

**UNIVERSITY OF GHANA  
DEPARTMENT OF INFORMATION  
STUDIES**

**THE USE OF ICT IN TEACHING AND LEARNING AT  
THE WISCONSIN INTERNATIONAL UNIVERSITY  
COLLEGE**

**BY**

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**THIS DISSERTATION IS SUBMITTED TO THE  
UNIVERSITY OF GHANA, LEGON IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE  
AWARD OF MA INFORMATION STUDIES DEGREE.**

**JULY 2017**

## DECLARATION

I do hereby declare that this dissertation is the result of my own original work except reference to other peoples work which has been duly acknowledged and that no part of it has been presented for another degree elsewhere.

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## DEDICATION

I dedicate this work to my lord Jesus Christ, whose faithfulness has brought me this far. I also dedicate to my family for their diverse support and prayers, especially Dr. Seth Osafo for his towering financial support throughout my academic life on campus, and well as to my mother Madame Gladys Saforo for the love and sacrifice she made for me to pursue this programme.



## ACKNOWLEDGEMENT

My first word of appreciation goes to my supervisor, Professor E. E. Badu for his fatherly supervision and encouragement, which has made this work successful.

I am very grateful to Dr. Markwei, Prof A. A. Alemna, Prof. H. Akussah and all lecturers and staff of the department of Information Studies for the opportunity and support given to me to undertake the MA. Programme.

My very special thank you goes to Mr. Eric Amoafu (Balme Librarian), for his immense support and encouragement before and during the period of this project.

I am also grateful to Wisconsin International University College, Ghana for the permission granted to me to undertake this study.

Finally, I am indebted to my wonderful friends' Naomi Larney, Francis Awuni, Charles Coffie and Corretta Lamptey, for their interest in my life.

I can only invoke the blessing of the Almighty God in your lives in all your endeavors. Thank you.

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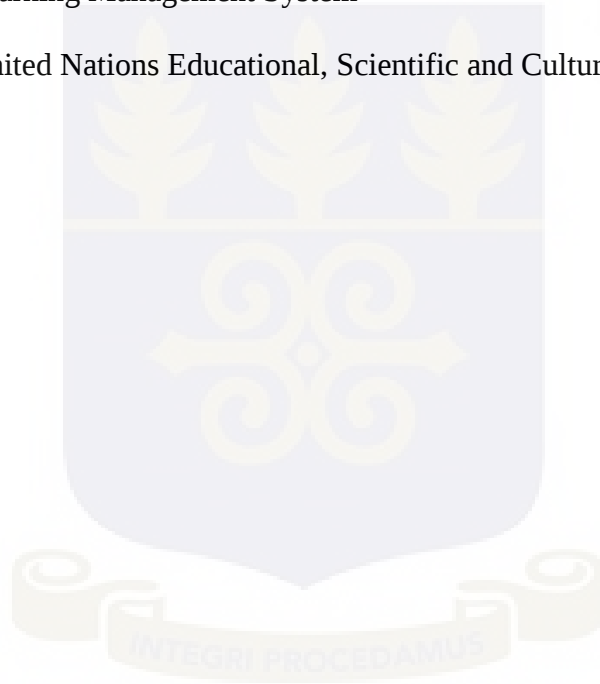


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## LIST OF ACRONYMS

|               |   |                                                                  |
|---------------|---|------------------------------------------------------------------|
| <b>ICT</b>    | - | Information and Communication Technology                         |
| <b>WIUC</b>   | - | Wisconsin International University College                       |
| <b>NAB</b>    | - | National Accreditation Board                                     |
| <b>MBA</b>    | - | Master in Business Administration                                |
| <b>KNUST</b>  | - | Kwame Nkrumah University of Science and Technology               |
| <b>VR</b>     | - | Virtual Reality                                                  |
| <b>WIS</b>    | - | Web Information System                                           |
| <b>LMN</b>    | - | Learning Management System                                       |
| <b>UNESCO</b> | - | United Nations Educational, Scientific and Cultural Organization |



## ABSTRACT

The study investigated the use of Information and Communication Technology (ICT) as a tool to support teaching and learning in the Wisconsin International University College. It specifically identifies existing facilities and how they are being used and the inherent problems and the perceptions of lecturers and students on integration of ICT in teaching and learning in the university.

The survey research methodology was used for the study. The survey size was 205, made up of 150 undergraduate students and 55 lecturers. Questionnaire was the main data collection instrument complemented with observation.

The findings indicate that both lecturers and students had a positive perception towards ICT integrated teaching and learning, but only few lecturers applied existing ICT facilities during their teaching. Online communication between lectures and students was poor, with students and lectures using only e-mail to communicate online instead of using Learning Management System such as Blackboard, WebCT or Moodle, which creates online community portal that connects lecturers and students and provides an avenue for classroom materials or activities to be shared easily.

Lack of constant electricity supply, limited internet bandwidth, system breakdown and unavailability of ICT integration support staff were some of the main problems encountered in the use of ICT for teaching and learning. All the lecturers had personal computers, which was not the same in the case of students even though most of the student do have their own computers. The study recommended ICT training for lecturers and students, constant supply of electricity, expansion and improvement of internet bandwidth, provision of Learning Management System and Virtual Reality supported teaching.

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 BACKGROUND TO THE STUDY

Turner (2009) defined Information and Communication Technology (ICT) as any device or system that allows the storage, retrieval, manipulation, transmission and receipt of digital information. For example, personal computers, digital television, email, robots.

Information and Communication Technology (ICT) is now being applied in every facet and discipline of human endeavor. It has contributed to organization, storage, retrieval, access, effective and efficient production and use of information. Throughout the world, there is awareness of the fundamental role of new Information and Communication Technologies (ICTs) especially in the field of education. ICT has unified the World in such a way that the term “global village” has been derived based on its, applications, roles and impacts it serves. Amongst its applications and roles are telecommunication, e-governance, teleconference, e-commerce, e-learning, e-mail etc., ICT and its importance in modern human endeavors cannot in any way be underscored.

ICT has become, within a very short time, a key foundation of modern society. Many countries now regard understanding and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. UNESCO aims to ensure that all countries, both developed and developing, have access to the best educational facilities necessary to prepare young people to play full roles in modern society and to contribute to a knowledge nation (Anderson & Weert, 2002).

Education is not only limited to teaching students according to prescribed syllabus at a specific school level but rather has much broader objectives, goals and other concepts. Thus, education is

becoming an increasingly important tool to combat poverty and to establish a modern nation. An evolving feature of modern society is the penetration of information technologies in all spheres of life, including schooling. In general, the new technologies have been recognized to play a valuable role in developing and improving the teaching and learning circumstances.

Technological advancement has made it possible for most universities worldwide to create and maintain electronic libraries together with electronic teaching models in order to make teaching and learning conceivable. Information centers and traditional libraries were the backbone of teaching and learning as well as providing all the logistics and creating the necessary conditions and environment needed for teaching and learning in education.

Today, technological advancement has made it possible for information professionals and librarians to create and maintain electronic libraries. This advancement has made creation, collection, organizing, storage, retrieval and dissemination of information simpler than before. With Information and Communication Technology being applied to every facet and discipline of human endeavor, its full impacts should be seen in the process of teaching and learning.

In the context of this study, ICT refers to any electronic equipment that can be used to enhanced teaching and learning: systems that enable easy communication between the teacher and the students beyond the physical barrier (either by space, time or both) of the classroom. (Lim and Chai, 2004). According to Kirschner & Selinger (2003), ICT offers the potential to meet the learning needs of individual students; to promote equality of opportunity; to offer high-quality learning materials; and to increase self-efficacy and independence of learning amongst students of all ages. For the teaching profession, ICT is not only an essential tool for teachers in their daily work, but it also offers them opportunities for their own professional development. It can be used to encourage new ways of working as part of professional learning teams and it offers schools themselves the possibility of a faster route to establishing a meaningful role in the wider

community, embracing learners of all ages, linking and networking to other educational establishments and bringing professionals together across a range of areas.

Lewis (2008) defines teaching as the activities of educating or instructing: that impart knowledge or skill and also defined learning as the cognitive process of acquiring skill or knowledge. The essence of these definitions is the impartation and acquisition of skills and knowledge. The usefulness of any training programme is the ability to equip the individual with the skill to undertake whatever related activities or measure the skill is meant for. For this to be effective, the methods used to impart the skill or knowledge should be one that takes current processes and challenges into consideration. It must reflect modern ways of doing things. The process should prepare the trainee or recipient of the knowledge to fit into the related field of endeavor. It should also be conducive for the teacher to also be able to deliver effectively and efficiently.

Roblyer (2004) stated that one of the things that make teaching so challenging is that it goes on in the environment that mirrors and sometimes magnifies some of society's most profound and problematic issues. Adding computers to this mix makes the situation even more complex. Yet, to integrate technology successfully into their teaching, educators must recognize and be prepared to work in this environment with all its subtleties and complexities.

## 1.2 WISCONSIN INTERNATIONAL UNIVERSITY COLLEGE

In order to place the study in its institutional context, an overview of Wisconsin International University College is presented.

The following information about the university is provided by the University website. (URL: <http://www.wiuc-ghana.edu.gh/brief-history>)

The University College was established by Dr. John Buuck and Rev. Dr. Paul K. Fynn in 1998. The University received accreditation in January 2000 under the name University College of Wisconsin International University - Ghana (UCWIU-Gh), it one of the very first private universities to receive accreditation. It began its operations in August 2000 under Rev. David Asante Dartey as the Director and Togbe Kwao Anipati IV as Dean of Academic Studies with nine International MBA students, the first MBA programme to be run by a private university in Ghana. Established as a Limited Liability Company, Wisconsin International University College, Ghana has been accredited by the National Accreditation Board (NAB) and is affiliated to the University of Ghana, Legon and the University of Cape Coast and, recently, to Kwame Nkrumah University of Science and Technology, Kumasi.

The vision of Wisconsin International University College is “to provide the opportunity for young men and women from Ghana and the rest of Africa to acquire the knowledge and skills relevant to successful careers and fulfillment in an increasingly globalizing and competitive world.

The mission of the university is to:

1. Train and develop skillful and competent professionals for business, Information and Communication Technology and Entrepreneurship”.
2. To ensure that its graduates are not marginalized in the knowledge and expertise required for the management of modern global organizations

3. To provide a broad-based adult and continuing education for the knowledge society in Ghana and Africa.

The University offers programmes at the undergraduate and post graduate levels as well as professional and certificate courses. True to its name as an international institution, the University has attracted students from other West African countries, North Africa, Central Africa and East Africa countries and other continents. It has students from Ghana, Nigeria, Cote D’voire, Mali, Togo, Benin, Egypt, Congo DR, Niger, Guinea, Liberia, Gabon, Chad, Cameroun, Burkina Faso, Kenya, Liberia, Niger, Sierra Leone and Gambia. The University provide flexible learning options where student needs are anticipated and met by providing courses in a variety of formats. The University offers well thought out programmes and combines academic work with work placement. These give students valuable opportunities to explore career options, develop a practical understanding of work-related issues and learn new skills.

Furthermore, it offers Career Advisory Services which ensures that the college works closely with local and national employers to match students with attachment opportunities in their final year and job placement when they graduate. Graduates are linked with the National Service Secretariat for employment. Students have access to practical advice from specialists who help them explore their career options and develop a plan to achieve their career goals. Workshops and seminars help put our students one step ahead in a competitive job market.

Finally, it has writing centres which complements the regular class activities by giving assistance to students with their assignments – essays, presentations, proposals and long essays. Students can also walk in with their writing questions and receive help to improve their writing skills across the curriculum.

Among the universities objectives is to “train and develop skillful and competent professionals for business, Information and Communication Technology and Entrepreneurship which is facilitated by software design centers within the university. These centers help students learn vital research skills, software development, and good management practices through empirical studies. By designing projects for organizations, students ensure that their research has practical value.

## **STATEMENT OF THE PROBLEM**

Preliminary observation of some lecture halls at the Wisconsin International University College showed that, the University is well equipped with teaching and learning facilities, which can enhance teaching and learning process. These includes computers, projectors, Internet, TV and VCD/DVD/VCR.

Unfortunately, most lecturers and students within the various departments do not use these facilities at their disposal to its fullest. Some of the lecturers still use the orthodox way of teaching whereby a white board, a marker and written lecture notes are mostly the tools being used to the neglect of other technological facilities such as microphones and projectors. Most of the white boards are quite untidy due to the mistaken use of permanent markers, which leaves trails on the boards and in most scenarios, students have to strain their eyes so they can see the words on the board.

Also most of the students find it difficult to use the internet for research and because of this, a lot of time is wasted in the retrieval of relevant information for their academic work. It is obvious that the University has the necessary ICT facilities that underpins teaching and learning processes. Yet the impacts of this resource on students and lecturers in the teaching and learning environment is minimal.

#### **1.4 PURPOSE OF THE STUDY**

The purpose of this study is to investigate the use of ICT as a tool to enhance teaching and learning in the Wisconsin International University College.

#### **1.5 OBJECTIVES OF THE STUDY**

The following are the objectives of the research conducted:

1. To find out whether lecturers and students make adequate use of ICT as a tool for teaching and learning;
2. To ascertain the views of lecturers and students on the availability of teaching and learning technologies in the Wisconsin International University College;
3. To find out whether lecturers integrate ICT into teaching so as to enhance the teaching and learning process;
4. To find out the difficulties encountered by lecturers and student in an ICT integrated environment for teaching and learning;
5. To suggest ways in which ICT can be used to support teaching and learning.

#### **1.6 RESEARCH QUESTIONS**

The study was guided by the following questions

1. Do lecturers have interest in an ICT integrated teaching and learning environment?
2. What are the ICT facilities in the lecture halls?
3. Do lecturers make use of ICT in teaching and learning?
4. How often do lecturers use the ICT facilities for their academic work?
5. What are the challenges in the use of the ICT facilities?

### **1.7 SCOPE OF STUDY**

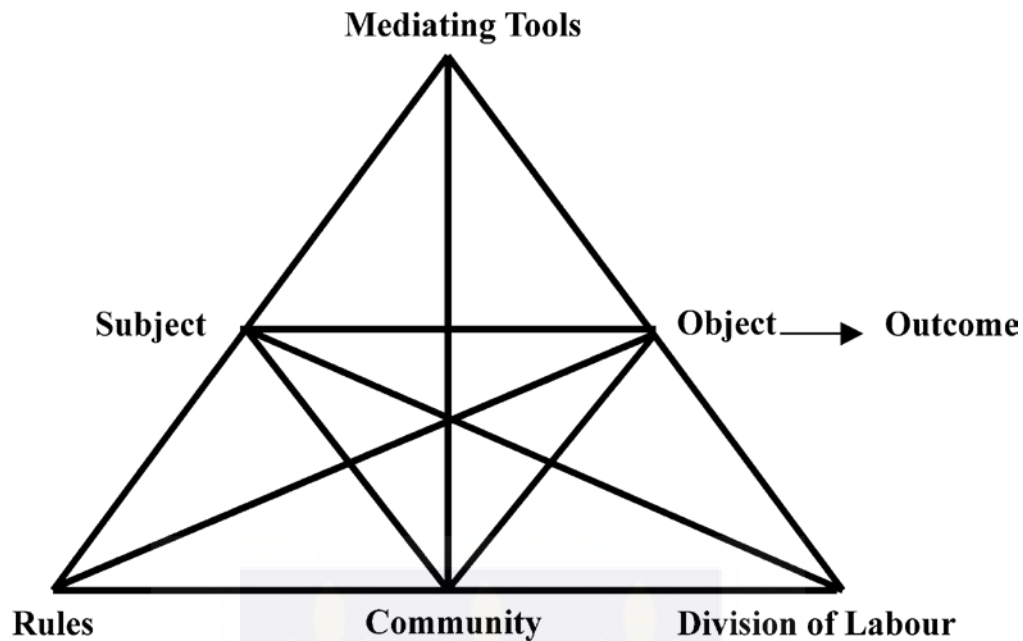
The study was limited to Wisconsin International University College because of proximity, time and funding constraint of the research. The study focused on undergraduate students who form larger classes in most tertiary institutions and some lecturers across the various faculties.

### **1.8 THEORETICAL FRAMEWORK**

The theory to be used is the Activity Theory Model of Quek & Shah (1995), which stems from the work of Russian psychologists Vygotsky and Leont'ev, in particular Vygotsky's (1934, 1978) theory of mediated activity. The theory argues that all purposeful human activity is accomplished through the use of physical and/or psychological tools. After Vygotsky, Leont'ev (1977, 1978) pioneered the concept of the hierarchical levels in activity, and explained that activity is always collective, never individual. Activity Theory was developed further by Engeström (1987), who produced the diagram of the activity system (Fig 1).

According to (Lim & Hang, 2003), activity theory proposes that activities consist of processes both at the individual and social level, including the mediational tools and artefacts that link the processes together. These tools may include ICT that mediate work functions among members of the learning environment. Taking activity theory as the theoretical framework provides important insights into the ICT integration process in Ghanaian universities. According to Hashim & Jones (2007), Activity Theory is a theoretical framework for the analysis and understanding of human interaction through their use of tools and artefacts. It offers a holistic and contextual method of discovery that can be used to support qualitative and interpretative research. Activity Theory is particularly relevant in situations that have a significant historical and cultural context and where the participants, their purposes and their tools are in a process of rapid and constant change.

Fig 1. **Ergeström's Activity Model**



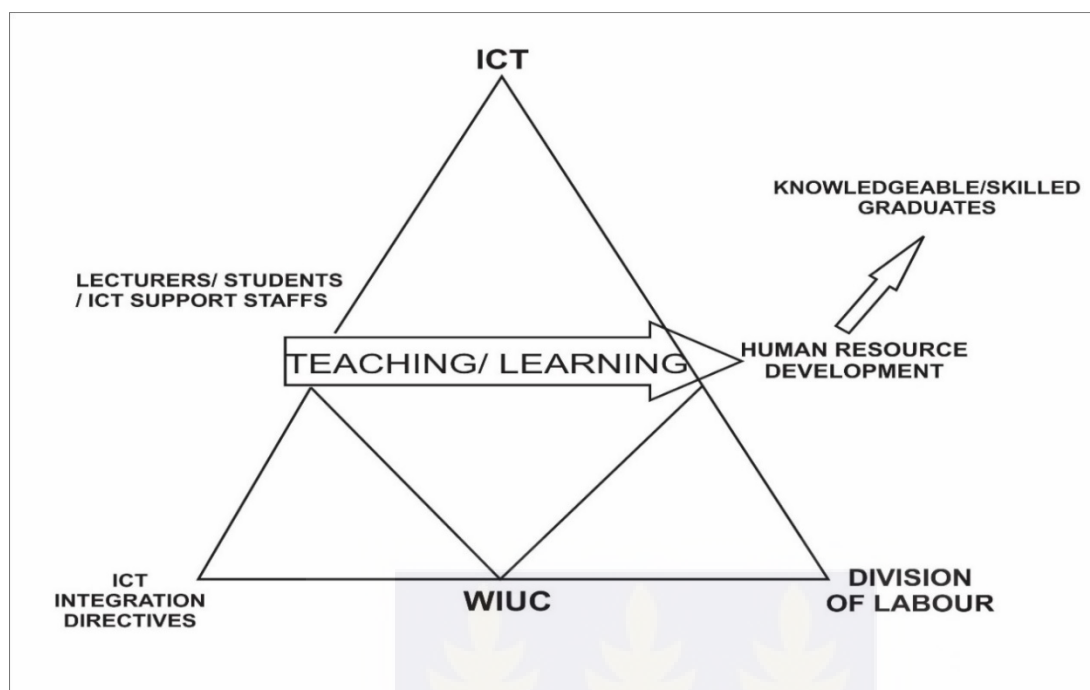
Source: Lim & Hang, (2003) *Computers & Education* 41 (2003) 49–63.

The theory is based on an ideology that, for an individual to perform a task (activity), an artefact or a mediating tool must be used which can be both physical or psychological in order to get an outcome or a result. According to Hashim & Jones (2007), Activity Theory sees the integration of technology as tools, which mediate social action. These tools, or artefacts, include instruments, signs, language, machines and computers. The relation between the individual and their environment is considered through the component of community. The relation between subject and community is mediated by rules and the relationship between object and community is mediated by the division of labour.

The Activity Theory was adopted for this study based on Mwanza's (2001) Eight-Step Model of open-ended questions on the individual components as illustrated below (Fig 2). Regarding this study, the components of the adapted model are as follows:

1. Activity - teaching and learning is the activity undertaken by the subjects
2. Subjects- the study focuses on lecturers and students as the subject directly involve the teaching and learning process.
3. Object-ive- “Human Resource Development” which is explicitly stated in the mission statement of the Wisconsin International University College is considered as the object of the activity.
4. Tools- “ICT” is the proposed tool expected to be used to enhance the processes of teaching and learning.
5. Rules- directives demanding ICT training for lectures/students and its integration in the teaching and learning should be made available.
6. Division of labour- the act of teaching and learning in an ICT integrated environments, apart from lecturers and student should also include “ICT Support staff” who will be responsible for the running and maintenance of equipment and programs.
7. Community- the environment within which the activity is undertaken is an academic environment which is the Wisconsin International University College.
8. Outcome- the expected results of the activity is the churning out of practically “Knowledgeable skilled Graduates” ready for industry. Source (Amoafu 2011)

Fig 2. The adopted Ergeström Activity Theory Model for the study



Source: Field work 2017

## 1.9 SIGNIFICANCE OF THE STUDY

There have been numerous concerns and discussion on ICT and its usage as a tool for teaching and learning as far as universities are concerned, its discussions in the Ghanaian based literature is minimal.

The results of the study are expected to expose the challenges and opportunities involved in using ICT as a tool for teaching and learning in the Ghanaian context.

This study will be useful to researchers and scholars since it will add to the existing literature by identifying and analyzing deficiencies in previous work and bridge the identified gaps in knowledge in developing countries compared to the advanced countries. The study will also establish the need for the Wisconsin International University College to integrate ICT fully into the processes of teaching and learning.

## 1.10 ORGANIZATION OF CHAPTERS

The study is organized into five chapters.

### **Chapter one: Introduction**

This chapter provides the basis for the research. It covers the introduction which contains the background to the study, overview of the study, statement of the problem, purpose statement, objectives of the study, theoretical Framework, definitions of terms, significance of the study, scope of the study and organization of chapters.

### **Chapter two: Literature Review**

This chapter covers the Literature review which discusses available topic in the field of the study. It discusses the topic from the global, African and Ghanaian perspectives.

### **Chapter three: Research Methodology**

This chapter explains the methodology used to conduct the research. It covers the selection of cases, subjects (population, sample size, sampling technique) Instrumentation and ethical consideration.

### **Chapter four: Data Analysis and Discussion**

This chapter presents and discusses the findings obtained from the data collected.

### **Chapter five: Summary of findings, Conclusion and Recommendation**

The final chapter presents a summary of findings, conclusion and recommendations.

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## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 INTRODUCTION

There has been wide-ranging research in the area of ICT integration in Education in different countries. In relation to this work, related literature will be reviewed to show the research progress made concerning the use of ICT for teaching and learning.

The literature review took a critical look at some of the literature, the opportunities and challenges that they identified, as well as their relevance to this study. In doing this, literature was reviewed under the following themes: teaching and learning, Information and Communication Technologies application, teaching and learning technologies, ICT as a tool for teaching and learning in tertiary schools in Ghana, application of ICT to teaching and learning in the Wisconsin International University College.

#### 2.2 TEACHING AND LEARNING

Teaching and learning are tightly bound activities, so questioning “what is learning?” might lead to have a closer look about what precisely are the components of teaching—and their underlying principles as well—that can cause efficient learning (Dessus, Mandin, & Zampa, 2008).

Bruce Joyce (2017) defined teaching as the creation of learning environments with long-range and short-term effects on students. "Content, skills, instructional roles, social relations, types of activities, physical facilities and their use all add up to an environmental system whose parts interact with one another to constrain the behavior of all participants. The different combinations of these elements create different environments eliciting different educational outcomes". These outcomes are further differentiated as "instructional" (content and skills gained by the student through activities which characterize a learning environment) and "nurturing" (capacities and values which result from living in an environment). Thus, teaching is the process of carrying out

those activities that experience has shown to be effective in getting students to learn. De Houwer, Barnes-Holmes, & Moors, (2013) defined learning as ontogenetic adaptation—that is, as changes in the behavior of an organism that result from regularities in the environment of the organism.

Learning is the process by which one acquires, ingests, and stores or accepts information. Thus, our experiences with learned information compose our bodies of knowledge. Learning is a process unique to each individual. Some learn quickly, scanning the information and mastering the concept or skill seemingly effortlessly. Others stumble while processing information, taking longer to grasp the concept or requiring numerous exposures over a sustained period. Some individuals store the information they have learned indefinitely, cementing it in their memories. Others find that the information they have learned slips away rapidly. Some learn best through text, others through practice, and some through hearing. Learning styles are as unique and varied as our personalities. Learning is a lifelong endeavor. As long as one remains engaged in life, learning does not cease.

### **2.3 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) APPLICATIONS**

According to Owusu-Ansah, (2015), Information technology (IT) refers to all equipment, processes, procedures and systems used to provide and support information systems (both computerized and manual) within an organization and those reaching out to customers and suppliers (Cashman, et al., 2006).

The term “Information and Communication Technology (ICT)” was coined to reflect the seamless convergence of digital processing and telecommunications (Negroponte, et al., 2006). ICTs include hardware, processes and systems used for storing, managing, communicating and sharing information (ICT in Education Policy, 2008). ICTs are indispensable and have been accepted as part of the contemporary world especially in the industrialized society (Hawkins, 2002).

Pelgrum and Law (2003) state that near the end of the 1980s, the term ‘computers’ was replaced by ‘IT’ (Information Technology) signifying a shift of focus from computing technology to the

capacity to store and retrieve information. This was followed by the introduction of the term ‘ICT’ (Information and Communication Technology) around 1992, when e-mail started to become available to the general public (Pelgrum and Law 2003). According to a United Nations report (1999), ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services, and other related information and communication activities. According to UNESCO (2002) information and communication technology (ICT) may be regarded as the combination of ‘Informatics technology’ with other related technology, specifically communication technology. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs etc have been used in education for different purposes (Sharma, 2003; Sanyal, 2001; Bhattacharya and Sharma, 2007). Noor-Ul-Amin, (2013), is of the view that the field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research. A great deal of research has proven the benefits to the quality of education (Al-Ansari, 2006). ICTs have the potential to innovate, accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; as cited by Yusuf, 2005).

## **2.4 TEACHING AND LEARNING TECHNOLOGIES**

Since the invention of computers, schools have implemented novelties to help deal with the complexities of giving quality trainings. With the introduction of the Internet, those advances have extended further. From course enrollment to representative administration to understudy joint effort to task following, PCs and the Internet have radically changed instructing and learning in advanced education. Various programming bundles are touted by organizations as giving rearrangements of the bureaucratic wreckage innate to extensive associations.

In today's classroom, innovation is a device, as well as an asset for getting to data that additionally empowers learning. New open doors and approaches to incorporate innovation into the learning procedure are being made each day. The following are a portion of the advances that improves instructing and learning process.

### **2.4.1. Web Information Systems**

A Web Information System is an information system that uses Internet web technologies to deliver information and service to users or other information systems/applications. Thus, it is a software system whose main purpose is to publish and maintain data by using hypertext-based principles. Web Information Systems (WIS's) have turned into a staple for advanced education schools. They can oversee everything from worker finance to understudy course determination. As a suite of programming applications that draw data from a unified database, WIS's are essential to class overseers, letting them rapidly get to data through a web program from any Internet-associated PC. Understudies and staff can likewise utilize WIS's to deal with their courses, finance status and assess their degree status. WIS's regularly give the establishment other instructive advancements for use in their work (SunGard Higher Education, 2010). For instance, some Learning

Management Systems utilize the course information put away in the WIS to make individualized pages controlled by the educator and available to the understudies.

Amongst the most prevalent WIS's utilized by educational systems worldwide is the Banner Unified Digital Campus worked by SunGard Higher Education (2010). It can be incorporated and customized to a specific establishment.

Moreover, the Banner framework incorporates with numerous other well-known instructive advancements, expanding its handiness.

#### **2.4.2. Learning Management Systems**

According to Adzharuddin & Ling (2013), Learning Management System (LMS) is an online portal that connects lecturers and students. It provides an avenue for classroom materials or activities to be shared easily. It is also a portal that enables lecturers and students to interact out of the classroom, having discussions through forums that could otherwise take up too much of the time supposed to be spent learning in the classroom. Learning Management Systems (LMS's) give teachers an individualized online space for each of their classes. Many give the capacity to post archives, send declarations, oversee reviews and empower talks (Powel and Gill, 2003). Educators can contact understudies and keep tabs on their development in online assignments.

Most Learning Management Systems contain the capacity to connect with WIS's keeping in mind the end goal to streamline the page creation prepare (i.e. utilize class records to keep up authorizations for a specific course). Some prominent LMS's incorporate Blackboard, WebCT and Moodle. Chalkboard is the biggest and most compelling element of the three since it obtained WebCT. Backboard is incorporating the two organizations' product bundles (Bremer and Bryant, 2005). On the other hand, Moodle is a free open source programming bundle that has as of late developed as a rival in the advanced education LMS domain. As an open source extend with many dynamic designers, Moodle permits any product specialist to make modules to develop its abilities.

As of now, more than 45,000 government associations, organizations, and instructive establishments keep up dynamic establishments of Moodle around the world; Hong Kong itself has seventy-eight known establishments (Martin and Serrano, 2009).

In this modern world where information is disseminated quickly via the internet, the LMS is an essential tool for university students as not they can keep updated with their coursework, but get instant notifications pertaining to their daily assignments. In turn, lecturers have an easier time reaching out to their students out of class hours and can instantly update them over the LMS about issues regarding their coursework. Although those using the LMS might encounter some problems, it's all part of learning and using a whole new system altogether. Universities should provide proper training and guidance for students and lecturers using the LMS, as well as have a team, which is on-call at all times to solve any problems that may arise (Adzharuddin & Ling (2013).

#### **2.4.3. Virtual Reality**

According to Mandal (2013), Virtual Reality (VR) is a technology, which allows a user to interact with a computer-simulated environment, whether that environment is a simulation of the real world or an imaginary world. It is the key to experiencing, feeling and touching the past, present and the future. It is the medium of creating our own world, our own customized reality. It could range from creating a video game to having a virtual stroll around the universe, from walking through our own dream house to experiencing a walk on an alien planet. With virtual reality, we can experience the most intimidating and grueling situations by playing safe and with a learning perspective.

According to Piovesan, Passerino, & Pereira (2012), education can be seen as a discovery, exploration and observation process, besides the eternal construction of the knowledge. With this, the specific characteristics of the virtual reality can transform it as a mighty tool in service for everybody who seeks for an education evolution. Many things that until short time ago were

dreams, here become reality nowadays, with the current technological advances became reality. With the virtual reality acting in education we can discover, explore and build knowledge about places and situations that we could never explore. The great potential of the virtual reality is exactly on these possibilities, not only through classes or physical objects, but also through the virtual manipulation of the target to be explored, analyzed and studied.

According to Clark (2006), the Virtual Reality can be used to make the learning more interesting and fun with the purpose of improving the motivation and attention, decreasing costs when using the objective and the real environment no matter how expensive the simulation is.

Virtual Reality presents an opportunity of learning with a real situation, but artificially created, facilitating the visualization and the interaction sensation with the study focus. When we cannot have the real experiences, the Virtual Reality is irreplaceable. The simulation in the Virtual Reality also permits us to be in hard and dangerous situations, which are not usually accessible in the real world. Also, it can change the way a learner interacts with the subject matter. Virtual Reality requires interaction. It encourages active participation rather than passivity. The participant who interacts with the virtual environment is encouraged to continue interacting by seeing the results immediately. It provides an opportunity for the learner to make discoveries previously unknown. New perspectives are made possible by modeling the real world, and studying the model can provide insights never before realized. Virtual Reality allows the disabled to participate in an experiment or learning environment when they cannot do so otherwise. (Pantelidis, 2010)

## 2.5 USE OF ICT IN TEACHING AND LEARNING

The 1990s was the decade of computer communications and information access, particularly with the popularity and accessibility of internet-based services such as electronic mail and the World Wide Web (WWW). At the same time the CD-ROM became the standard for distributing packaged software (replacing the floppy disk). As a result, educators became more focused on the use of the technology to improve student learning as a rationale for investment. Any discussion about the use of computer systems in schools is built upon an understanding of the link between schools, learning and computer technology. When the potential use of computers in schools was first mooted, the predominant conception was that students would be ‘taught’ by computers (Mevarech & Light, 1992).

Daniels (2002), stated that many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to ‘computers and computing related activities’. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs.

Jhurree (2005) posited that, much has been said and reported about the impact of technology, especially computers, in education. Initially computers were used to teach computer programming but the development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into schools at a rapid rate. Computers and applications of technology became more pervasive in society which led to a concern about the need for computing skills in everyday life. Hepp, Hinostroza, Laval and Rehbein (2004) claim in their paper “Technology in Schools: Education, ICT and the Knowledge Society” that ICTs have been utilized in education ever since

their inception, but they have not always been massively present. Although at that time computers have not been fully integrated in the learning of traditional subject matter, the commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs (Pelgrum, Law, 2003).

In a sense, it was considered that the computer would ‘take over’ the teacher’s job in much the same way as a robot computer may take over a welder’s job. Collis (1989) refers to this as “a rather grim image” where “a small child sits alone with a computer”. However, the use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process.

According to Kirschner & Selinger (2003), Information and Communications Technology (ICT) offers the potential to meet the learning needs of individual students; to promote equality of opportunity; to offer high-quality learning materials; and to increase self-efficacy and independence of learning amongst students of all ages. For the teaching profession, ICT is not only an essential tool for teachers in their daily work, but it also offers them opportunities for their own professional development. It can be used to encourage new ways of working as part of professional learning teams and it offers schools themselves the possibility of a faster route to establishing a meaningful role in the wider community, embracing learners of all ages, linking and networking to other educational establishments and bringing professionals together across a range of areas.

## 2.6 ICT AS A TOOL FOR TEACHING AND LEARNING IN TERTIARY SCHOOLS IN GHANA

Afari-kumah, & Tanye (2009) have noted that in the past most initiatives which have led to advancements in ICTs (the Internet, for example), had their origins in the academic community. The achievement of this vision is spelt out in the overall goal of the National ICT in Education Policy (NICTEP, 2004) as well as the National ICT Policy for Development (ICT4D, 2003) respectively as follows:

1. “To enable graduates from Ghanaian educational institutions to confidently and creatively use ICT tools and resources to develop requisite skills and knowledge needed to be active participants in the global knowledge economy by 2015”.
2. “To transform Ghana into information rich, knowledge base, technology driven, high income economy and society”.

Summary et al., (2009) have however also noted that though Ghana’s national curricula for the various subjects contain policy statements about the use of ICT in teaching and learning, the limitations imposed by inadequate number of computers in institutions, poorly trained educators and lack of internet connectivity pose major challenge to the implementation of the policy to integrate ICT into teaching and learning.

Agyei, (2013) also reported that the Ministry of Education is in the process of developing a new “ICT in Education Policy” (Ministry of Education, 2009) to replace the one developed in 2003 in order to outline strategies and implementation procedures and modules that would guide the development and deployment of ICT across the educational system. This is a welcome next step and augers well for the country’s effective use of ICT in Ghana’s educational system. It is however important that the new ICT policy statement addresses gaps that were observed in the original ICT in education policy. For example, the policy statement should address the type of hardware,

operating systems, and software conducive to school environments in the country. Moreover, teachers need to understand how to apply ICT to support their teaching and administration. Therefore, policies should identify ways of improving teacher capacity in the use of ICT as well as their specific integration.

## **2.7 USE OF ICT TO TEACHING AND LEARNING IN THE WISCONSIN INTERNATIONAL UNIVERSITY COLLEGE**

Wisconsin International University College has made steady progress in the provision of its ICT infrastructure. The ICT directorate of the University is responsible for the management of ICT infrastructure within the university, staff and student training and the University websites. The University as part of its mission is to train and develop skillful and competent professionals for business, Information and Communication Technology, and Entrepreneurship. With ICT integration interwoven at its core, the University provides every student with an email address immediately after admission and orients students on the various facilities (teaching and learning) that can be utilized for their study. Email address systems are used to channel various messages to students on the activities within the university and a feedback channel for lecturers and students on assignments. The ICT directorate provide maintenance and technical support to students and lecturers within the various lecture halls for the smooth operability of teaching and learning facilities. The university has computer labs within the various faculties connected to the internet as well as Wi-Fi hotspot, which students and lecturers can use to access internet on their personal computers for their academic work.

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## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1 INTRODUCTION

This chapter describes the system of methods and procedures that was followed for data collection and analysis in the study. The chapter explains the research design, selection of case, selection of subjects, instrumentation, data analysis and presentation of results.

#### 3.2 RESEARCH DESIGN

The survey method was adopted due to its effectiveness and timesaving, characteristics and it is a cheap way of collecting information from a large number of sources. (Fraenkel and Wallen 2005). The design was adopted because it allows the results of the study to be generalized from a sample to the entire population. According to Kumah (2005), Research design is the procedural plan that is adopted for implementation of the research. Due to the large size of the intended population, the survey method was adopted to facilitate the collection of quantitative data for analysis in order to obtain a high level of reliability in the results. The results emanating from the survey also serve as a benchmark for reviewing or refining upon existing situations.

#### 3.3 SELECTION OF CASE

The site investigated is the Wisconsin International University College (WIUC), which is a private tertiary university. The choice of WIUC was based on the fact that the University has a mission to train and develop skillful and competent professionals for Business, Information and Communication Technology, and Entrepreneurship. The researcher perceived that the mission cannot be achieved efficiently without the full utilization of ICT in the process of teaching and learning. Again, the selection was influenced by the academic nature of the study and the heterogeneous nature of the student population of the university in terms of distribution by faculty.

### 3.3 SELECTION OF SUBJECTS

Population refers to the group from which a sample is selected. According to Frelkel and Wallen (1993), “population refers to the group of interest to the researcher, the group to which the researcher would like to generalize the results of the study. The study focused on the lecturers and students who undertake their lecture sessions in the large lecture halls within the university. Hence, undergraduate students and lecturers from the various faculties were targeted for the survey.

#### 3.3.1 POPULATION

A population is a group of individual's persons, objects, or items from which samples are taken for measurement. The intended population for the study is made of lecturers and undergraduate students of the Wisconsin International University College. The population as published by WIUC Human Resource Department (November 2016) is 2,883 which is made up of 119 lecturers and 2764 students. The table below illustrates the population for the study.

Table 3:1 **Population of undergraduate students**

| FACULTY                              | NUMBER OF STUDENTS<br>N= 2764 |
|--------------------------------------|-------------------------------|
| Business School                      | 1701                          |
| Computing and Information Technology | 617                           |
| Law                                  | 267                           |
| Nursing School                       | 36                            |
| Social Science & Humanities          | 143                           |
| <b>Total</b>                         | <b>2764</b>                   |

Source: fieldwork 2017

TABLE: 3.2 **Population of lecturers**

| <b>FACULTY</b>                       | <b>NUMBER OF LECTURERS<br/>N=119</b> |
|--------------------------------------|--------------------------------------|
| Business School                      | 18                                   |
| Computing and Information Technology | 58                                   |
| Law                                  | 10                                   |
| Nursing School                       | 6                                    |
| Social Science & Humanities          | 27                                   |
| <b>Total</b>                         | <b>119</b>                           |

**Source:** Fieldwork (2017)

### 3.6 SAMPLE SIZE

The choice of the sample was influenced by the assertion made by Fraenkel and Wallen (1993) that, when it is possible, researchers would prefer to study the entire population in which they are interested. Usually, however, this is difficult to do, because most population are large, diverse, and scattered over a large geographical area. Finding, let alone contacting, all the members can be time-consuming and expensive. For that reason, of necessity, a researcher can select the sample for the study based on his capability and constrain to collect data for the study. The researcher used non-probability approach to select a sample of 269, made up of 150 students and 119 lecturers as the population for the study as depicted in Table 3.3 and 3.4 below.

Table 3.3 Population and Sample Size of Undergraduate Students

| <b>POPULATION &amp; SAMPLE SIZE</b>     |                                   |                                                  |
|-----------------------------------------|-----------------------------------|--------------------------------------------------|
| <b>FACULTY</b>                          | <b>NUMBER STUDENTS<br/>N=2764</b> | <b>NUMBER OF STUDENTS<br/>SELECTED<br/>N=150</b> |
| Business School                         | 1701                              | 55                                               |
| Computing and<br>Information Technology | 617                               | 35                                               |
| Law                                     | 267                               | 25                                               |
| Nursing School                          | 36                                | 15                                               |
| Social Science &<br>Humanities          | 143                               | 20                                               |
| <b>Total</b>                            | <b>2764</b>                       | <b>150</b>                                       |

Source: Fieldwork (2017)

Table 3.4 Population and Sample Size of Lecturers

| <b>FACULTY</b>                          | <b>NUMBER OF LECTURERS<br/>N=119</b> | <b>LECTURERS SELECTED<br/>N=119</b> |
|-----------------------------------------|--------------------------------------|-------------------------------------|
| Business School                         | 18                                   | 18                                  |
| Computing and<br>Information Technology | 58                                   | 58                                  |
| Law                                     | 10                                   | 10                                  |
| Nursing School                          | 6                                    | 6                                   |
| Social Science &<br>Humanities          | 27                                   | 27                                  |
| <b>Total</b>                            | <b>119</b>                           | <b>119</b>                          |

Source: Fieldwork (2017)

### **3.7 SAMPLING TECHNIQUE**

Sampling techniques involves the examination of carefully selected proportion of the unit of a phenomenon in order to extend knowledge gained from the study to the whole form from which the part was selected. The main interest in sampling is to extend the results of analysis based on the sample to the population from which the sample was drawn. The characteristics of the sample must therefore, closely reflect those of the population (Kumekpor, 2002).

Newman (2007) states that a large sample with poor sampling frame is less representative than a smaller one with an excellent sampling frame. Systematic and simple random sampling techniques were used in the selecting of students, while the population of lecturers was maintained for the research study. The researcher sampled the undergraduate students from large population above 100 by soliciting a sample frame from the University used Microsoft Excel to randomly select 1/10 of students on the sample frame.

The simple random technique was adopted for population below 100. Here, the number required to form the sample size for students within the various faculties was labeled on pieces of paper. The piece of papers was put into a box and shuffled. The researcher then asked a student to select the pieces of papers without looking into the container or box, one after another, until the required sample sizes were obtained for the different faculties.

### **3.8 INSTRUMENTATION**

With the help of class representatives from the various faculties and Teaching Assistants (TA's), questionnaires were administered to students and lecturers. This method is the easiest and most preferred because the respondents would be at ease when answering the questions. Anybody present in the selected class received a questionnaire. They answered the questionnaire independently since they were not in direct contact with the researcher.

A structured questionnaire was designed and made up of four sections. Section one collected background information of the student or lecturer, section two collected information on computer knowledge, section three collected information on the availability of ICT facilities and section four collected information on ICT use for teaching (teachers) or learning (students). In order to have a separate view of students and lecturer's responses, the questionnaire was divided into two forms for both students and lecturers. This facilitated students and lecturers to stay beyond the scope of the study as well as relate their views on the topic been researched. The researcher was interested with their perceptions and use of ICT in their work.

### **3.9 PILOT TESTING**

A pilot testing was carried out to ascertain the dependability, reliability and validity of the instrument and to revise and improve the questions to make them more specific and effective in eliciting the needed responses. The pre-testing was conducted at the Department of Information Studies of the University of Ghana, Legon. A total of twenty copies of the questionnaire were distributed to the undergraduate students within the Information Studies Department.

### **4.0 METHODS OF DATA ANALYSIS**

The collected data was statistically analyzed using Microsoft Excel and SPSS software. To draw inferences and comparison, the Statistical Package for Social Science (SPSS) was used for Chi-square test with significance level ( $P=0.05$ ), to indicate relationships between variables when necessary. To aid easy and quick interpretation of data, table graphics such as tables were used for the summary.

#### 4.1 PROBLEMS ENCOUNTERED DURING DATA COLLECTION

The challenges faced in conducting this study were;

1. Getting lecturers to fill the questioners was the main problem encountered by the researcher. This is reflected in 55 (35%) of the 119 copies of questionnaire administered were retrieved. However, that of the students was 100%.
2. The data collection was confronted with formalities which prompted the Department of Information Studies, University of Ghana to furnish the university with letters of credence in order to obtain certain data. For instance, the department sought approval from the WIUC in order to obtain sample frame from the university.
3. The data collection coincided with the university examination period, which was also a factor in the poor response from lecturers who were busily preparing their exams questions. However, the researcher gave the lecturers a period of time to complete the questionnaires which were submitted to the university for collection after the examination period was over.

#### 5.0 ETHICAL CONSIDERATIONS

Fraenkel and Wallen (2000) stated that, “all subjects should be assured that any data collected from or about them will be held in confidence”. The research assured and maintained the anonymity and confidentiality of respondents. Accordingly, no personal information such as name, Student and Staff ID was captured with the questionnaire. Payne and Payne (2004) share the view that ethical considerations are the embodiment of a moral stance that involves conducting research to achieve not just high professional standards of technical procedures, but also respect and protect for the people consenting to be studied. In relation to this, the researcher deemed it necessary to obtain approval from the University of Ghana and Wisconsin International University College in

writing, in order to obtain the participants' consent and ensure confidentiality and objectivity in research reporting.



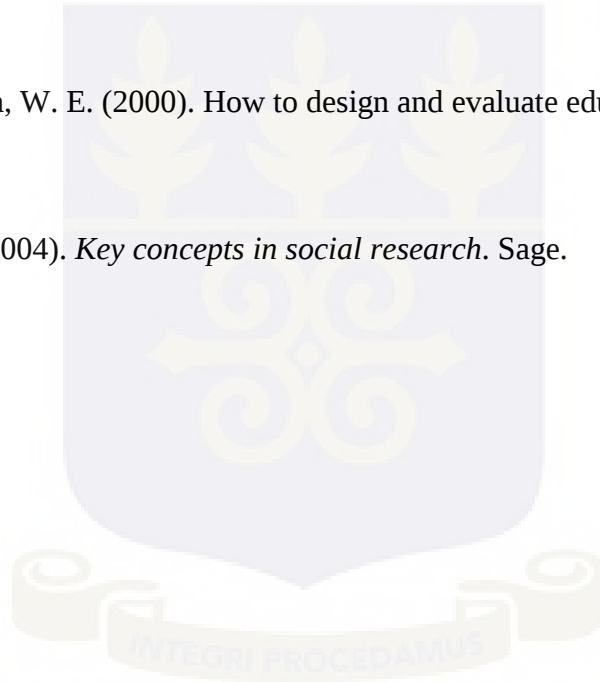
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**CHAPTER FOUR****4.0 DATA ANALYSIS AND DISCUSSION****4.1 INTRODUCTION**

This chapter deals with the analysis and presentation of data collected through the questionnaires. Respondents were randomly selected from the various faculties within the Wisconsin International University College during the process of data collection. A total of 269 questionnaires were administered to student and lecturers. Out of 150 questionnaires administered to students, 150 were returned indicating 100% responses, while 119 questionnaires were administered to the lecturers out of which 55 were returned indicating 46% responses. Respondent answered questions concerning the availability of ICT facilities in their various faculties in the university and their acceptance and adoption for teaching and learning.

**4.2 DEMOGRAPHIC CHARACTERISTICS**

The focus of the data collection exercise of the research is perceptions by students and lecturers concerning ICT facilities and its application to teaching and learning in the University. Without any attempt to balance gender and age of respondents, in the data collection, the study identified the demographic make-up of respondents, which are summarized in table 4.1 to 4.4.

**4.2.1 Gender of Respondents**

Out of 150 student respondents, 90 (60%) were males and 60 (40%) were females. Of the fifty-five responses from lecturers, 37 (68%) were males and 18 (32%) being females. This shows that there were more male participants than females in the sample.

**4.2.2 Age Distribution of Respondents**

The age distribution from table 4.1 shows that 37% of the undergraduates were 20 years or below in age. 47% of them were aged 21-30 years, 11% ranged in age between 31 and 40 years, while 5% were 41 years or above. Also, the age distribution from table 4.2 shows that 15% of lecturers

were aged 30 years or below, 31% of them were aged 31-40 years, 38% ranged in age between 41 and 50 years and 16% were aged 51 years and above. It can be concluded that most of the respondents were young people under 30 years, while most of the lecturers were aged between 31 and 50 years.

Table 4.1 shows the ages of students

Table 4.1 **Age of Students**

| <b>STUDENTS</b> <b>N= 150</b> |                  |                       |
|-------------------------------|------------------|-----------------------|
| <b>Age Range</b>              | <b>Frequency</b> | <b>Percentage (%)</b> |
| 20 years & below              | 55               | 37%                   |
| 21-30 years                   | 71               | 47%                   |
| 31- 40 years                  | 16               | 11%                   |
| 41 years & above              | 8                | 5%                    |
| <b>Total</b>                  | <b>150</b>       | <b>100%</b>           |

**Source:** Fieldwork (2017)

In relation to the above, Table 4.2 also shows the ages of lectures

Table 4.2 **Age of Lecturers**

| <b>LECTURERS</b> <b>N= 55</b> |                  |                       |
|-------------------------------|------------------|-----------------------|
| <b>Age Range</b>              | <b>Frequency</b> | <b>Percentage (%)</b> |
| 30 years & below              | 8                | 15%                   |
| 31-40 years                   | 17               | 31%                   |
| 41- 50 years                  | 21               | 38%                   |

|                  |           |             |
|------------------|-----------|-------------|
| 51 years & above | 9         | 16%         |
| <b>Total</b>     | <b>55</b> | <b>100%</b> |

**Source:** Fieldwork (2017)

#### 4.2.3 Student Year of Study

Table 4.3 Level of Undergraduate Student

| Level N= 150 | Frequency  | Percentage (%) |
|--------------|------------|----------------|
| 100          | 51         | 34%            |
| 200          | 45         | 30%            |
| 300          | 28         | 19%            |
| 400          | 26         | 17%            |
| <b>Total</b> | <b>150</b> | <b>100%</b>    |

**Source:** Fieldwork (2017)

Table 4.3 shows that, 34% of the students were from level 100, 30% were from level 200, 19% and 17% were from 300 to 400 levels respectively.

#### 4.2.4 Levels Taught by Lecturers

In order to ascertain the level of lecturer engagement with students, the research at the different levels collected data on the levels that lecturers taught courses. The results from the data (Table 4.4 indicate that 45% of lecturers were assigned to only one particular level of study (either, 100, 200, 300 and 400), 55% were assigned to more than one level. This illustrates that majority of the lectures teach more than one level.

Table 4.4 Levels Taught by Lecturers

| Levels Taught N=55       | Frequency | Percentage (%) |
|--------------------------|-----------|----------------|
| Single Engagement        | 25        | 45%            |
| More than one Engagement | 30        | 55%            |
| <b>Total</b>             | <b>55</b> | <b>100%</b>    |

**Source:** Fieldwork (2017)

### 4.3 AVAILABILITY OF TEACHING AND LEARNING TECHNOLOGIES

In soliciting the views of lecturers and student on the availability of ICT facility for teaching and learning in the Wisconsin International University College as the first objectives of this study, there has to be suitable platform for it, in order to make teaching and learning technologies available. ICT-enhanced learning mobilizes tools for examination, collection and analysis of information and provides platforms for student inquiry, analysis, and construction of new information. In this way, and in contrast to memorization-based or rote learning, ICT-enhanced learning promotes increased learner engagement (Watson, 2001). Sections 4.3.1 to 4.3.6 provides results and issues related to the availability of teaching and learning technologies. Namely: possession of computer, frequency of computer and internet use,

#### 4.3.1 POSSESSION OF COMPUTER

When asked whether they had computers of their own, 115 (74%) of the students answered in the affirmative, and 40 (26%) did not have any. In the case of the lecturers, 55 (100%) affirmed having computer. Probing further, when asked to indicate whether their computers were provided by the university, only 5 (9%) answered in the affirmative, whilst 50 (91%) acquired their computers

themselves. This indicates that two-thirds of the students had their own computers while almost all the lecturers also did.

#### 4.3.2 FREQUENCY OF COMPUTER AND INTERNET USE

According to Amenyedzi, Larney, & Dzomeku (2011), computer technology has made it possible for teachers and students to interact through the Internet. ICT are resources that can be deployed to augment existing teaching and learning materials. According to Awotua-Efebo (1999), most Internet-based collaborative learning projects include teacher support and training, and conference proceedings are published regularly on the Web. Chat rooms or forums may become a laboratory for new ideas. Online study resources can also provide interactive tools for teachers to access feedback from students. Computer based assignments are an effective way of ascertaining students' understanding of concepts. In relation to these statements, respondents were asked to rate their access and use of computers for academic work and research. Table 4.5-4.6 indicate the frequency of their computer use for academic purposes.

Table 4.5 Frequency of Computer use by Students

| Rating N=150 | Frequency  | Percentage (%) |
|--------------|------------|----------------|
| Not at all   | 5          | 3%             |
| Not Often    | 45         | 30%            |
| Often        | 20         | 13%            |
| Very Often   | 30         | 20%            |
| All the time | 50         | 34%            |
| <b>Total</b> | <b>150</b> | <b>100%</b>    |

Source: Fieldwork (2017)

Table 4.6 Frequency of Computer use by Lecturers

| <b>Rating N= 55</b> | <b>Frequency</b> | <b>Percentage (%)</b> |
|---------------------|------------------|-----------------------|
| Not at all          | -                | -                     |
| Not Often           | 2                | 3%                    |
| Often               | 10               | 18%                   |
| Very Often          | 15               | 35%                   |
| All the time        | 25               | 44%                   |
| <b>Total</b>        | <b>55</b>        | <b>100%</b>           |

**Source:** Fieldwork (2017)

Table 4.6 depicts that no lecturer reported not using computer. From table 4.5, almost all 97% of the students had at least some level of use of computer, however, only 34% had constantly used computer, while 3% did not use at all. From the tables above, it is evident that, use of computer by students and lectures was very high among both students and lecturers.

On internet connectivity, all the students and lecturers responded in the affirmative indicating that their faculties had internet connectivity. Based on this response, it can be concluded that almost every department on campus had access to internet.

#### 4.3.2 ICT FACILITIES AVAILABLE

When probed to indicate whether their lecture halls were equipped with ICT facilities. From Table 4.7 and 4.8, it can be observed that 87 (58%) of students and 13 (24%) of lecturers indicated that only a few of the lecture halls they used had ICT facilities for teaching. 33 (22%) of the student

and 26 (47%) of lecturers indicated that there were ICT facilities in all the lecture halls they use. Hence, less than 10% of the lecture halls were not equipped with ICT facilities for teaching and learning.

**Table 4.7 Students' Response on ICT Facilities in Lecture Halls**

| <b>Response</b> | Students N= 150  |                       |
|-----------------|------------------|-----------------------|
|                 | <b>Frequency</b> | <b>Percentage (%)</b> |
| None            | 12               | 8%                    |
| All of them     | 18               | 12%                   |
| Most of them    | 33               | 22%                   |
| Few of them     | 87               | 58%                   |
| <b>Total</b>    | <b>150</b>       | <b>100%</b>           |

Source: Fieldwork (2017)

Table 4.8 also shows lectures response from lectures when asked on the availability of ICT Facilitates within their lecture halls.

**Table 4.8 Lecturers Response on ICT Facilities in Lecture Halls**

| <b>Response</b> | Lecturers N= 55  |                       |
|-----------------|------------------|-----------------------|
|                 | <b>Frequency</b> | <b>Percentage (%)</b> |
| None            | -                | -                     |
| All of them     | 16               | 29                    |
| Most of them    | 26               | 47                    |
| Few of them     | 13               | 24                    |
| <b>Total</b>    | <b>55</b>        | <b>100%</b>           |

Source: Fieldwork (2017)

#### 4.3.4 THE TYPE OF ICT FACILITIES AVAILABLE IN LECTURE HALLS

This section reports on data on the types of ICT facilities available in lecture halls and used for teaching and learning. From Table 4.9, 42 (18%) of the respondents indicated “there were computers in all the lecture halls”, while 92 (42%) indicated “there are some computers in some of the lecture rooms” and 95 (40%) indicated, “there were no computers in the halls”. Also, 86 (35%) reported “projectors in all their lecture halls”. 102 (41%) reported in some of their lecture halls, whilst 58 (24%) reported “none in the lecture halls”. This showed that most lecture halls had a projector available.

Table 4.9 Type of ICT Facilities Available in Lecture halls

| Facility            | Responses N= 205     |                       |                           |                   |
|---------------------|----------------------|-----------------------|---------------------------|-------------------|
|                     | In all lecture rooms | In some lecture rooms | None of the Lecture rooms | Total             |
| Computers           | 42 (18%)             | 92(42%)               | 95 (40%)                  | <b>229 (100%)</b> |
| Projector           | 86 (35%)             | 102 (41%)             | 58 (24%)                  | <b>246 (100%)</b> |
| Internet connection | 160 (58%)            | 50 (35%)              | 12 (7%)                   | <b>212 (100%)</b> |
| TV                  | 8 (3%)               | 91(35%)               | 158 (62%)                 | <b>257 (100%)</b> |
| VCD/DVD/VCR         | 15 (7%)              | 79 (35%)              | 128 (58%)                 | <b>222 (100%)</b> |

**Source:** Field work (2017)

In relation to internet connectivity, 105 (50%) responded indicated “internet connection in all the lecture halls” whilst, 88 (41%) of the respondents indicated “internet connection in some of the halls”, and 19 (9%) of the respondent indicated “there were none in their lecture halls”. Concerning Television (TV’s), 158 (62%) of the respondents indicated “there was none in the lecture halls” whilst 91(35%) of the respondents indicated “some in their lecture halls”. Finally, 15 (7%) of the respondents indicated “VCD/DVD/VCR in all the lecture halls”, whilst 79 (35%) indicated “some of the lecture halls”, and 128 (58%) indicated “VCD/DVD/VCR in none of the halls”. In addition, inference from the responses indicates that 58% of the lecture halls had internet connectivity.

#### **4.3.3 ICT FACILITIES USED FOR TEACHING**

To determine the integration of ICT facilities in teaching, respondents were being asked to indicate as applicable. 143 (70%) out of 205 respondents indicated that some ICT facilities were used during teaching. Again, probing further as to the kind of facilities applied, an aggregate of 132 (64.4%) of the respondents indicated that projectors and computers as the facilities used during teaching.

#### **4.3.4 FUNCTIONALITY OF ICT INFRASTRUCTURES**

The consistency and smooth operability of facilities are essential in an integrated ICT environment. This can be achieved when there is constant troubleshooting and maintenance of these facilities. The researcher, tried to find out the operability of the ICT systems in various departments. From the response, 78% of the students and 80% of the lecturers indicated that the ICT facilities in their lecture halls were functional, whilst 28% of the students and 20% of the lecturers believed that the systems were not functioning due to the lack of maintenance. According to Amoafu

(2011), to encourage ICT application to teaching and learning, it is imperative that available facilities are maintained.

#### 4.4 EXTENT OF ICT USE FOR TEACHING AND LEARNING

This section reports findings on the extent of ICT integration in teaching and learning. Respondents were asked to rate themselves regarding to their ICT skills, frequency of computer use, and familiarity with software use. Section 4.4.1- 4.4.6 reports findings on the extent of ICT use for teaching and learning. Namely; Students' ICT Skills before admission, current ICT skills of undergraduate students, lecturers' computer literacy and mode of ICT Skill acquisition, mode of skill acquisition by lecturers, purpose of computer use, ICT use for teaching and learning, and familiarity with computer software

##### 4.4.1 STUDENTS' ICT SKILLS BEFORE ADMISSION

In order to determine student's familiarity and involvement with ICT, the research asked the students on their skills in ICT before admitted to the University. The table below shows the outcome of the response.

Table 4.10

**Students' ICT Skill before Admission**

| <b>Rating</b> | <b>N=150</b> | <b>Frequency</b> | <b>Percentage (%)</b> |
|---------------|--------------|------------------|-----------------------|
| None          |              | 13               | 9%                    |
| Basic         |              | 15               | 10%                   |
| Some How Good |              | 71               | 47%                   |
| Good          |              | 32               | 21%                   |
| Very Good     |              | 19               | 13%                   |

|              |            |             |
|--------------|------------|-------------|
| <b>Total</b> | <b>150</b> | <b>100%</b> |
|--------------|------------|-------------|

**Source:** Fieldwork (2017)

From table 4.10, ninety-one percent (91%) of the students indicated that they had some form of ICT skills prior been admitted whilst nine percent (9%) had no skills. It also shows that 71 (47%) were somehow good, 32 (21%) rated themselves good, 19 (13%) rated themselves as very good and 15 (10%) considered themselves as basic. This shows that the entire student had various degrees of ICT skills before entering into the university and as such have had an encounter or interacted with ICT facilities.

#### 4.4.2 CURRENT ICT SKILLS OF UNDERGRADUATE STUDENT

Again probing further, the researcher tried to find out the improvement in students ICT skills of students after a period of study on campus. Below is a table indicating the ratings of skills of student.

Table 4.11 **Current ICT Skills of Undergraduate Students**

| <b>Rating</b> | <b>N=150</b> | <b>Frequency</b> | <b>Percentage (%)</b> |
|---------------|--------------|------------------|-----------------------|
| None          |              | -                | -                     |
| Basic         |              | 4                | 3%                    |
| Some How Good |              | 25               | 17%                   |
| Good          |              | 65               | 43%                   |
| Very Good     |              | 56               | 37%                   |
| <b>Total</b>  |              | <b>150</b>       | <b>100%</b>           |

**Source:** Fieldwork (2017)

From the response, 56 (36%) of student rated as themselves very good, 65 (43%) as good, 25 (17%) as somehow good and 4 (3%) considered themselves as basic. Comparing the ratings from table 4.10 and 4.11 shows a significant improvement in student ICT skills after a period of study in the university.

#### 4.4.3 LECTURERS COMPUTER LITERACY AND MODE OF ICT SKILL ACQUISITION.

For the full benefit of ICT to take effect on teaching and learning, it is imperative that teachers are competent in the use of and application of ICT. The study therefore, tried to find out the knowledge and interest of lecturers in ICT. Table 4.12 shows the responses of lectures on computer literacy.

Table 4.12 **Lecturers' Computer literacy**

| <b>Computer literacy N=55</b> |                  |                       |
|-------------------------------|------------------|-----------------------|
| <b>Ratings</b>                | <b>Frequency</b> | <b>Percentage (%)</b> |
| None                          | -                | -                     |
| Basic                         | 12               | 22%                   |
| Some How Good                 | 11               | 20%                   |
| Good                          | 28               | 51%                   |
| Very Good                     | 4                | 7%                    |
| <b>Total</b>                  | <b>55</b>        | <b>100%</b>           |

Source: Field work (2017)

Probing further, lectures were asked to indicate where they acquired their computer literacy skills.

Table 4.13 shows the channel through which they acquired their skills.

Table 4.13 **Mode of Skill Acquisition by Lecturers**

| <b>Computer literacy N=55</b> |                  |                       |
|-------------------------------|------------------|-----------------------|
| <b>Ratings</b>                | <b>Frequency</b> | <b>Percentage (%)</b> |
| Self-trained                  | 18               | 33%                   |
| Through friends               | 20               | 36%                   |
| Workshops                     | 9                | 16%                   |
| Professional ICT training     | 5                | 9%                    |
| All                           | 3                | 6%                    |
| <b>Total</b>                  | <b>55</b>        | <b>100%</b>           |

Source: Field work (2017)

Table 4.12 illustrates that, only 4 (7%) of the respondents rated their competencies in ICT as “very good”, 28 (51%) as “good”, 11 (20%) as “good” and 12 (22%) as “basic”. Probing further, the researcher tried to justify the mode in which the respondents acquired their skills. Form table 4.13, 18 (33%) of the respondents acquired their computer literacy through “self-training”, 20 (36%) indicated “through Friends”, 9 (16%) and 5 (9%) acquired their skills through “Workshop” and “Professional ICT training respectively. Whilst 3 (6%) acquired their skills in all the mediums. According to Noor-Ul-Amin, (2013) teachers could make their lectures more attractive and lively by using multi-media which enabled the students to capture the lessons taught to them easily.

When they found the class very interesting, they also retained what they had been taught in their mind for a longer span and it helped them to perform better during examinations. This indicates that, for maximum interaction, attractiveness and comprehension of a programme or course, lecturers must be well trained and equipped with ICT resources. Even though, all the lecturers had some level of competencies, only 4 (7%) were well versed in computing. For ICT facilities to be fully integrated in teaching, lecturers must be well trained and equipped to harness the full impacts in order to enhance teaching and learning process.

#### **4.4.4 PURPOSE OF COMPUTER USE**

A computer is any electronic device that can take instruction or data (input) and channel out information to the end user. In the context of the study, the researcher limited the application of computer to academic information. Here, respondents were asked to indicate their use of computers on the following applications such as word processing, spreadsheet, internet, research presentation and programming. Results from the response indicated that internet, word processing and research presentation emerged as the most common activity that most of the respondents use the computer for, in which word processing had the highest usage.

#### **4.4.5 ICT USE FOR TEACHING AND LEARNING**

To ascertain the views and extent of the use of ICT for teaching and learning in the University. The researcher used the chi square with a significance relation ( $p\text{-value} = 0.00 < 0.05$ ) to determine whether there is a relationship between respondents in ICT integrated teaching and learning environment.

Table 4.14 Interest in ICT Integrated teaching and learning by Students and lecturers

| Response     | Student          | Lecturers       | Total             |
|--------------|------------------|-----------------|-------------------|
| Yes          | 89 (79%)         | 24 (21%)        | <b>113 (100%)</b> |
| No           | 44 (75)          | 15 (25%)        | <b>59 (100%)</b>  |
| Undecided    | 17 (48%)         | 16 (52%)        | <b>33 (100%)</b>  |
| <b>Total</b> | <b>150 (73%)</b> | <b>55 (27%)</b> | <b>205 (100%)</b> |

$$x^2 = 0.0077 \quad df=2 \quad p\text{-value} = 0.00 < 0.05$$

Judging from the level of interest of students and lecturers on ICT integration into teaching and learning from table 4.14 we can confidently say that there is a significant relationship ( $p\text{-value} = 0.00 < 0.05$ ) between students and lecturers on the view of integrating ICT into teaching and learning.

#### 4.4.6 FAMILIARITY WITH COMPUTER SOFTWARE

In order for one to be skilled enough to use ICT facilities, he or she must have basic knowledge with the use of software applications. Respondents were asked to indicate their level of familiarity with some prevalent and regularly used applications. The table below shows the responses of students on their knowledge with the use of software applications.

Table 4.15 Students Familiarity with Computer Software

| Software N=150                                                         | Level of Familiarity |           |          |          |           | Total      |
|------------------------------------------------------------------------|----------------------|-----------|----------|----------|-----------|------------|
|                                                                        | Excellent            | Good      | Average  | Poor     | Very poor |            |
| Word processors ( MS Word, Word Perfect, etc.)                         | 74 (49%)             | 56 (37%)  | 15 (10%) | 4 (4%)   | 1 (1%)    | 150 (100%) |
| Spreadsheet and Statistical Packages ( MS Excel, SPSS, Epi-Info, etc.) | 25 (16.7%)           | 14 (9.3%) | 72 (48%) | 24 (16%) | 15 (10%)  | 150 (100%) |
| Presentation (Power Point etc.)                                        | 63 (42%)             | 72 (48%)  | 6 (5%)   | 8 (4%)   | 1 (1%)    | 150 (100%) |
| Database Management system (MS Access, Oracle etc.)                    | 21 (14%)             | 14(9%)    | 9 (6%)   | 30 (20%) | 76 (51%)  | 150 (100%) |
| Programming languages (Java, C++, VB.net etc.)                         | 15 (10%)             | 25 (17%)  | 3 (2%)   | 21 (14%) | 86 (57%)  | 150 (100%) |
| Internet Surfing/ Browsing                                             | 85 (56%)             | 46 (31%)  | 6 (4%)   | 3 (2%)   | 10 (7%)   | 150 (100%) |

**Source:** Fieldwork (2017)

From the table above, 145 (96%) of the students were at least good with word processors. Most of the respondents 111 (73%) rated their skills between “Excellent” and “Average” in the use of spreadsheet and Statistical Package for Social Science (SPSS). 141(95%) of the respondents considered themselves at least good in the use of presentation software’s.

In the case of database management, students responses was not encouraging; 21 (14%) rated themselves as “Excellent” whilst 14 (9%), 9 (6%), 30 (20%) and 76 (51%) rated themselves as “Average”, “Poor” and “Very Poor” respectively. Thus, an average of at least 50% were poorly skilled in database Management application. Again, respondent’s skill in programming was very low. 15 (10%) rated their skills as “Excellent”, 25 (17%) as “Very Good”, 3 (2%), 21 (17%) and 86 (57%) rated their skills as “Average”, “Poor” and “Very Poor” respectively. This shows that at least 60% of the respondents were not properly skilled in the use of programming languages.

However, with respect to internet, about 131 (87%) of the respondents stated that they had good Internet surfing/ browsing skills. In conclusion, majority of students were very familiar with Internet browsers, Word Processors, SPSS, Spreadsheets, and Presentations applications than Database Management systems and programming language.

#### **4.4.7 FAMILIARITY WITH COMPUTER SOFTWARE BY LECTURERS**

According to Boakye & Banini (2008), “education stakeholders in Ghana have been concerned about how teachers and students use computers in schools and how their use supports learning. Teachers use computers to write lesson plans, prepare materials for teaching, record and calculate student grades, and communicate with other teachers”. Relating to this, lecturers were asked to indicate their level of familiarity with some of the popular and frequently used applications for these processes as indicated in the table 4.16 below.

Table 4.16 Lecturers Familiarity with Computer Software's

| Software N=55                                                         | Level of Familiarity |            |           |            |            | Total     |
|-----------------------------------------------------------------------|----------------------|------------|-----------|------------|------------|-----------|
|                                                                       | Excellent            | Good       | Average   | Poor       | Very poor  |           |
| Word processors ( MS Word, Word Perfect, etc)                         | 35 (63.6%)           | 15 (27.3%) | 4 (7.3%)  | 1 (1.8%)   | -          | 55 (100%) |
| Spreadsheet and Statistical Packages ( MS Excel, SPSS, Epi-Info, etc) | 14 (25.5%)           | 20 (36.4%) | 6 (10.9%) | 4 (7.3%)   | 11 (20.0%) | 55 (100%) |
| Presentation (Power point etc)                                        | 38 (69.1%)           | 11 (20.0%) | 6 (10.9%) | -          | -          | 55 (100%) |
| Database Management system (MS Access, Oracle etc)                    | 5 (9.09%)            | 2 (3.64%)  | -         | 13 (23.6%) | 35 (63.6%) | 55 (100%) |
| Programming languages (Java, C++, VB.net etc)                         | 9 (16.4%)            | 7 (12.7%)  | 3 (5.5%)  | 1 (1.8%)   | 35 (63.6%) | 55 (100%) |
| Internet Surfing/ Browsing                                            | 35 (63.6%)           | 5 (9.1%)   | 8 (14.5%) | 2 (3.6%)   | 5 (9.1%)   | 55 (100%) |

**Source:** Fieldwork (2017)

From the table above it is obvious that all respondents were knowledgeable in word processors, internet surfing and presentation. At least 60% of the respondents had skills in Spreadsheets and SPSS whilst about 65% of the lecturers rated their skills as having “Poor” and “Very Poor” in programming and database management applications. In summary, in response to skills, majority of the lecturers were very familiar with word processors, Presentation software, internet surfing, Spreadsheets and SPSS whilst in the case of programming and database management programmes the response was very low.

#### 4.5 DIFFICULTIES ENCOUNTERED IN THE USE OF ICT

One of the objectives of this study was to find out the difficulties encountered by students and lecturers. 72% of the respondent identified lack of constant supply of electricity, system malfunctioning, inadequate internet bandwidth due to the increasing number of users and sabotage by computer virus. Affirming on these problems, even though 42% of respondents indicated that, there were generators within most of the faculties to support main electricity supply, the lack of Uninterruptible Power Systems (UPS) in most parts of the lecture halls to support ICT facilities makes it difficult to rely on ICT. Again, 68% of the respondents complained that they had to wait for longer times in order for the ICT facilities such as computers and projectors to be restored. This sometimes causes a malfunction because of power surges accruing from power outages. Interestingly, 62% of the students resort to study on campus during assignments and exams to have constant power supply for their academic work. The reason is that most of the students do not have generators in their hostels that can help them study and submit their assignments to their lecturers through e-mails in the case of power outage.

#### 4.6 PERCEPTION OF ICT USE FOR TEACHING AND LEARNING

To find out the perception of students and lecturers towards ICT integrated teaching and learning, respondents indicated their perception of students toward ICT in conjunction to some selected questions presented to the respondents.

Table 4.17 Students' Perception on ICT use for Teaching and Learning

| Perception                                                   | Strongly Agree | Agree      | Strongly disagree | Disagree |
|--------------------------------------------------------------|----------------|------------|-------------------|----------|
| An integrated teaching and learning is more preferable to me | 90 (60%)       | 52 (34.7%) | 2 (1.3%)          | 6 (4%)   |

|                                                                                                |            |            |            |             |
|------------------------------------------------------------------------------------------------|------------|------------|------------|-------------|
| Your lecturer is very competent in using ICT for teaching                                      | 42 (28%)   | 64 (42.7%) | 11 (7.3%)  | 33 (22%)    |
| I find it time consuming to use ICT for learning                                               | 15 (10%)   | 17 (11.3%) | 69 (46%)   | 49 (32.67%) |
| Prefer accessing information in the library to the internet                                    | 14 (9.3%)  | 26 (17.3%) | 79 (52.7%) | 31 (20.67%) |
| I find it difficult to change from my current learning practice to integrate ICT tools into it | 9 (6.0%)   | 52 (34.7%) | 79 (52.7%) | 10 (6.7%)   |
| I Learn perfectly well without computers (ICT)                                                 | 34 (22.7%) | 43 (28.7%) | 53 (35.3%) | 20 (13.3%)  |
| Internet use has an impact in your learning                                                    | 88(58.7%)  | 26 (17.3%) | 12 (8%)    | 24 (16%)    |
| The network Bandwidth (speed) in my department is poor                                         | 93 (62%)   | 45 (30%)   | 7 (4.7%)   | 5 (3.3%)    |

**Source:** Fieldwork (2017)

From table 4.17, on the issues of using ICT for teaching and learning, it can be seen from the responses that an aggregate of 142 (94.7%) of the student's respondents agree to the integration of ICT into teaching and learning. This is an indication of student's willingness to accepting an ICT integrated teaching and learning. To find out if students perceives their lecturer to be knowledgeable in the application of ICT during teaching, the response showed that even though an aggregate of 106 (70.7%) considered their lecturers to be knowledgeable whilst 44 (29.3%) of the respondents indicated that their lecturers were not competent. Moreover, to ascertain whether students find it time-consuming using ICT for learning. 118 (78.7%) of the respondents disagreed to this assertion, this indicates that majority of students found the use of ICT not to be time consuming and hence were comfortable with its use. Again, to ascertain student's perception

regarding access to accessing information from the library and that of the internet, the response proved that an aggregate of 110 (59.4%) of the respondents preferred assessing information on the internet than going to the library, which is a justification that students have positive perception concerning ICT use.

Having been engaged in the instructional mode of teaching and learning where students listen to lecturers and write notes, the study tried to find out whether students finds it difficult to change from this mode of learning and to integrate ICT into their learning. The response indicated that 61 (40.9%) agreed to having difficulty in integrating ICT into learning whilst majority 89 (59.3%) had no difficulty in integrating ICT into their learning. In summary, taking an average of 61 (40.9%) from this sample can considered to be very high number which calls for the need to take the ICT training of students more seriously.

Finally, bandwidth is the essential factor that stimulate user's interest in using the internet. A high bandwidth (speed) reduce time taken to retrieve information whilst low bandwidth takes a longer time. Whilst 124 (92%) of the respondent perceived theirs to be poor, 12 (8%) of the respondents did not consider it to be so. From the responses in table 4.14, there is no doubt that students had a positive perception towards the use of ICT as a tool for teaching and learning and this also illustrates that, with a positive institutional involvement in terms of training and encouragement, student will be properly skilled for an ICT integrated teaching and learning environment.

#### **4.6.1 LECTURERS' PERCEPTION TOWARDS ICT USE FOR TEACHING AND LEARNING.**

To ascertain lecturers' perception in relation to ICT integrated teaching and learning environment as in the case of students, lecturers were asked to indicate their perception from the questions provided in the table below.

Table 4.18 **Lecturers' Perception towards ICT use for Teaching and Learning.**

| <b>Perception</b>                                                                                               | <b>Strongly Agree</b> | <b>Agree</b> | <b>Strongly disagree</b> | <b>Disagree</b> |
|-----------------------------------------------------------------------------------------------------------------|-----------------------|--------------|--------------------------|-----------------|
| ICT integrated teaching and learning is more preferable to me                                                   | 26 (47.3%)            | 19 (34.6%)   | 5 (9.1%)                 | 5(9.1%)         |
| You are very competent in using ICT for teaching.                                                               | 10 (18.2%)            | 38 (69.1%)   | 2 (3.6%)                 | 5 (9.1%)        |
| I find it time consuming to use ICT for learning                                                                | 11 (20.0%)            | 9 (16.4%)    | 16 (29.1%)               | 19 (34.6%)      |
| My peers have been giving negative comments about using ICT for teaching                                        | 2 (3.6%)              | 9 (16.4%)    | 23 (41.8%)               | 21 (38.2%)      |
| Students gave negative feedback on ICT supported teaching                                                       | 3 (5.5%)              | 8 (14.6%)    | 19 (34.6%)               | 25 (45.5%)      |
| I Prefer accessing information in the library to the internet                                                   | 4 (7.27%)             | 9 (16.4%)    | 15 (27.3%)               | 27 (49.1%)      |
| I teach perfectly well without computers                                                                        | 5 (9.1%)              | 4 (7.3%)     | 17 (30.9%)               | 29 (52.7%)      |
| I find it difficult to change form my current learning practice to integrate tools into it                      | 10 (18.2%)            | 3 (5.45%)    | 22 (40.0%)               | 20 (36.4%)      |
| The university did not initiate any program (Such as seminar and workshop) to encourage ICT supported teaching. | 2 (3.6%)              | 5 (9.1%)     | 19 (34.6%)               | 29 (52.7%)      |
| There is no technical staff to support the integration of technology into teaching                              | 16 (29.1%)            | 28 (50.9%)   | 6 (10.9%)                | 5 (9.1%)        |
| Internet use has an impact in your learning                                                                     | 35 (63.6%)            | 19 (34.6%)   | 0                        | 1 (1.8%)        |
| The network Bandwidth (speed) in my department is poor                                                          | 36 (65.5%)            | 10 (18.2%)   | 3 (5.5%)                 | 6 (10.9%)       |

**Source:** Fieldwork (2017)

From table 4.18, on the issue of ICT integrated teaching and learning, an aggregate of 45 (81.9 %) of the lecturers had a positive perception towards it as against 10 (18.2%) this indicates that most

of the lecturers affirmed to the integration of ICT into teaching and learning. To assess how lecturers perceived their competence in using ICT for teaching and learning, an aggregate of 48 (87.3%) of the respondents considered themselves to be competent. Again, to find out if lecturers perceive ICT use in teaching to be time consuming, the responses shows that 34 (63.7%) of the lecturers did not find it time-consuming.

Furthermore, to understand whether lecturers preferred accessing information from the library to the internet, 42 (76.4%) of the lecturers did not share this perception, indicating that most of the lecturers uses internet resources. To probe further, the lecturers when asked to indicate whether they can teach without necessarily depending on ICT, 46 (84%) of the lecturers said they cannot teach very well without their computers whilst nine (9) (16.4) thought otherwise. This shows that a good number of lecturers were comfortable with ICT integrated teaching.

In summary, both lecturers and students had a positive perception towards the integration of ICT into their teaching and learning. Training, motivation and constant maintenance of ICT all contribute to enhancing teaching and learning.

#### **4.7 DISCUSSION OF FINDINGS**

The discussion of the results has been arranged under the following major headings.

1. Perception towards ICT use for teaching and learning
2. Availability of teaching and learning technologies
3. Extent of ICT used for teaching and learning
4. Difficulties encountered in the use of ICT

#### **4.8 PERCEPTION TOWARDS ICT USE FOR TEACHING AND LEARNING**

The results from the study shows that, it was clear that almost all the students perceived ICT integrated teaching and learning as the new order of the day. The students disagreed with the assertion that using ICT for teaching and learning is time-consuming. They were in agreement with the perception that integrating ICT into their teaching and learning is difficult but were convinced that the use of internet had a positive impact on teaching and learning. Both preferred online information even though they were all mindful of the poor internet bandwidth (speed) within their faculties. The majority of them agreed to the perception that the lack of technical staff to support the integration of technology into teaching was a major drawback.

#### **4.9 AVAILABILITY OF TEACHING AND LEARNING TECHNOLOGIES**

As part of the research objectives, the study tried to ascertain the availability of teaching and learning resources within the Wisconsin International University College. Issues considered with respect to this were; possession of computers by students and lecturers, access to computer and the internet, availability of ICT facilities in lecture halls, type of facilities available, whether the available facilities are used and the functionality of these facilities.

The study showed that all the lecturers had computers of their own, but the same thing cannot be said about students though majority of them do. In addition, the findings as evident in table 4.9, indicated projectors and computers are available in all the lecture halls yet the response on other ICT facilities such as TV, VCD/DVD/VCR was not encouraging. From the findings, it can be concluded that there are not enough ICT facilities in most of the lecture halls.

#### 4.10 EXTENT OF ICT USED FOR TEACHING AND LEARNING

The Activity theory was the framework of this study, which looked at the mediational role played by the tools used to accomplish tasks. According to Coverdale (2009), there is rarely a direct relationship between the subject and object, and that the object is seen and manipulated within the limitations by the set tools. This means that, whatever the outcome of an activity may be largely dependent on the tools used to undertake the activity and arguably the skills and understanding of the individual user concerning the effective application of the tool. It is therefore necessary that the ICT skills of students and lecturers and their interest in ICT is given priority attention in order to foster their application of ICT to make their teaching and learning effective.

The majority of students have basic ICT skills and a fair number of them were above average prior to their admission into the university and improved drastically while on campus. In addition, a great number of the lecturers were computer literate, having their ICT skills rated as just above average. To ascertain the familiarity and frequency of computer use in the teaching and learning process, word processing and PowerPoint was the most dominant. In terms of skills rating, both students and lecturers could be said to be efficient in the use of word processors and internet surfing even though, a good number are also skilled in spreadsheet (Microsoft Excel) and SPSS.

There was a clear demonstration of ICT use by both students and lecturers. It was clear from the findings that students are interested in an ICT integrated teaching though more than half of the lecturers alluded to applying ICT during teaching whilst an appreciable number of them do not. Although the study proved that most lecturers were ICT literate, only a few of them rated their skills as being very good and only a few of them applied ICT to their teaching at all time.

A chi square test conducted on whether student and lecturers have interest in an ICT integrated teaching and learning environment resulted in the positive which is in relation to (Noor-Ul-Amin,

2013), that the adoption and use of ICTs in education have a positive impact on teaching, learning, and research which can affect the delivery of education and enable wider access to the same.

Concerning Internet use for teaching and learning, it was identified that a great number of students and lectures make use of it with its application more related to sourcing for information and communication through e-mail to enhance teaching and learning. However, the lack of an online interactive page for students such as “Sakai” which is used by the University of Ghana to create forums from which students can brainstorm and be assessed by their lectures on assignments makes the communication aspect not fully utilized.

#### **4.11 DIFFICULTIES ENCOUNTERED IN THE USE OF ICT**

According to Miller (2002), internet bandwidths, user-unfriendly computer application and lack of access to the web are some of the well-known barriers of ICT. This finding to a large extent proves to be true in the case of students. Students sometimes complain about the time taken to retrieve information on the internet due to inadequate bandwidth. Even though some lecturers had a different view, they agreed that the internet bandwidth was low concerning the fact that all the faculties are interconnected.

Lack of constant electricity supply was found to be another major difficulty encountered by students and lecturers alike in the use of ICT in the Wisconsin International University College. Even though the university has generators to support all the halls, the lack of power backup (Uninterruptible Power System (UPS) systems to restore power to the ICT facilities in the halls, makes ICT integrated teaching very difficult as lectures sometimes have to be cancelled or end abruptly. Without electricity, ICT is but a dormant tool.

In relation to the above, system breakdown was also identified as a fact that inhibits the use of ICT for teaching and learning. To address this, it is important to have ICT support staff in every

department to assist in the integration of ICT into teaching and learning as well as system maintenance. This will encourage lecturers in the application of ICT during teaching and in line with the “Division of Labour” as the activity theory component that looks at how labour is divided in accomplishing a task apart from the tools used.



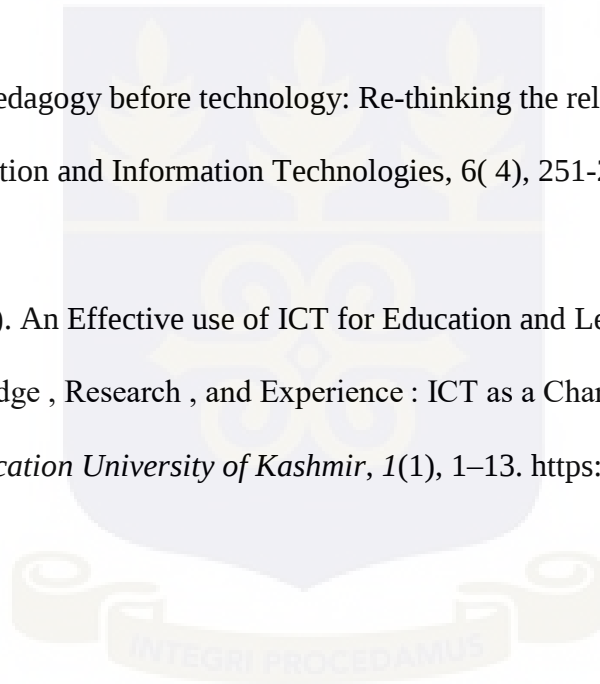
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## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION**

#### **5.1 INTRODUCTION**

This research was undertaken to investigate the use of ICT as a tool to support teaching and learning in the Wisconsin International University College of Ghana. In the context of this study, ICT refers to any electronic equipment that can be used to facilitate teaching and learning.

The activity Theory (Engestrôm Model) was used for the study. The theory states that all human actions are mediated by tools (be physical or psychological). Thus, there is a direct relationship between the subject and object.

A survey based research was adopted for this study. Questionnaires were the main data collection instrument complemented by observation. The study setting was conducted in five faculties namely: Business School, Computing and Information Technology, Law, Nursing School and Social Science & Humanities. A total of 269 questionnaires were administered to students and lecturers. Out of the 150 questionnaires administered to students, 150 were returned indicating 100% responses. Of the 119 questionnaires administered to the lecturers only 55 were returned representing 46% responses. Respondents answered questions concerning the availability of ICT facilities in their various faculties, the university and their application and acceptance for teaching and learning. Results were presented in figures, percentages and tables and where necessary, Chi-square test were used to identify possible relation between variables.

## 5.2 Summary of Findings

A summary of the major findings are as follows:

1. Almost all (91%) the lecturers acquired computers of their own; however, this was not the case among students, though majority (60%) of them do.
2. About 61 (40.7%) of the students and 13 (24%) of the lecturers agreed to having difficulty in integrating ICT into learning. These percentages can be considered to be very high which calls for the need to take the training of lecturers and students in the integrated use of ICT for teaching and learning more seriously.
3. It emerged from the survey that 98.2% of the lectures and s 76% of the students make use of the internet for teaching and learning. Its application however, was more related to sourcing for information to enhance teaching and learning. Online interaction between lecturers and students was very low as students only submit assignments through e-mails to their lecturers.
4. Both lecturers and students have positive perspectives towards ICT integrated teaching and learning. However, the lack of adequate skills, confidence and facilities were identified as some of the reasons for none application of ICTs by most lecturers during teaching.
5. Interruptions in power supply, low internet bandwidth and computer virus were the difficulties that were encountered by students and lecturers in the use of ICT in the lecture halls.

### **5.3 CONCLUSION**

ICT facilities for teaching and learning is require considerable improvement in the Wisconsin International University. A conscious effort should be made to provide related ICT facilities in all faculties, departments and all lecture halls to increase access among students and lecturers.

To enhance ICT development in Ghana and especially in developing countries, it is imperative to model the methods of teaching around the needs of the industry, such that graduates are able to acquire the necessary skills required by the industry. However, in most scenarios it is industry that performs these tasks; as a result of this, society and industry are questioning the true benefits of university education, given its cost (Laurillard, 2002). In relation to this, lecturers have to renew and develop their model of learning process well beyond the traditional transmission model by integrating new technologies that will increase the marketability of graduates.

Lecturers must be encouraged to involve students during teaching in an ICT integrated environment since some of the students have good ICT skills. In this modern era where many young students acquire basic computer skills before they enter the university, it is crucial that lecturers create a conducive and collaborative environment where students can apply technology to their education and also acquire improved technical skills.

### **5.4 RECOMMENDATIONS**

In order for the university to be able to train and develop skillful and competent professionals for business, Information and Communication Technology, and Entrepreneurship as part of its mission, Wisconsin International University College will need a new generation of teaching and instructional tools. The study therefore recommends the following;

### **1. ICT TRAINING FOR LECTURERS**

As a long-term ICT skills development measure, the ICT directorate, the Library and the Education Technology Department should collaborate to organize frequent ICT training programmes for lecturers in order to improve their competence and encourage and motivate them to integrate relevant technologies into their teaching. This should come with a general university directive and blueprint that requires lecturers to incorporate ICT into their lecture delivery. This would make lecturers take training programme seriously.

### **2. ICT TRAINING FOR STUDENTS**

ICT training at the Directorate should be intensified and made a university requirement for graduation or a core programme for all students so as to motivate, increase students' confidence, acceptability and use of ICT resources to enhance their learning. For instance, the ICT directorate and library must be proactive and able to organize forums for students to participate in order to improve the ICT skills of students. For instance, the librarian can educate students on materials available in the libraries and also teach them how to use various academic databases for research. This will eliminate the frustration students go through when searching for information on the internet for their various assignments.

### **3. CONSTANT SUPPLY OF ELECTRICITY**

Constant supply of electricity should be given a high priority to enable the smooth operation and utilization of ICT resources during teaching and learning. This can be done by providing adequate standby electric generators and Uninterruptible Power Supply (UPS) within the various lecture halls to ensure constant supply of power as well as prolong the lifespan of these devices.

#### **4. INTERNET ACCESS AND BANDWIDTH**

Internet access point especially wireless should be expanded to halls of residence in order to enhance and promote convenient online interaction between lecturers and students as well as among students in order to encourage learning beyond the boundaries of the classroom.

#### **5. PROVISION OF LEARNING MANAGEMENT SYSTEM**

The introduction of Learning Management Systems (LMS) will facilitate communication and interaction among students and lecturers. LMS will help the lecturers to provide their learning materials and also interactivity features such as thread discussions, shared files and forums. This will provide proper training and guidance for students and lecturers using the LMS, as well as have a team which is on-call at all times to solve any problems that may arise.

#### **6. PROVISION OF VIRTUAL REALITY FACILITIES FOR TEACHING AND LEARNING**

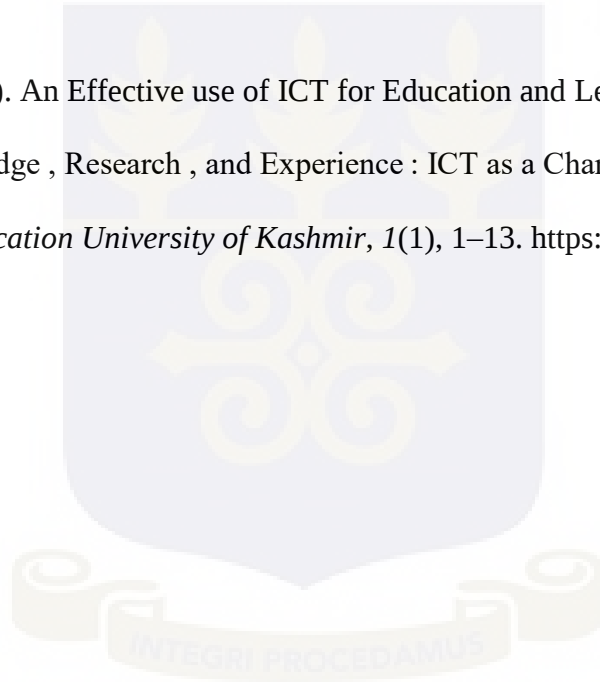
Virtual Reality can help students practice in a risk free environment and to obtain objective and immediate feedback regarding their actions (e.g., too much pressure is being applied, the probe is too far, etc.). The use of a model can help make that determination. Such a model can play a part in the continuing search for ways to use virtual reality in education and training courses.

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APENDIX I

QUESTIONNAIRE FOR LECTURERS

APPENDIX 1

Questionnaire for lecturers

**UNIVERSITY OF GHANA. LEGON**  
**DEPARTMENT OF INFORMATION STUDIES**

**Questionnaires on “The use of ICT as a Tool for Teaching and Learning”**  
**(Lecturers)**

Dear Sir/Madam,

I am investigating the use of ICT as a tool for teaching and Learning in the Wisconsin International University College in order to write my Dissertation for MA. Degree. I will entreat you to complete the questions to help me achieve this objective. All responses will be treated confidentially.

Thank you in advance

.....

Justice Ofosu-Appiah

(MA. Information Studies)

**Please answer the following questions by ticking or providing an appropriate answer.**

**BACKGROUND INFORMATION:**

1. Gender: a. Male [ ☐ ]                      b. Female [ ☐ ]
2. Level(s) you teach:      a. 100 [ ☐ ]      b. 200 [ ☐ ]      c. 300 [ ☐ ]      d. 400 [ ☐ ]
3. Your age: a. 30 years & below [ ☐ ]      b. 31-40 years [ ☐ ]      c. 41-50 years [ ☐ ]  
                    d. 51 years & above [ ☐ ]

4. Faculty: a. Arts [ ] b. Engineering [ ] c. Science [ ] d. Social Studies [ ] e. Business School [ ]

### COMPUTER KNOWLEDGE

5. Do you use the computer for your work?  
a. Yes [ ] b. No [ ]
6. If yes, how will you rate your computer knowledge?  
a. Basic [ ] b. Somehow good [ ] c. Good [ ] d. Very Good [ ]
7. If no, please go to question (10)
8. What is your level of computer knowledge now?  
a. Still the same [ ] b. Improved a bit [ ] c. Improved [ ] d. extremely improved [ ]
9. Have you ever participated in the ICT training organized by the ICT directorate?  
a. In all the modules [ ] b. In a few Modules [ ] c. Never [ ]

### AVAILABILITY AND USE OF ICT/COMPUTER

10. Do you have a computer of your own? a. Yes [ ] b. No [ ]
11. If yes, was it provided by the University? a. Yes [ ] b. No [ ]
12. Do you have a computer lab in your department?  
a. Yes [ ] b. No [ ] c. Not Aware [ ]
13. If yes what purpose does it serve?  
a. ICT training [ ] b. Browsing and Research [ ] c. Don't know [ ]
14. Are there enough computers in your department for all students? a. Yes [ ] b. No [ ]
15. Do you have access to the internet in your department? a. Yes [ ] b. No [ ]
16. How often do you get access to a computer?  
a. Not often [ ] b. Often [ ] c. Very often [ ] d. All the time [ ] e. Not at all [ ]
17. Does your department provide frequent system maintenance? a. Yes [ ] b. No [ ]
18. Purpose of computer use ( Please tick as many as applicable)  
a. Word processing [ ] b. Spreadsheet [ ] c. Research purposes [ ]  
d. programming [ ] e. Internet [ ]

19. Do you use ICT for learning purposes? a. Yes [ ] b. No [ ]

20. How familiar/ good are you with the following frequently used software?

| Software's                                                            | Excellent | Good | Average | Poor | Very poor |
|-----------------------------------------------------------------------|-----------|------|---------|------|-----------|
| Word processors ( MS Word, Word Perfect, etc)                         |           |      |         |      |           |
| Spreadsheet and Statistical Packages ( MS Excel, SPSS, Epi-Info, etc) |           |      |         |      |           |
| Presentation (Power point etc)                                        |           |      |         |      |           |
| Database Management system (MS Access, Oracle etc)                    |           |      |         |      |           |
| Programming languages (Java, C++, VB.net etc)                         |           |      |         |      |           |
| Internet Surfing/ Browsing                                            |           |      |         |      |           |
| Internet Design ( Front Page, Joomla, Wordpress etc)                  |           |      |         |      |           |

#### ICT USE FOR TEACHING AND LEARNING

21. Do you use ICT during teaching?

a. Yes [ ] b. No [ ]

22. If yes, how often do you use ICT for teaching purposes?

a. At all times [ ] b. Sometimes [ ] c. Not at all [ ]

23. Are there ICT facilities in your lecture halls?

a. All of them [ ] b. Most of them [ ] c. Few of them [ ] d. None [ ]

24. Please indicate if any of the following ICT facilities are available? (Tick as many as applicable)

| Equipment              | In all lecture rooms | In some lecture rooms | None of the lecture rooms |
|------------------------|----------------------|-----------------------|---------------------------|
| a. Computer            |                      |                       |                           |
| b. Projector           |                      |                       |                           |
| c. Internet connection |                      |                       |                           |

|                |  |  |  |
|----------------|--|--|--|
| d. TV          |  |  |  |
| e. VCD/DVD/VCR |  |  |  |

25. Do you apply any of the above facilities during teaching?

- a. Some of them [ ] b. All of them [ ] c. None of them [ ]

26. If you do apply any of the facilities above please indicate which

ones.....  
.....

27. Do you use the internet to access information concerning your subject?

- a. Always [ ] b. Sometimes [ ] c. Never [ ]

28. Does your course assignment involve ICT? a. Yes [ ] b. No [ ]

29. If yes, in what format are the assignments presented?

- a. Typed & Printed [ ] b. Handwritten [ ] c. Softcopy on a drive [ ] d. Online [ ]

30. Do you engage your students in any form of online academic interaction?

- a. Yes [ ] b. No [ ]

31. If yes, Please

indicate.....  
.....

32. Do you use the internet to access information concerning your subject?

- a. Always [ ] b. Sometimes [ ] c. Never [ ]

33. How often do you use the internet?

- a. Daily [ ] b. Twice a week [ ] c. Weekly [ ] d. Monthly [ ] e. Never [ ]

34. What mainly do you use the internet for? ( Please tick as many as applicable)

- a. Email [ ] b. Facebook [ ] c. Skype [ ] d. Journal subscription [ ] e. Newsgroup [ ] f. Blogging [ ] g. Surfing [ ] i. Chat [ ] j. Information for my study [ ]

35. What are some of the problems you face in the use of ICT?

- a. Power fluctuation [ ] b. Virus attack [ ] c. System breakdown [ ] d. Lack of maintenance [ ]

36. How often does the problem occur?

- a. Daily [ ] b. Weekly [ ] c. Monthly [ ] d. Occasionally [ ]

37. Please indicate your perception towards the use of ICT Integrated teaching and learning.

Responses: 1. Strongly agree, 2. Agree 3. Strongly disagree 4. Disagree

| Perception Towards ICT Integrated Learning                                                                      | Strongly agree | Agree | Strongly disagree | Disagree |
|-----------------------------------------------------------------------------------------------------------------|----------------|-------|-------------------|----------|
| An integrated teaching and learning is more preferable to me                                                    |                |       |                   |          |
| You are very competent in using ICT for teaching                                                                |                |       |                   |          |
| And it time consuming to use ICT for learning                                                                   |                |       |                   |          |
| Your peers have been giving negative comments about using ICT tools for teaching                                |                |       |                   |          |
| Students gave negative feedback on ICT supported teaching                                                       |                |       |                   |          |
| Prefer accessing information in the library to the internet                                                     |                |       |                   |          |
| Teach perfectly well without computers                                                                          |                |       |                   |          |
| And it is difficult to integrate ICT tools into my teaching                                                     |                |       |                   |          |
| The University did not initiate any program (such as seminar and workshop) to encourage ICT supported teaching. |                |       |                   |          |
| There is no technical staff to support the integration of technology into teaching                              |                |       |                   |          |
| Internet use has an impact in your learning                                                                     |                |       |                   |          |
| The network connectivity(Bandwidth) in my department is poor                                                    |                |       |                   |          |

APENDIX II

QUESTIONNAIRE FOR STUDENTS

UNIVERSITY OF GHANA. LEGON  
DEPARTMENT OF INFORMATION STUDIES

**Questionnaires on “The use of ICT as a Tool for Teaching and Learning”**

(Student)

Dear Sir/Madam,

I am investigating the use of ICT as a tool for teaching and Learning in the Wisconsin International University College in order to write my Dissertation for MA. Degree. I will entreat you to complete the questions to help me achieve this objective. All responses will be treated confidentially.

Thank you in advance

.....

Justice Oforu-Appiah

(MA. Information Studies)

**Please answer the following questions by ticking or providing an appropriate answer.**

**BACKGROUND INFORMATION:**

1. Gender: a. Male [ ☐ ]      b. Female [ ☐ ]
2. Level: a. 100 [ ☐ ]      b. 200 [ ☐ ]      c. 300 [ ☐ ]      d. 400 [ ☐ ]
3. Your age: a. 20 years & below [ ☐ ]      b. 21-30 years [ ☐ ]      c. 31-40 years [ ☐ ]  
d. 41 years & above [ ☐ ]
4. Faculty:      a. Arts [ ☐ ]      b. Engineering [ ☐ ]      c. Science [ ☐ ]      d. Social Studies  
[ ☐ ]      e. Business School [ ☐ ]

### COMPUTER KNOWLEDGE

5. Did you have any computer knowledge before coming to Wisconsin International University College?  
b. Yes [ ] b. No [ ]
6. If yes, how will you rate your computer knowledge?  
b. Basic [ ] b. Somehow good [ ] c. Good [ ] d. Very Good [ ]
7. What is your level of computer knowledge now?  
b. Still the same [ ] b. Improved a bit [ ] c. Improved [ ] d. extremely improved [ ]
8. Have you ever participated in the ICT training organized by the ICT directorate?  
b. In all the modules [ ] b. In a few Modules [ ] c. Never [ ]

### AVAILABILITY AND USE OF ICT/COMPUTER

9. Do you have a computer of your own? a. Yes [ ] b. No [ ]
10. Do you have a computer lab in your department?  
b. Yes [ ] b. No [ ] c. Not Aware [ ]
11. If yes, what purpose does it serve?  
b. ICT training [ ] b. Browsing and Research [ ] c. Not Aware [ ]
12. Are there enough computers in your department for all students? a. Yes [ ] b. No [ ]
13. How often do you get access to a computer?  
a. Not often [ ] b. Often [ ] c. Very often [ ] d. All the time [ ] e. Not at all [ ]
14. Does your department provide frequent system maintenance? a. Yes [ ] b. No [ ]
15. Purpose of computer use ( Please tick as many as applicable)  
a. Word processing [ ] b. Spreadsheet [ ] c. Research purposes [ ]  
d. programming [ ] e. Internet [ ]
16. Do you use ICT for learning purposes? a. Yes [ ] b. No [ ]
17. How often do you use ICT/computer for learning purposes?  
a. Everyday [ ] b. Every week [ ] c. A few times in the semester [ ] d. Only for assignments [ ]  
e. Never [ ]

18. What are some of the problems you face during teaching and learning?

- a. Power fluctuation [    ]      b. Virus attack [    ]      c. System breakdown [    ]

19. How familiar/ good are you with the following frequently used software?

| Software's                                                            | Excellent | Good | Average | Poor | Very poor |
|-----------------------------------------------------------------------|-----------|------|---------|------|-----------|
| Word processors ( MS Word, Word Perfect, etc)                         |           |      |         |      |           |
| Spreadsheet and Statistical Packages ( MS Excel, SPSS, Epi-Info, etc) |           |      |         |      |           |
| Presentation (Power point etc)                                        |           |      |         |      |           |
| Database Management system (MS Access, Oracle etc)                    |           |      |         |      |           |
| Programming languages (Java, C++, VB.net etc)                         |           |      |         |      |           |
| Internet Surfing/ Browsing                                            |           |      |         |      |           |
| Internet Design ( Front Page, Joomla, Wordpress etc)                  |           |      |         |      |           |

#### ICT USE FOR TEACHING AND LEARNING

20. Do you like your lecturer to use ICT during teaching?

- b. Yes [    ]    b. No [    ]    c. Undecided [    ]

21. Are there ICT facilities in your lecture halls?

- b. All of them [    ]    b. Most of them [    ]    c. Few of them [    ]    d. None [    ]

22. Please indicate if any of the following ICT facilities are available? (Tick as many as applicable)

| Equipment              | In all lecture rooms | In some lecture rooms | None of the lecture rooms |
|------------------------|----------------------|-----------------------|---------------------------|
| f. Computer            |                      |                       |                           |
| g. Projector           |                      |                       |                           |
| h. Internet connection |                      |                       |                           |
| i. TV                  |                      |                       |                           |
| j. VCD/DVD/VCR         |                      |                       |                           |

23. Do your lecturers apply any of the above facilities during teaching?  
 b. Some of them [   ]      b. All of them [   ]      c. None of them [   ]
24. If your lecturer applies any of the facilities above please indicate which  
 one.....  
 .....
25. Do you use the internet to access information concerning your subject?  
 a. Always [   ]      b. Sometimes [   ]      c. Never [   ]
26. Does your course assignment involve ICT?      a. Yes [   ]      b. No [   ]
27. If yes, in what format are the assignments presented?  
 a. Typed & Printed [   ]      b. Handwritten [   ]      c. Softcopy on a drive [   ]      d.  
 Online [   ]
28. Do you have any form of online academic interaction with your lecturer?  
 a. Yes [   ]      b. No [   ]
29. If yes, Please  
 indicate.....  
 .....
30. How often do you use the internet?  
 a. Daily [   ]      b. Twice a week [   ]      c. Weekly [   ]      d. Monthly [   ]      e. Never [   ]
31. What mainly do you use the internet for? ( Please tick as many as applicable)  
 a. Email [   ]      b. Facebook [   ]      c. Skype [   ]      d. Journal subscription [   ]      e.  
 Newsgroup [   ]      f. Blogging [   ]      g. Surfing [   ]      i. Chat [   ]  
 j. Information for my studies[   ]
32. What are some of the problems you face in the use of ICT?  
 a. Power fluctuation [   ]      b. Virus attack [   ]      c. System breakdown [   ]      d. Lack  
 of maintenance [   ].
33. How often does the problem occur?  
 a. Daily [   ]      b. Weekly [   ]      c. Monthly [   ]      d. Occasionally [   ]
34. Please indicate your perception towards the use of ICT Integrated teaching and learning.  
 Responses:      1. Strongly agree,      2. Agree      3. Strongly disagree      4. Disagree

| Perception Towards ICT Integrated Learning                   | Strongly agree | Agree | Strongly disagree | Disagree |
|--------------------------------------------------------------|----------------|-------|-------------------|----------|
| An integrated teaching and learning is more preferable to me |                |       |                   |          |

|                                                                                            |  |  |  |  |
|--------------------------------------------------------------------------------------------|--|--|--|--|
| Your lecturer is very competent in using ICT for teaching                                  |  |  |  |  |
| And it time consuming to use ICT for learning                                              |  |  |  |  |
| Prefer accessing information in the library to the internet                                |  |  |  |  |
| And it is difficult to change form my current learning practice to integrate tools into it |  |  |  |  |
| Learn perfectly well without computers (ICT)                                               |  |  |  |  |
| Internet use has an impact in your learning                                                |  |  |  |  |
| The network connectivity(Bandwidth) in my department is poor                               |  |  |  |  |

