Babalola (2012).

5.7 Theoretical Interpretation of the Findings

The Technology Acceptance Model (TAM) by Park (2009) was adopted to establish the theoretical footprint of this research. The research explores the various facets of the theory through the objectives set for the study. Legris, Ingham and Collerette (2003) have established the relevance of the theory by indicating that it can be useful in explaining and predicting actors' behavior of ICT. In relation to one of the key components of the theory which is 'perceived usefulness', students brought out a number of usefulness they have perceived, with ICT helping to increase information accessibility to students and assisting students to try new strategies, thinking and creativity taking greatly accepted by students. The perceived ease of use, which is an important component of the TAM model has influenced the perceived usefulness of ICT by the students. In general, students had ease of use with micro-computers, broadcasting technologies and telephony. This indication as revealed by Park (2009) in TAM will influence the perceived usefulness as well as attitude toward the use of ICT facilities and services. Attitude toward ICT use has been shaped differently in the two universities.

Whilst in KNUST, ICT facilities and services are widely agreed by students to be available for studies and that distance education has encouraged them to use ICTs, those in UEW-K revealed ICT facilities were not adequate and that distance education has not encouraged not to use ICTs. Within the framework of the TAM model, it can be said that the diversified pattern of ICTs adequacy and perception about how distance education has triggered the use of ICT have underpinned the behavioral intention of use of ICTs leading to differences in the actual use of ICTs by students. Thus, ICT facilities and services are frequently used by students in KNUST as compared to those in UEW-K who used the facilities and services not too often, but rather 'sometimes'. External variables such as factors that can influence ICT use and challenges associated with the utilization and accessibility

of ICT facilities have served as the basis to induce the perception on ICTs usefulness and their ease of use by students from both KNUST and UEW-K.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This is the concluding chapter of the study, and it summarizes all the findings based on the objectives set in chapter one. The conclusion and recommendations of the study are also included in this chapter. Again, areas for further studies are included in the chapter.

6.2 Summary of Findings

This study examined and compared the use of ICT in distance education by students of the Kwame Nkrumah University of Science and Technology (KNUST) and the University of Education, Winneba-Kumasi (UEW-K). The investigation was aimed at ICT facilities and services availability, usage of ICT by distance education students, usefulness of ICT for distance education, the factors influencing the use of ICTs for distance education, and the challenges facing the utilization and accessibility of ICTs for distance education.

6.3 ICT Facilities and Services Availability

The study sought to find out the ICT facilities and services available to distance education students in KNUST and UEW-K. The findings revealed that ICT facilities and services were not adequate, even though KNUST had higher number of facilities and services availability than UEW-K. Most students from the two institutions depended on personal ICT facilities and services instead of institutional facilities and services.

6.3.1 Usage of ICT Facilities and Services

The study also investigated the usage of ICT facilities and services by students from KNUST and UEW-K. The findings indicated that, the usage of ICT facilities and services have had some form of influences on students' level of skills and knowledge on ICT as well as their ICT literacy. Students use ICT tools for assignments, learning, research and entertainment, but there were differences in usage among students from the two universities. In KNUST, ICT usage was tilted more to learning, then to research, assignments and entertainment; whilst in UEW-K, usage was tilted more to research, then learning, assignments and entertainment. The number of times of ICT usage varied among students, and that whilst KNUST students used ICT more frequently, those in UEW-K used it in some cases. This is an indication of how distance education has been structured in both universities, with one encouraging frequent use of ICT, whilst the other, the less use of ICT by students. ICT usage also comes with cost on majority of students, and this holds true for both universities.

6.3.2 Usefulness of ICTs

As one of the objectives, the usefulness of ICTs for distance education, for students from both KNUST and UEW-K was also ascertained. The study found wide range of usefulness of ICTs to students from both institutions including a sort of autonomy for students in their education, induced presentation, demonstration, drill and practices, interaction and collaboration with instructors, ensured variety and change in accommodating different learning styles, eliminated socio-economic, politico-cultural and geographical imbalances that could affect the quality of education, increased information accessible to students and assisted them in trying new strategies, thinking and creativity, strengthened instructor-students communication, enhanced acquisition of skills and provided challenging and authentic content that compels and engages students throughout the learning process,

induced internet surfing for information, ensured access to wide range of resourceful persons including experts, researchers, professionals and friend, and enhanced students' performance.

6.3.3 Factors Influencing the Use of ICTs

The study also investigated the factors influencing the use of ICTs for distance education. The findings attested to diverse factors categorized into socio-cultural, technological, political and economic. The main factors included knowledge, beliefs, arts, morals, traditional laws and customs, level of technological development, perceptions and attitudes and the cost involved in the use of ICTs. These among others were seen to have influence on the use of ICTs for distance education.

6.3.4 Challenges of Utilization and Accessibility of ICTs

It was also deemed worthy to ascertain the challenges faced by students in the utilization and accessibility of ICTs for distance education. The findings confirmed some key challenges which were grouped primarily into intrinsic and extrinsic problems. The intrinsic problems identified in the study were that ICT is complicated and the resistance to change by students and instructors. The extrinsic problems were the limited ICT facilities and services, technical hitches and their difficulties and huge cost involved in the use of ICT as the students indicated.

6.4 Conclusion

Distance education has increasingly become an integral component of the educational structure of Ghana at the higher level. Even across the globe, distance programmes are gaining ground, and many universities are using distance education as an avenue to reach out to numerous individuals across the globe. It will not be far-fetched to see the global educational system dominated by distance education,

especially at the postgraduate levels. Ghana as a developing country, needs to put in the right measures to meet the global incremental transformation in line with distance education. The research has revealed that several policy options and actions are needed to enhance distance educational programmes in the country. Ghana is still learning through systematic improvement from current actions taken, and hence, the distance education structure will continuously receive inputs through research to shape it in the right context to meet the needs and aspirations of the country. Both KNUST and UEW-K have made some headways, but there are still loopholes which need to be filled, particularly in UEW-K, where ICT facilities and services seem to be limited.

6.5 Recommendations

In solving the problems identified in the study, the following recommendations have been made to improve distance education and ICT use in the two universities. The recommendations could also be beneficial to other universities which run distance programmes in Ghana and other developing countries.

6.5.1 Effective upgrading of ICT Facilities and Services

There is the need for the two universities to upgrade the existing ICT facilities and services used for distance education. This could take the form of incorporating inventory management into distance education administration. The use of inventory management ensures that gaps in facilities and services are identified and appropriately addressed. In fact, inventory management software has emerged which allows institutions to plan and track their facilities and services; and this could be considered by the universities. In KNUST, inventory management as the basis for upgrading ICT facilities and services could be characterized by effective and organized monitoring. This is because

the university has management planning systems for stock-keeping. On the other hand, UEW-K needs to set-up inventory management unit composed of competent and qualified staff members to ensure effective stock keeping and upgrading of facilities and services.

6.5.2 Comprehensive Needs Assessment of ICT Facilities and Services

It will also be necessary for the two universities to embrace comprehensive needs assessment of their ICT facilities and services. This measure ensures that discrepancy between the current condition and wanted condition of the facilities and services are ascertained. Needs assessment should be proactive and participatory and should be done in tandem with inventory management. Need assessment could be done either internally by trained staff members or externally by a hired expert, but this ultimately depends on the financial health of the universities. In KNUST, inventory management has not been tied to needs assessment, and this needs urgent attention. In the case of UEW-K, current efforts should ensure that needs assessment is instituted and tied to inventory management system.

6.5.3 Effective and Regular Training Programmes for both Instructors and Students

The organization of training programmes for instructors and students should not be relegated to the background. Distance education is based on ICT, which continuously manifests and transforms itself due to technological upgrade and unpredictable emergence. The distance education students are more conversant with the widely known ICT tools such as computers and laptops, but their use of newly emerging ICT tools has been low. Again, students hardly use their ICT tools for complex applications which are instrumental in distance education transformation such as video conferencing, and online discussions, which are unique platforms for students to gain knowledge from a wide range of experts across the globe. It will therefore be prudent for training programmes to be instituted and these should

be tied to emerging technologies so that students are abreast of up and coming ICTs which will help them in their distance education programmes. The training programmes could better be handled by conducting '*training needs analyses*. The needs analysis would identify the real training gaps needed, for instance, is it that instructors are not comfortable with the use of micro-computers for teleconferencing, or why are instructors and students not embracing modern search engines to get information for their studies?. Based on the results of the analysis, formal and differential training packages could be designed for distance education students and their instructors from both universities to improve their competencies and ease of use of ICTs.

6.5.4 Students' Preparedness and Access to ICT Facilities should be encouraged

Students enrolled on distance education programme should understand that the programme by its nature is dependent on ICTs. In line with that all students who want to enroll on distance education programmes should ensure that they have access to ICT facilities through personal means. This will require extra financial commitment from students and they should be ready to accept that. Historically, distance education was designed for professional individuals to serve as an avenue for them to further their students whilst in their working environment. It is thus, assumed that students who enroll on to the programme should be individuals who are working and have enough financial resources to undertake the study in order to advance their knowledge. Students clearly revealed the inadequate number of facilities and services for their studies. This cannot be downplayed by the universities, however, whilst the universities make effort to improve the facilities and services, distance education students should also ensure that they have personal access to some basic ICT facilities and services necessary for their studies. The burden of facilities and services availability should not be placed on the shoulders of only the universities but students as well. With this, the cost

burden is shared between students and their universities, and this will ultimately help reduce the huge cost incurred by students in accessing ICTs.

6.5.5 Knowledge on ICT should form part of the admission requirements for Distance Education

It will be necessary for the two universities to incorporate ICT as a basic requirement for admission to distance education programmes. This is because, some degree of knowledge on ICTs will ensure that students can easily cope with the utilization of ICT facilities and services for successful outcome. Thus, students who have very limited knowledge on the use of basic ICTs should not be considered for distance education, instead regular student. This is because, distance programmes make use of ICTs more than regular programmes, and as such, individuals who have very limited knowledge on ICTs will not be able to cope with distance programmes.

6.6 Areas for Further Studies

The study examined ICT use in distance education in only two universities in Ghana, and these universities were also public institutions. There is a large number of universities embracing distance education including private institutions. Further research works are thus needed to assess ICT use in distance education in the remaining universities both public, and private in order to determine their related issues concerning the subject matter.

A comparative study between a public and a private university could be an interesting one which would provide profound findings for policy options.

There could also be a comparative study among private institutions. Such studies should include instructors, administrators and students in order to make the findings very comprehensive.

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APPENDIX 1

UNIVERSITY OF GHANA
COLLEGE OF EDUCATION
SCHOOL OF INFORMATION AND COMMUNICATION STUDIES
DEPARTMENT OF INFORMATION STUDIES

This Research Instrument is designed to collect data for a study on the "**Use of ICT in Distance Education: A comparative study of Kwame Nkrumah University of Science and Technology (KNUST) and University of Education, Winneba-Kumasi (UEW-K) Distance Education students."** Please be assured that the responses you provide are for academic purposes and are completely anonymous and treated confidential. Your assistance in responding to the following questions will help the study achieve its stated objectives. Thank you for your understanding.

Institution: ( ) KNUST
( ) UEW-K

A. BASIC INFORMATION

1. Age (years):
   (a) Below 16 (b) 16-19 (c) 20-25 (d) 26-31 (e) 32-35 (f) Above 35

2. Sex: (a) Male (b) Female

B. ICT FACILITIES AND SERVICES AVAILABILITY

Please indicate which of the following ICT facilities and services are available for use as distance education student. Please use (✓) to indicate your response in the Table below

No.	ICT facilities and services	Availability			If Available, please indicate whether it is personal or institutional
		Available for use	Available but not usable now	Not available	Personal/Institutional
A.	**Category 1: Micro Computer**				
	Computer system				Personal [ ] Institutional [ ]
	Laptop				Personal [ ] Institutional [ ]
	Palmtop				Personal [ ] Institutional [ ]
	Tablet				Personal [ ] Institutional [ ]
B.	**Category 2: Internet**				
	Wi-Fi				Personal [ ] Institutional [ ]
	Cable connection				Personal [ ] Institutional [ ]
	Modem				Personal [ ] Institutional [ ]
C.	**Category 3: Broadcasting Technologies**				
	Radio				Personal [ ] Institutional [ ]
	Television				Personal [ ] Institutional [ ]
D.	**Category 4: Telephony**				
	Telephone				Personal [ ] Institutional [ ]
	Mobile phones				Personal [ ] Institutional [ ]

3. What other ICT facilities/services are available for distance education in the institution?
   ……
   ……
   ……

C. USAGE OF ICT BY DISTANCE EDUCATION STUDENTS

4. How would you rate yourself with regard to the usage of ICT?
   (a) Basic (b) Intermediate (c) Advanced (d) Professional
5. Does the distance education programme encourage the usage of ICT facilities?
   (a) Not at all (b) Somehow (c) Very well (d) Greatly (e) Completely
6. What do you use the ICT tools available in the university for your distance education programme? (*Tick as applicable)*
   (I) Assignments (II) Teaching and Learning (III) Tests
   (IV) Research (V) Entertainment
   (VI) Specify others: ……
7. How often do you use the ICT facilities available in the university?
   (a) Whenever I wish (b) Frequently (c) Sometimes (d) Never
8. How do you rate the ease of use of the following ICT facilities/services for distance education? Tick only in areas applicable to you.

No.	**ICT facilities/services**	**Ease of use**		
		Very ease	**Quite easy to use**	**Not easy to use**
A.	**Category 1: Micro Computer**			
	PC			
	Laptop			
	Notepad			
	Tablet			
B.	**Category 2: Internet**			
	Wi-Fi			
	Cable connection			
	Modem			
C.	**Category 3: Broadcasting technologies**			
	Radio			

	Television			
D.	**Category 4: Telephony**			
	Telephone			
	Mobile phone			

9. How adequate are the ICT facilities in your university to serve the needs of distance education students?
   (a) Very Adequate (b) Adequate (c) Fairly Adequate (d) Inadequate

11. Do you pay for the use of ICT for your Distance Education on your campus?

    (a) Yes (b) No

If yes, how much does it cost you per week to use ICT for your Distance Education on your campus?

a) Below GH¢ 1 b) GH¢ 1-5 c) GH¢ 6-10 d) GH¢ 10-20 e) Above GH¢ 20

12. Do you easily get information in relation to your area of study with the use of ICT in your institution?
    (a) All the time (b) Mostly (c) Sometimes (d) Rarely (e) Never

D. USEFULNESS OF ICT FOR DISTANCE EDUCATION

13. How well has the use of ICT and its tools helped you in your education as a Distance Learner?
    (a) Extremely well (b) Well (c) Somehow (d) Not well
14. Do you think the use of ICT in your institution has improved your ICT literacy level?
    (a) Yes (b) Not Completely (c) May be (d) No
    Justify by explaining briefly your response in (Q14):
    ……
    ……
    ……
    ……
    ……

15. Please rate the extent to which you agree or disagree with (✓) in terms of the perceived usefulness of ICT for distance education in your institution

Usefulness of ICT for distance education	*Likert scale*				
	Strongly Agree	*Agree*	*Undecided*	*Disagree*	*Strongly Disagree*
The use of ICT has allowed for autonomy in your education					
ICT has ensured presentation, demonstration, drill and practice, interaction and collaboration with your instructors					
ICT has given you variety and change in accommodating different learning styles					
ICT has eliminated socio-economic, politico-cultural and geographical imbalances that could have affected the quality of your education					
The use of ICT has increased information accessible to you and has assisted you in trying new strategies, thinking and creativity					
Communication with your instructors and non-academic staff has been strengthened through ICT					
ICT has facilitated your acquisition of basic skills and has provided challenging and authentic content that compels and engages you throughout the learning process					
You are able to surf the internet for electronic books, trial questions, course materials and other relevant documents due to ICT in distance education					
You have access to other resource persons, mentors, experts, researchers, professional and friends across the globe to share and learn from them through ICT.					

ICT has improved your performance, and has ensured effective teaching services as well as appropriate administration					
You are able to use ICT for for video-conferencing, electronic mailings, audio-conferences amongst others for information dissemination and knowledge gaining					

E. FACTORS INFLUENCING THE USE OF ICTs FOR DISTANCE EDUCATION

16. Please indicate the extent to which you agree with the following as factors influencing the use of ICTs for distance education in your university. Tick (✓) in appropriate box

Factors influencing the use of ICTs for distance education	*Likert scale*				
	Strongly Agree	*Agree*	*Undecided*	*Disagree*	*Strongly Disagree*
Socio-cultural factors					
Knowledge, beliefs, arts, morals, traditional laws and customs of a geographical location can influence the use of ICT for distance education					
ICTs use for distance education is influenced by teachers' attitude and beliefs about ICTs					
Technological factors					
The number of ICT facilities and services such as computer system, internet services and others in a learning environment plays role in influencing the use of such facilities for distance studies					
Level of technological development can influence the use of ICTs by instructors and students for distance education.					
Political factors					

Perceptions and attitudes of a political system could affect the acceptance and use of ICT					
Government policies on ICT are necessary for enhancing distance education well centered on the use of ICT					
Economic factors					
Cost is an importance factor that influence the level of use of ICTs by students and instructors for distance studies					
Resource availability or scarcity has significant bearing on the use of ICTs for distance education					

17. What other factors do you think have influenced the use of ICT for distance education in your university?

……
……
……
……
……

F. CHALLENGES STUDENTS' FACE IN THE UTILIZATION AND ACCESSIBILITY OF ICTs FOR DISTANCE EDUCATION

18. Please indicate the extent to which you agree with the following challenges of ICTs for distance education in your university. Tick (✓) in appropriate box

Challenges faced in the utilization and accessibility of ICT for distance education	*Likert scale*				
	Strongly Agree	***Agree***	***Undecided***	***Disagree***	***Strongly Disagree***
A. Intrinsic challenges					
ICT is complicated and needs special skills from both teachers and instructors, who often do not have such skills					
Some instructors and students resist change, hence they are unable to effectively use ICT tools for distance education					
In some cases, there are difficulties in the integration of ICT in instruction					
Lack of time for professional training among teachers and instructors for knowledge upgrade					
Lack of time to explore emerging technologies by teachers and students					
B. Extrinsic challenges					
Limited ICT facilities and services					
Difficulties in dealing with technical hitches in the use of ICT for distance education					
Huge cost involved in the use of ICT for distance education					

19. What other challenges do you face in the utilization and accessibility of ICT for distance education? …….
……
……
……
……

20. From your point of view as a distance education student, what do you think should be done to improve the utilization and accessibility of ICT in distance education in your department?

……
……
……
……