



**FACTORS AFFECTING THE INFORMATION AND COMMUNICATION
TECHNOLOGY (ICT) USAGE IN TEACHING AND LEARNING IN INSTITUTIONS
OF HIGH LEARNING IN UGANDA
A CASE OF BUKALASA AGRICULTURAL COLLEGE (BAC)**

**BY
KIGGUNDU WILSON TAMALE**

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SUPERVISORS

MRS. PROSS OLUKA

MRS. LUBWAMA AIDA

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Acronyms and Abbreviations

BAC	Bukalasa Agricultural College
ICT	Information and Communication Technology
LAN	Local Area Network
MS	Microsoft
MoES	Ministry of Education and Sports
NTC	National Teachers' College
PC	Personal Computer
RAM	Random Access Memory
SAQ Self	Administered Questionnaire
SPSS	Statistical Package for the Social Sciences
SQL	Structured Query Language
UCC	Uganda College of Commerce
UNESCO	United Nations Educational Scientific and Cultural Organization
TRA	Theory of Reasoned Actions
UTAUT	Unified Theory of Acceptance and Use of Technology
DOI	Diffusion of Innovations

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The study will examine the relationship between the factors affecting ICT usage in teaching and learning, a case of Bukalasa Agricultural College (BAC). In Africa, there is insufficient evidence to suggest a direct link between ICTs and development. Ngwenyama et al, (2006) argue that “recent studies have found a positive correlation between investment in ICTs and economic growth in developed countries, but evidence for developing countries is not as extensive”. However, the potential for ICTs to transform the productive capacities of developing nations like Uganda has been noted (Crafts, 2003; Chen and Zhu, 2004). It must be stated that meaningful productive capacities are aligned with a nation’s development goals. To the extent that ICTs are used in many businesses in Africa, especially in the urban areas, this does not suggest that ICTs have brought development to these areas. It can also be argued that the correlation between investment in ICTs and economic growth does not help in understanding whether ICTs cause economic growth or vice versa more especially in the education sector.

The chapter provides the background of the study, rationale for undertaking the study, the statement of the problem, the basic research questions that will guide the study, justification and significance of the study. It will also include the explanation for the definitions of the terms that will be most commonly used throughout the study and will be explained in relation to the study.

1.2 Background

This background was categorized into four perspectives, namely; historical, theoretical, conceptual and contextual: This chapter also presents the statement of the problem, purpose, specific objectives, hypotheses, scope and significance of the study.

1.1.1 Historical Perspective

Educational systems around the world are under increasing pressure to use Information and Communication Technology (ICT) to teach students the knowledge and skills needed in the 21st century (Omwenga, 2007). Development and application of ICT in African institutions of higher learning is critically important if the continent is to reduce the knowledge, technological and economic gaps between itself and the rest of the world (Farrell and Shafika, 2007). According to Farrell (2007), Uganda developed its initial National ICT Policy in 2003 with its main objective of integrating ICT into educational curricula as well as other literacy programmes to provide for equitable access for all students regardless of the academic level. With the establishment of a Ministry of ICT in Uganda in 2006, various policies were developed in the Ministry of Education and Sports (MoES), for example, ICT policy on education for primary and secondary schools which aims at training teachers in ICT skills, is in operation. In tertiary education, ICT policy is not particularly integrated and initiatives are taken on an individual institutional basis with the Ministry and /or with other partners. In recent years there have been numerous efforts and resources directed at improving teachers' competence and confidence in using ICT effectively in classroom teaching and learning (Magambo, 2007).

Researchers in the past have had interest in ICT usage in teaching and learning in several ways. For example, Peansupap and Walker (2005) looked at factors enabling ICT diffusion and actual implementation in large construction organizations in Australia. Tusubira and Mulira (2004) assessed the integration of ICT in organizations, challenges and best practice recommendations based on the experience of Makerere University. Katushabe and Kisambira (2002) studied ICT based educational content on Kyambogo University and its affiliated NTCs; whereas Mulamira (nd) assessed utilization of electronic resources by academic staff of Makerere University. Bakkabulindi (2008) considered individual characteristics affecting use of computers in Makerere

University whereas Odongo (2007) looked at ICT integration and its influence on teaching process in selected secondary schools in central Uganda. No studies had been undertaken on studies relating problems in ICT usage in teaching and learning in institutions of higher learning like Bukalasa Agricultural College, a gap this study endeavoring to close.

Much as the studies considered factors influencing ICT usage in teaching and learning, the population studied consisted of only tutors in core primary teachers' colleges and thus leaving a gap to be closed by this study by considering lecturers and students in other tertiary institutions like BAC.

Analyzing the data quantitatively and qualitatively, Akankwasa (2008), studied teachers' attitudes, skills and behaviours related to ICT use at Christian University, Mukono. To find out the relationship between variables, data was analyzed using Pearson chi-square. This study therefore is deemed wanting to use another method of analyzing data which the previous study did not explore. In the study, Munyantware (2006) found out that teachers' technological skills were critical for successful ICT usage in teaching and learning in the classroom. However, the study targeted only science and mathematics teachers in secondary schools and thus, leaving a gap for this study to close by investigating the extent to which factors (that is, cost of ICT training materials, staff skills in ICT and administrative support) influence ICT usage in teaching and learning in institutions of higher learning like BAC.

1.1.2 Theoretical Perspective

This study will view ICT usage in ICT teaching and learning as an example of innovation adoption and thus invokes one innovation diffusion theory of Rogers (2003) of perceived attributes theory which stipulates that if the perceived advantage to the use of an innovation is positive, there is a greater likelihood that it will be adopted rapidly. The perceived attributes are the characteristics of innovation that have an impact on the likelihood of acceptance and adoption, and also on the rate

at which this process develops. Innovation attributes supporting diffusion are: relative advantage, compatibility, complexity, observability and trialability. Rogers (2003:229) defines relative advantage as “the degree to which an innovation is perceived as being better than the idea it relatively difficult to understand and use”. Rogers however stated that, opposite to the other attributes, complexity is negatively correlated with the rate of adoption and usage. Thus, excessive complexity of an innovation is an important obstacle in its adoption. A technological innovation might confront faculty members with the challenge of changing their teaching methodology to integrate the technological innovation into their instruction (Munyantware, 2006), so it might have different levels of complexity. This suggests that if computer hardware and software are user-friendly, then they might be adopted successfully for the delivery of course materials.

According to Rogers (2003:16), “trialability is the degree to which an innovation may be experimented with on a limited basis”. Also, trialability is positively correlated with the rate of adoption. The more an innovation is tried, the faster its adoption is. Then, the innovation may be changed or modified by the potential adopter. Increased reinvention may create faster adoption of the innovation, which is especially helpful for later adopters. However, Rogers stated that earlier adopters see the trialability attribute of innovations as more important than later adopters.

Rogers (2003) defines observability as “the degree to which the results of an innovation are visible to others”. Role modeling (or peer observation) is the key motivational factor in the adoption and diffusion of ICT (Munyantware, 2006). Similar to relative advantage, compatibility, and trialability, observability also is positively correlated with the rate of adoption of an innovation. In summary, Rogers (2003) argued that innovations offering more relative advantage, compatibility, simplicity, trialability, and observability will be adopted faster than other innovations. Rogers does caution, “getting a new idea adopted, even when it has obvious advantages, is difficult”, so the availability of all of these variables of innovations speeds up the innovation-diffusion process. Adopters tend to have greater risk tendencies and the higher the risk, the shorter the rate of

diffusion of a typical innovation. Research showed that all these Problems influenced faculty members' likelihood of adopting a new technology into their teaching. Using Rogers' theory, Kim (1999) found out that where there is an uncertainty, confusion and support problem, an innovation becomes incompatible, complex and intimidating.

Adopters tend to have greater risk tendencies and the higher the risk, the shorter the rate of diffusion of a typical innovation. Adopting Rogers (2003) perceived attributes and innovation characteristics; the current study will consider cost of ICT training materials, staffs' skills in ICT and administrative support as possible problems influencing ICT usage in teaching and learning in institutions of higher learning.

1.1.3 Conceptual Perspective

In this study, the dependent variable is ICT usage in teaching and learning. ICT is an umbrella term that includes all technologies for the communication of information (Brock, 2000). For the purpose of this study, ICT is used to refer to computers in computer laboratories on campus, which are primarily designated for teachers/trainers and student use. In an information technology context, ICT usage encompasses all the processes involved in getting new software or hardware operating properly in its environment, and making necessary changes in the training and learning methods. The independent variable in this study is the factors. The Free Online Dictionary (n.d) defines factors as situations that affect the accomplishment, result, or process. In this study factors that will be considered are; cost of ICT training materials, staff skills in ICT, and administrative support. Cost of ICT training materials in this study refers to price paid to have computers and related peripherals in place. Staff skills in ICT in this study refers to special ability (or expertise) enabling one to perform an activity by using a computer and its related peripherals in either teaching or learning. Administrative support refers to the help and guidelines given out by

administrators in institutions of learning to aid computer training and integration of ICT into the curriculum.

1.1.4 Contextual Perspective

According to Bakkabulindi (2008) and Republic of Uganda (2002, 2007), most institutions of higher learning in Uganda, both tertiary and universities, depended on manual systems, with little use being made of computers in teaching, admission, examination, registration, students' records, finance and accounting. In addition, internet access and e-mail applications were minimal and what was on the ground was desk computers for office work and other general applications.

The application of other ICT tools such as video conferencing, emailing and the Internet was rare. Moreover, institutions of higher learning are still using old versions of software, black board and textbooks in teaching. The usage of ICT to enhance and extend teaching and learning across a wide range of subject areas has proved challenging to many institutions of higher learning in Uganda, and understanding the issues regarding encouragement, support and infrastructures required to achieve this has proved to be complex. However, there are some institutions where majority of staff have adopted ICT use into their working practices, adapting existing approaches to teaching and learning and developing new ones. In other institutions with apparently similar desire for ICT to be used, and similar resources, only pockets of limited ICT use has been achieved.

Kasozi (2003) carried out a study on ICT issues in Uganda's education sector on Information and Communication Technology (ICT) implementation in the central region. His findings and conclusions were that, there are still many problems facing ICT spread in the education sector. He highlighted the problems as initial capital being prohibitive and lack of technical personnel. However, it should be noted that he investigated the level of computer literacy and competence among employees in the education sector. He did not investigate ICT usage in teaching and learning in institutions of higher learning. However, such studies dealt only with training skills

and availability of resources affecting ICT usage in institutions of higher learning and none was on ICT usage in teaching and learning in institutions of higher learning like Bukalasa Agricultural College hence gap this study intends to close.

1.3 Statement of the problem

Diffusion of ICT through institutions needs to be effectively supported to better prepare for future ICT application, adoption and usage (Markus, 1987). The forces that have driven institutions of higher learning to adopt and incorporate ICT usage in teaching and learning include greater information access; greater communication, synchronous and asynchronous learning, increased cooperation and collaboration, increased staff skills, cost-effectiveness and pedagogical improvement (Surry and Ely, 2001). ICT can be integrated into curriculum delivery through use of e-learning, video conferencing, electronic platforms, World Wide Web and open source software.

Much as investment in ICT continues to increase, information communication technologies such as computers; internet surfing, video players and projectors have not been effectively used in lecture rooms in institutions of higher learning in Uganda. Most teachers/trainers do not use these ICTs in lecture room as frequently in institutions of higher learning as policy makers and researchers expect.

Failure to access and adopt information and communication technologies and knowledge critically has hindered sustainable progress Big institutions of higher learning like Makerere University, Kyambogo University, Mbarara University of Science and Technology, Uganda Martyrs University, Nkozi University have tried to integrate ICT into teaching and learning environments, amidst constraints and challenges (Farrell, 2007) for individuals and communities in the 21st century (Katundu, 2000). Several studies had documented minimal ICT usage in teaching and learning in institutions of higher learning, ICT implementation and usage had been studied under

different perspectives (for example, attitude, time, age, motivation and income). Bukalasa Agricultural College is one of the tertiary institutions that have integrated ICT in teaching and learning. Like other institutions, the college has faced challenges and constraints limiting maximum benefits from ICT. In order for this to happen, it is imperative that factors influencing ICT usage in teaching and learning are understood. Currently none of such information is available hence, the need for this study.

1.4 Purpose

The present study aims at investigating the factors influencing both the usage of ICT in teaching and in learning at Bukalasa Agricultural College. To achieve this twofold aim, the study will consider the extent to which the institution contributes towards ICT usage during the teaching and learning.

1.5 Objectives

The specific objectives of the study are;

- i. To investigate the influence of staff skills in ICT usage in teaching and learning in BAC
- ii. To find out the extent to which organizational support structures affect ICT usage in teaching and learning in BAC
- iii. To explore the influence of administrative support on ICT usage in teaching and learning in BAC
- iv. To find out whether the cost of ICT training materials affects the ICT usage in teaching and learning in BAC.

1.6 Research questions

- i. How do staff skills in ICT affect ICT usage in teaching and learning?
- ii. To what extent do organizational support structures influence ICT usage in teaching and learning?
- iii. How does administrative support influence the ICT usage in teaching and learning at?
- iv. To what extent is the cost of ICT training materials affects the ICT usage in teaching and learning?

1.7 Hypotheses

The research sought validity or otherwise of the following hypotheses;

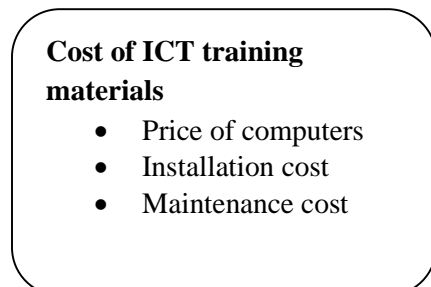
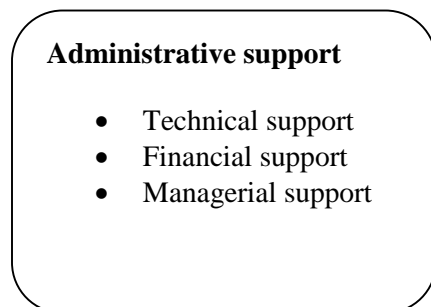
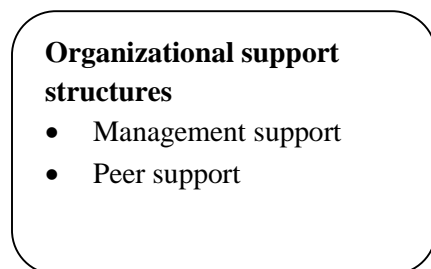
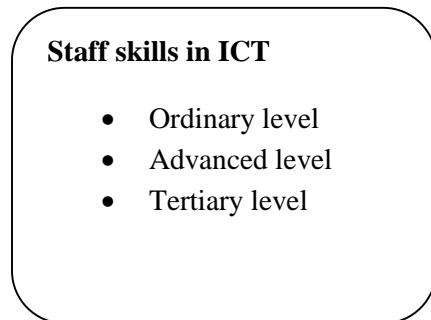
1. Staff skills in ICT both positively and negatively affect ICT usage in teaching and learning.
2. Organizational support structures influence positively the ICT usage in teaching and learning.
3. Administrative support does not enhance ICT usage in teaching and learning.
4. The cost of ICT training materials has an impact on the ICT usage in teaching and learning.

1.8 Conceptual Framework

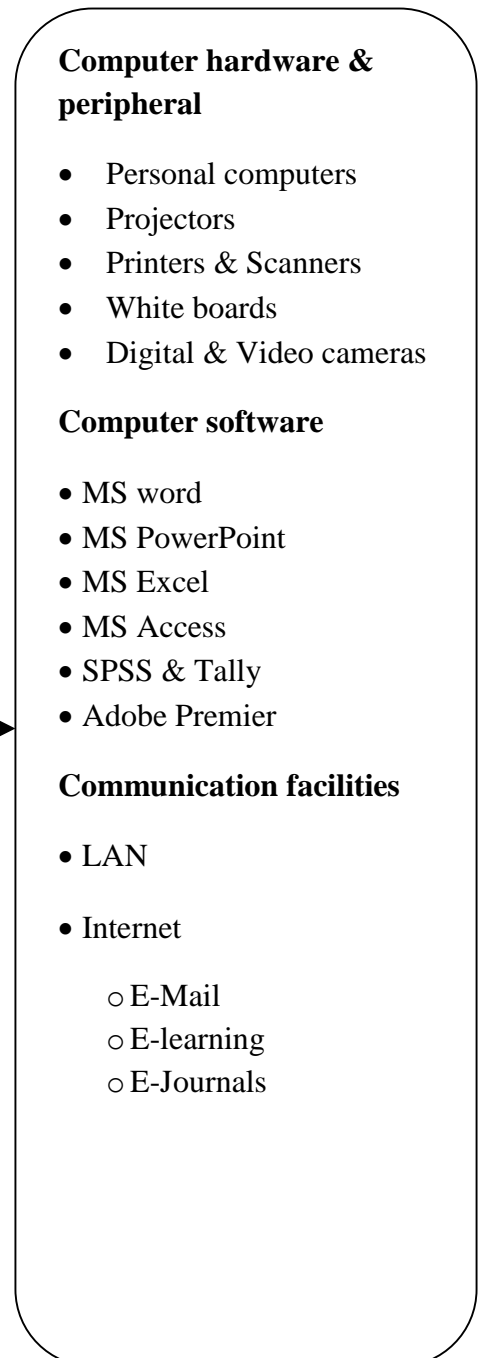
The study will be guided by a conceptual framework where by the Independent variables (IV) are the factors which include staff skills in ICT, organizational support structures, administrative support and cost of ICT training materials as their dimension and the Dependant Variables (DV) in ICT usage in teaching and learning and has it is dimension as Computer hardware and peripherals, computer software and communication.

CONCEPTUAL FRAMEWORK

Independent Variables (IV) (Factors)



Dependant Variables (DV) (ICT usage in teaching and learning)



Source: The conceptual was developed by the researcher with the adoption of planned behavior theory and Diffusion of Innovation theory from Ajzen (1988 – 1991) and Rogers, (2003).

The above conceptual framework illustrates the relationship between the Independent Variable and Dependant Variable, namely staff skills in ICT, organizational support structures, Management support and cost of ICT training materials which play an important role in influencing the ICT usage in teaching and learning. The general code of conduct, formal and informal relationship among people (staffs) in an organization like BAC and leaders' attributes influence decision making respectively (Aswathapa, 2005, Balkan & Cardy, 2005, and Cole, 1993). All these depend on the learning acquired by staffs and how they have been trained to behave.

1.9 Significance of the study

The proposed research has the potential to make several contributions to scholarship and practice in the fields of education, measurement, and educational psychology. From a practice standpoint, the results of this research will be directly relevant to the Ugandan education system for the MoES more especially in the vocational sector. The outcomes will (i) provide the tertiary education system with factors which influence the usage of ICT in teaching and learning, and (ii) the policy review committee of MoES and BAC in specific will use the research report to review the ICT usage and implementation policies, the BAC administrative group will use the research report for making collective decisions and identify gaps in the ICT usage in teaching and learning and the staff members of BAC will use the research report to know how they will catch-up with the technology integration in their field of experience. In so doing, these outcomes may not only increase ministry's awareness of the importance of ICT implementation and usage in teaching and learning and its key dimensions, but also impact significantly on the ways in which ICT is utilized as a learning tool.

1.10 Justification of the study

To the policy review committee, it will help them to review the policies, structures, administrative staff and leadership styles towards ICT usage in teaching and learning. To the staff members, it will break a ceiling and help them get more opportunities of advancing their skills and ease the teaching workload. To the college administration group, it will be an eye opener for them to lay better strategies to eliminate poor work ethic among staffs. Otherwise the attempts of the college development committee will never be successful.

1.11 Scope

1.11.1 Geographical scope

Geographically, the study will concentrate on Bukalasa Agricultural College in Wobulenzi Town Council - Luweero district – Uganda where ICT usage in teaching and learning was reported to be minimal (Bbakkabundi, 2008, Republic of Uganda, 2003).

1.11.2 Time Scope

Due to limited resources for example, time and finance, the researcher will only consider only Bukalasa Agricultural College and the researcher will use at least six months that is April to September.

1.11.3 Content Scope

In content, the study is to focus on these factors i.e. cost of ICT training materials, staffs' skills in ICT, organizational structures and administrative support affecting ICT usage in teaching and learning.

1.12 Operational definitions

College: Bukalasa Agricultural College in Wobulenzi – Luweero district

Staffs: all teaching staff members of the college

Leadership: process at work in a group whereby one individual over a particular period of time and a particular organizational context, influences the other group members to commit themselves freely to the achievement of group tasks or goals.

Organizational structure: this is the hierarchical authority, roles and responsibilities, functions and relations within the organization represented in a chart (Cole, 1993).

ICT: Information and Communication Technology

ICT Usage: this is operationalized as a final stage of information technology adoption and diffusion for knowledge generation, knowledge sharing (teaching), and knowledge application (Valaciah, Hoffer, & George, 2004).

Innovation: Rogers defines innovation as an idea, practice or object that is perceived a new by an individual or other unit of adoption.

Innovations: are often adopted by organization through two types of innovation-decision; collective innovation decision and authority innovation decision. The authority innovation decision occurs when the adoption has been made by very high positions of power within an organization (Rogers 2005, p.43)

Technology adoption: is synonymous with computer and internet usage / utilization (<http://www.bridges-to-technology.com/page21.html>)

Teaching: these are the methods used by trainers during the training sessions which include preparing training materials, face to face training, sending and receiving training materials and assignments via internet, research for advanced technology during lecture notes designing.

Learning: are the methods used by the trainees during the training sessions which involve the way they perceive the notes, research and submit the assignments among others.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher will review all the related literature on factors (Independent factors) linking each dimension to the dependant variable (DV) ICT usage in teaching and learning. This will include staff skills in ICT, organizational support structures, Management support and cost of ICT training materials in relation to ICT usage in teaching and learning respectively. However, the first section of this chapter will explore literature on the Theory of Reasoned Actions (TRA), Unified Theory of Acceptance and Use of Technology (UTAUT) and Theory of Planned Behavior (TPB).

2.1 Theoretical review

2.1.1 Theory of Reasoned Actions (TRA)

One of the theories concerning ICT usage in teaching and learning is the Theory of Reasoned Actions (TRA). The theory originates from social psychology, and it is a special case of the Theory of Planned Behavior (TPB) (Ajzen, 2010). Fishbein and Ajzen (1975) developed Theory of Reasoned Actions (TRA) to define the links between the beliefs, attitudes, norms, intentions, and behaviors of individuals. The theory assumes that a person's behavior is determined by the person's behavioral intention to perform it, and the intention itself is determined by the person's attitudes and his or her subjective norms towards the behavior. The subjective norm refers to "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen, 1975).

2.1.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Another most cited theory which enhances ICT usage in teaching and learning is the Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh et al. (2003) developed the unified model through reviewing eight models which explain ICT usage, namely Theory of Reasoned Actions (TRA), Technology Acceptance Model (TAM), the motivational model, TPB, a model combining TAM and TPB, the model of PC utilization, Diffusion of Innovations (DOI), and the social cognitive theory. The purpose of UTAUT is to explain a user's intentions to use ICT and the subsequent user behavior. The model considers four constructs as direct determinants of user acceptance and usage behavior, namely administrative support, skills level for staff, social influence, and facilitating conditions. There are four key moderating variables: gender, age, experience, and voluntariness of use. The authors stated that UTAUT provides a tool for managers to assess the likelihood of success of technology introductions and to understand the drivers of acceptance in order to design interventions, which include training or marketing. UTAUT focuses on users who may be less willing to adopt and use new systems.

2.2.3 Theory of Planned Behavior (TPB)

The theory of planned behavior is derived from the theory of Reasoned Action of Ajzen and Fishbein (1975, 1980) where they observed that behavior seem not to be 100% voluntarily and if under control. Therefore, this resulted into a perceived behavior control, hence the Theory of Planned Behavior (TPB). TPB predicts that behavior can be deliberate because it can be planned which is guided by three beliefs;

Behavioral beliefs: beliefs about the likely consequences of the behavior.

Normative beliefs: normative expectations of others

Control beliefs: beliefs about the factors that may facilitate or not facilitate behaviors.

The three beliefs above are very important in situations where behaviors of staffs need to be changed in order to meet certain goals and all these changes can only be planned by providing both hardware and software computer components.

2.3 Staff skills and ICT usage in teaching and learning

Hornby (2006) defines skill as the ability to do something well. Staff skills in ICT in this study will refer to special ability (or expertise) enabling one to perform an activity by using a computer efficiently and its related peripherals in either teaching or learning. Dalton (1998) asserts that training is directed at changing people's knowledge, experience, skills and attitudes. The scarcity of adequately trained and experienced analysts, software engineers, systems and network managers, restrains ICT development in Uganda.

The effective use of computers by teachers depends not only on their attitudes, but also on the training they have received (Afshari et al, 2009). Teachers' competence presupposes: positive attitudes to ICT, understanding of educational potential of ICT, ability to use ICT effectively in the curriculum and ability to manage ICT use in the classroom. However, Bauer and Kenton (2005) stated in their study that although teachers were having sufficient skills, were innovative and easily overcame obstacles, they did not integrate technology consistently both as a teaching and learning tool. Reasons being outdated hardware, lack of appropriate software, technical difficulties and student skills levels. The study found that professional development has a significant influence on how well ICT is embraced in the classroom. This implies that teachers' training programmes often focus more on basic skills and less on the integrated use of ICT in teaching. Despite the numerous plans to use ICT in schools, teachers have received little training in this area in their educational programs.

Integration of ICT in teaching and learning does not only deal with introduction of new hardware and software, but both trainers and students have to adopt new roles and change their behaviours and ways of teaching. Farrell (1999, cited in Sife et al, 2007) reported that ICT training and workshops are needed not only to improve the skills of the instructors, but also as a means of getting them involved in the process of integrating ICT in teaching and learning. Nachmis et al (2004) stated that staff training should be a continuous process for regular updates with the development of ICTs. Therefore, teachers need to be trained on educational technologies and the integration of computers into the classroom teaching. Teachers also need effective tools and techniques and assistance that can help them develop computer based projects and activities especially designed to raise the levels of teaching in required subjects and improve student learning.

While all the majority of above studies showed positive correlation between staff skills and adoption of ICT, and indeed some were on the context of institutions of higher learning, none was on the context of BAC. For example, Ssewanyana and Busler (2007) considered adoption and usage of ICT in developing countries targeting staff skills in ICT and top most taxpaying firms in Uganda but much as the study was concerned with factors influencing ICT usage, the population studied was different and thus leaving a gap for this study to close by investigating factors influencing ICT usage in teaching and learning at BAC. However, few studies such as Bauer and Kenton (2005) were of the view that possessing ICT skills cannot guarantee effective use of computers in teaching. Munyantware (2003) in his study, problems affecting adoption technology by mathematics and science teachers in secondary schools found out that teachers with lower ICT proficiency are not willing and have less confidence to use ICT for teaching. This suggests that teachers' information communication technological skills are critical for successful ICT usage in the classroom. Much as the study findings were in the context of BAC, it only covered teachers' affection, abilities and skills and thus cost of ICT training materials

and administrative support factors were not covered. In addition, the study dealt only with mathematics and science teachers in secondary school leaving a gap for lecturers in tertiary institutions like BAC not catered for. Thus, the need for this study to investigate the extent to which staff skills in ICT influenced ICT.

2.4 Organizational support structures and ICT usage in teaching and learning

Zang & McCullough (2004) assert that structures in the most investigated organizational characteristic in organizational literature. It institutionalize how people interact with each other, how communication flows, and how power relationships are defined (Hall, 1987). The structure of an organization reflects the value-based choices made by the company (Quinn, 1988), it refers to how job tasks are formally divided, grouped and coordinated.

Researchers have conceptualized organizational structure from different perspectives. March & Simon (1958) define organizational structure as the hierarchical relations among members of the organization. Child (1972), conceptualized it in terms of the allocation of tasks and responsibilities between individual organization members and groups to ensure effective communication and integration of effort. In the same vein, Hall (1987) argues that organizational structure institutionalizes how people interact with each other, how communication flows, and how power relationships are defined. In this study, the researcher will adopt Khandwalla's (1977) classification of organization structure.

According to Khandwalla (1977), organization structure can take many forms, ranging from highly mechanistic to highly organic. Mechanistic structures are highly formalized, non-participative, hierarchical, tightly controlled, and inflexible. Organic structures, on the other hand, are characterized by informality, decentralization of authority, open channels of communication and flexibility. Based on above, in this study the organizational structure is viewed as facilitating

interaction and communication for the coordination and control of the organization's activity. For purposes of this study, organization support structures will entail Management support and peer support in facilitating the ICT usage in teaching and learning.

2.4.1 Management support and ICT usage in teaching and learning

Mohamad, Shahriza & Ramlah (2007) define Management support as the degree to which administration understands the importance of the Information System (IS) function and the extent to which it is involved in information system activities. In the context of ICTs, researchers consistently found that Management support is a strong determinant of ICT usage success (Al-Garbi & Al-Turki, 2001; Eder & Igbaria, 2001; Tang, 2000; Bajwa & Ross, 2002). Pinto & Millet, (1999) argue that administration need to establish willingness on the part of the organizational members by creating a climate of cooperation, demonstrating the efficacy of the new system and its benefits over the old ways of doing things. They add that the degree of acceptance or resistance to ICT projects will be due to the degree of administrators for the project.

Still Phelps, (2002) as cited by Ahumuza argues that engaging leaders in ICT trainings enables them to reach greater understanding of potential of technology in challenging and enhancing ICT usage in teaching and learning. Fullan, (2003) agrees that no successful large scale change or ICT adoption effort has advanced without the support of administrators. Schiller's (2003) study related to the school principal as a change facilitator for ICT, concluded that principals who take an active approach to innovation can foster an environment that has greater benefits to the users. Hence leaders' awareness, understanding and use of ICT are essential for effective utilization of ICTs among staff in their teachings and learning (Sweets, 1999). Hope Kelly & Guyden, (2000) noted that leaders should use technology and modeling the practice to the staff.

While the above studies are trying to describe how the management skills affect the ICT usage in teaching and learning in high institution of learning but they explained outside Bukalasa Agricultural College context which yield interest for the researcher to have a study in line with BAC.

2.4.2 Peer support and ICT usage in teaching and learning

Peansupap & Waker, (2005) assert that innovation diffusion needs a sharing and learning organizational environment among peer members. They add that learning and sharing knowledge among staff is important for innovation diffusion. Rogers, (1996) argues that learning is a key factor in innovation development. He suggests that training and development should be shifted to an experiential style of learning. Organizational learning is a key ICT usage factor when ICT application development is frequently subject to change (Attewell, 1992; Fichman & Moses, 1999). Gibson & Smilor (1991) assert that sharing tacit ICT knowledge among peers built from users' experience can improve ICT usage within organizations. Carlopio (1998) explains that personal change may be best influenced by co-workers, friends, family and peers within an organization. Peansupap's (2005) study using qualitative data among construction firms in Australia reveal that collegial help and mentoring is one way that knowledge sharing can most effectively occur because experienced users can give strong support by assisting novices to use ICT applications through knowledge transfer. They are supported by Senge, (1999); Compeau & Higgins, (1995) that collegial help strongly influences change in an organization and argue that peer and collegial support is vital.

Although the above studies are enlightening about the peer support and ICT usage in teaching and learning in high institution of learning but were all out of Bukalasa Agricultural College's context, hence building the need for further research.

2.5 Administrative support and ICT usage in teaching and learning

Soanes (2006) defines administrative support as an act of giving out or applying something in an organization. Administrative support in the context ICT refers to the presence of encouraging ICT-using role models, such as the principal, and the presence of incentives for teachers to use technology (Priscilla et al, 2008). In this study, administrative support refers to the help and guidelines given out by administrators in institutions of higher learning to aid in computer training and integration of ICT into the curriculum. Sife et al (2007) reported that administrative support is critical to the successful integration of ICTs into teaching and learning processes. It can be argued that administrators can provide the conditions that are needed, such as putting in place an ICT policy, incentives and resources.

In a study of small firm computing, Teo and Lim (1998) found that lack of technical support often discourages ICT growth. Technical support may be provided to teachers by equipping them with technical skills on how to handle computer hardware and software. Afshari et al (2009), indicated that with information technology support, teachers are able to access school network, internet and computer accessories (printer, digital camera, data projector, large TV screen, scanner and video camera).

Lack of training support by administrators could be identified as a significant barrier towards usage of computers in classrooms. Krysa (1998) reported that successful implementation of computers can only occur if administrators offer teachers support and leadership. In addition to administrators developing a philosophy to guide the usage of computer technology, they can support the technological professional development of teachers by: establishing flexible schedules so that teachers can practice what they have learned (or to continue their learning); encouraging and facilitating team teaching and peer coaching allowing teachers to visit each other's classrooms to

observe computer technology integration; and scheduling regular meetings among teachers using technology to plan and evaluate instruction. Hsin-Kai et al (2007) in a study, teachers' beliefs about using educational technology in the science classroom in Taiwan found that although many teachers share beliefs that educational technology could promote learning and that the use of technology is desirable, they are reluctant to use computers (ICT) because of insufficient support and resources provided by schools.

Munyantware (2006) in his study, problems affecting teachers' adoption of technology in classrooms among science and mathematics teachers in Kisoro District, reported that in addition to social support from colleagues, perceived support from the school influences teachers adoption decision. The study suggested that continuous support to teachers gives them confidence in using computers in teaching their relevant courses BAC. Akankwasa (2006) found out that although many teachers share beliefs that educational technology could promote learning and that the use of ICT is desirable, they are reluctant to use educational ICT because of insufficient support and resources. Much as the above mentioned studies were on the context of factors that influence ICT usage, none of the factors studied were in line with cost of ICT training materials and administrative support the gap this study intended to close. The only factor that was similar was staff skills in ICT and in addition, such studies did not even investigate factors influencing ICT usage in teaching and learning in BAC, the gap this study intended to close.

Much as most of the above studies showed a positive relationship between administrative support and ICT usage in teaching and learning, none was in the context of selected institution of higher learning Bukalasa Agricultural College. Hence the need for this study to investigate the extent to which administrative support influenced ICT usage in teaching and learning in BAC.

2.6 Cost of ICT training materials and ICT usage in teaching and learning

According to the Free Online Dictionary (2nd), cost refers to an amount paid or to be paid for a purchase to acquire, produce, or maintain goods or services. The cost of ICT training materials is considered to be among the factors that could negatively affect the ICT usage in teaching and learning at BAC. The higher the cost of computers and their accessories, the fewer computers one can buy with the limited resources (Republic of Uganda, 2007; Sharma, 2003). According to Tsubira and Mulira (2004), the cost of a Desk top Computer (PC) connected to the Internet is often prohibitive for most people in developing countries and for those who can afford a PC, routine maintenance, and virus protection and servicing, is yet another problem that is not easily manageable by the first generation computer users.

Empirical studies on the relationship between cost of ICT training materials and ICT usage in teaching and learning are many. For example Mumtaz (2000) reported limited resources within schools as a great impediment to the take up of ICT and lack of computers and software in the classroom can limit what teachers are able to do with ICT.

Ssewanyana and Busler (2007) in their study, adoption and usage of ICT in developing countries, stated that usage of computers and internet is high in medium and large firms, and especially firms owned by foreigners. The small firms which are mainly locally owned, have low usage due to the high cost of required investment, limited knowledge and skills, and being very responsive to charges. The findings suggest that there is need to widen ICT training facilities for the local entrepreneurs to take advantage of opportunities associated with the adoption of ICT; and to address charges on the Internet services and other ICT consumables to lower the cost of acquisition. One has to undergo vigorous training in order to become a computer knowledgeable individual, however, high cost of ICT training materials would hamper this process. Though many

researchers advocate for the use of computers in management activities, there are quite a number of problems which affect the effective utilization of computers. In agreement with the statement, Zziwa (2001), in his paper on networking and the use of information technologies, pointed out that computer utilization is affected by training, organization, and supply of resources. With reduced costs on ICT tools, adoption of ICT innovation could be advantageous over other innovations. However, this assumption remains a theoretical one until it is proved and thus the need for this study to establish the extent to which cost of ICT training materials influences ICT usage in teaching and learning at BAC.

While most studies above show that the cost of ICT training materials pose a challenge to the adoption of ICT, Tusubira and Mulira (2004) and Ensafi et al, (2007) seem to be taking a different position of considering cost of computer as a less important factor. According to Tusubira and Mulira (2004), Cost of ICT training materials was not taken as a major inhibitor of ICT usage in teaching and learning. They considered lecturers' awareness and positive attitude towards ICT as necessary conditions for effective ICT usage. They urged that institutions of higher learning in Uganda could adopt freeware and open software for teaching and learning activities. Much as most studies above were concerned with cost of ICT training materials, the population studied was different. For example, some studies were concerned with secondary school teachers while others considered only post graduate lecturers like Malcom and Godwill (2008) for secondary schools and Namakungula (2007) for post graduate lecturers. Further more such studies were in line with other institutions of higher learning like Makerere University, Kyambogo University, Iranian University and none was related to Bukalasa Agricultural College. To contribute to the closure of this gap, this study needs to investigate the effect of cost of ICT training materials towards ICT usage in teaching and learning in higher institutions of learning like BAC.

2.7 Summary of literature review

As observed from the related literature from various scholars and past researchers collected from secondary sources i.e. textbooks, magazines, internet and journals, it shows that to a large extent ICT usage in developing countries is still minimal in some institutions of higher learning with exception of Makerere University. As regards to cost of ICT training materials, most studies indicate that to a large extent, costs were very high and thus affecting ICT usage in institutions of higher learning as supported by Makau (1986) for Kenya, and Mumatz (2005) in Tanzania. However, few scholars like Tsubira and Mulira (2004); Ensafi et al (2007) were taking another positive trend in the case of higher education. Other scholars were concerned with ICT implementation in primary and secondary schools i.e. Makau for Nigeria, Munyantware for Uganda, thus leaving a gap for institutions of higher learning which this study intended to close.

For the case of staff skills in ICT and administrative support, most scholars and past studies suggested that to a large extent these two variables positively affected ICT usage, for example, Farrell, Agaba and Mugisha for Makerere University, Kyambogo University, and Mbarara University, respectively. Few scholars like Mooij and Smeets (2001) in Holland were of the view that possessing ICT skills does not warrant use of computers in teaching. However, no study was in the context of ICT usage in teaching and learning in institutions of higher learning like BAC which is the gap this study intends to close.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter will describe the study design, methods to use in collecting, analyzing and presenting data. It focuses on the research design and approaches that will be adopted, the study area, target population, sample population, sample size and selection. The chapter will also examine the data collection instruments that will be used, sampling techniques and procedures, pre-testing of instruments, methods and procedures for data collection, analysis and dissemination of findings.

3.2 Research design

The study will employ a triangulation of cross sectional survey design and correlations. Cross sectional survey will ask a group of respondents a set of questions at one point in time. Because of limited amount of time, it is important to administer cross-sectional surveys since external changes (social, political & cultural) may affect the attitudes of respondents as time progresses. Since these surveys attempt to capture the attitudes of a sample in a specific time frame, this shorter timeline is vital in gleaning relevant results (Amin, 2003). Correlation research involves collecting data in an effort to determine whether and to what degree a relationship exists between two or more variables (Amin, 2005). The study will involve triangulation method in data collection methods and analysis will be employed. The qualitative methods will bring out a holistic enquiry through interviews and discussions with key informants of selected personnel of Bukalasa Agricultural College.

3.3 Study Population

The college has a target staff population of 36 teaching staff and 4 administrators (Payroll, 2011) and 1200 students. The accessible staff population at the college (full time) is 40 and 350 second year diploma students. The college is made up of five departments including Animal Science, Crop Science, Horticulture, Management and Agribusiness department. ICT usage in teaching and learning is a phenomenon that applies to all the above departments.

3.3.1 Sample size and selection strategies

Sampling size is the portion representing the population and selection which involves the process of choosing the elements from the population (Amin, 2005).

Table 1: Sample size

Category	Population Size (N)	Sample Size (S)	Sampling Strategy
Administration	4	4	Purposive sampling
Staffs	36	36	Purposive sampling
Students	350	250	Simple Random
Total	390	290	

Given the size of the population of 390 respondents only, to select the sample size the researcher will use the Matrix sampling technique in Probability sampling; this will ensure that a bigger percentage of the population participates in the research, Amin, (2005). In the table above, the population size is represented by (N) and sample size by (S).

3.4 Data collection Methods

The methods that the researcher will adopt in collecting the primary data for this study consist of semi-structured personal interviews, focused group interviews, questionnaire, personal observation and examination of historical documents for the secondary data. The adoption of multiple methods or triangulation in this study is because it has been endorsed by various researchers because it helps them to overcome flaws inherent in the use of one method, for example, Patton (1990) argues that “Combination of interviewing, observation and document analysis are expected in much social science field work.” He argues that studies which adopt only one method are more vulnerable to errors linked to that particular method, thus studies that use multiple methods in which different types of data provide cross-data validity checks (Patton, 1990: 187-188).

3.4.1 Questionnaire survey

Questionnaire is a carefully designed instrument for the collection of data in accordance with the research questions and hypothesis. Questions for respondents will be designed and administered which will involve the use of a set of questions printed in a definite order (Kothari, 2004). The justification of this instrument is that it is less expensive and does not require the researcher to be present for the respondent to fill up the questionnaire. It will be used to collect data in both the category of Administration and staffs, because of their level of literacy and they are able to read, understand and interpret the questions besides possessing the information required for the research. Attitude Scale (Linkert Scale) will also be used to enable the respondents to best select a statement that best describes his or her reaction to the statement in the question. This scale is used to determine what an individual believes, perceives or feels about self, others, activities, institution or situation, (Amin, 2005).

3.4.2 An Interviewing

An interview is an oral administration of a questionnaire or an interview schedule. This is a face-to-face encounter that requires maximum cooperation from the respondents (Mugenda, 1999). During interviews, facts about what is happening come to light, together with the options of the respondent regarding weakness in the existing system (French, 2001). Some of the advantages cited by many researchers include, providing in-depth data which is not possible to get using questionnaire, they guard against confusing the questions since the interviewer can clarify the questions thereby helping the respondent to give relevant responses, very sensitive and personal information can be obtained from the respondent. However they are more expensive as researcher has to travel to meet the respondents.

3.4.3 Observation

The observation method involves human or mechanical observation of what people actually do or what events take place in an organization. Information will be collected by observing process at work. The advantage is that the biasing effect of interviewers is either eliminated or reduced. Data collection by observation is thus, more objective and generally more accurate (Mugenda & Mugenda, 1999). Since this is work based research, actual observation of what happens will capture any information deemed relevant to the study and that will not have been got from interviews and use of questionnaires.

3.5 Data collection instruments

3.5.1 Self administered questionnaires

These instruments will have matrix questions. These are questions which share the same set of response categories measured using a five likert scale of coding (Mugenda, & Mugenda 1999).

The advantages of matrix questions according to Mugenda, & Mugenda (1999) are that, when questions or items are presented in matrix form, they are easier to complete and hence the respondents are unlikely not to be put off, space is used efficiently, it is also easy to compare responses given to different items there researcher can easily detect a trend just by glancing at the response. They will be constructed on assumption at the back of researcher's mind that some respondents, especially the ones that may not be too keen to give right responses, might form a pattern of agreeing or disagreeing with statements.

3.5.2 Interview schedule

An interview schedule is a set of questions that the interviewer asks when interviewing. They standardize the interview process so that interviewers can ask the same questions in the same manner. The study will involve the use of structured, unstructured and semi-structured interview schedule. To gain deeper investigation into user perception influence on ICT usage in teaching and learning, a structured interview schedule will be administered to members of staff and unstructured and semi-structured to administration and students.

3.5.3 Observation checklist

The researcher will utilize observation checklist to record what is observed during data collection. To ensure accuracy of the study, the researcher will define behaviors to be observed and then a detailed list of behaviors developed.

3.6 Data collection procedures

A letter of introduction will be secured from Uganda Management Institute. It will be presented to the Principal of the college and a copy to the Academics Registrar from whom permission will be sought to administer the questionnaires and conduct the interviews.

3.7 Validity and Reliability

3.7.1 Validity

Validity will be determined by giving the instrument to expert judges who include supervisors and other academicians who have progressed.

3.7.2 Reliability

Reliability measures the degree to which a research instrument yields consistence results after repeated trials while validity measures the degree to which results obtained from the field are relevant to the study (Amin, 2005). The split half technique of assessing reliability will be employed. In this approach, an instrument will be designed in such a way that there will be two parts. Scores from one part (PI) will be correlated with scores from another part (PII). They will be then fed into SPSS Pearson and the relationship will be found. If the relationship is >0.7 , the instrument will be perfect, if <0.6 , the instrument will not be reliable, it causes confusion.

3.8 Data Management Analysis

After collecting the questionnaires and the researcher schedules, the researcher will then do a central editing to check the questionnaire for obvious errors such as wrong entry in the wrong place, missing or inappropriate replies and determining the proper answers and contacting the respondents for clarifications if necessary.

3.8.1 Quantitative Data Analysis

The researcher will summarize the data using descriptive statistics before coding and entering the data in the computer to verify the hypothesis using Statistical Package for the Social Science

(SPSS) computer software (Amin, 2005). Data will be presented in a form of tables, charts, frequencies and percentages for the purpose of comparison and then interpreted.

3.8.2 Qualitative Data Analysis

Data from the field notes will be organized and edited when collected. The researcher will then create themes, categories and patterns to be able to distinguish them by the use of codes and then establish the relationships among these themes and come up with in-depth explanations and interpretations.

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Appendix I: Questionnaire

Introduction

This is a questionnaire on study of factors influencing ICT usage in teaching and learning for the award of a Masters in Institutional Management and Leadership at Uganda Management Institute. Because of your unique responsibility and experience at the college, you have been selected as one of the respondents. I kindly request you to attend to it as that after one week, I will collect it from you. All the information you will put in, it will be kept confidential and for academic purpose only. Thank you very much in advance.

Instruction

These questions seek information regarding the respondents' background, organizational support structures, ICT infrastructure, user perceptions, and ICT usage in teaching and learning (all the computer hardware and computer software applications used).

Please kindly read the directions carefully and provide responses honestly in the format requested. Indicate your responses to the following questions by ticking the appropriate option(s) for each question.

Section A: Background Information

- | | | | | |
|-----------|---------|--------------------------|---------|--------------------------|
| 1. Gender | Male | <input type="checkbox"/> | Female | <input type="checkbox"/> |
| 2. Age | 20 – 29 | <input type="checkbox"/> | 30 – 39 | <input type="checkbox"/> |
| | 40 – 49 | <input type="checkbox"/> | 50 -69 | <input type="checkbox"/> |
| | | | above | <input type="checkbox"/> |

3. Working experience below 2 2 -5 6 – 9
- 10 – 16 17 – 20 above
4. Highest academic level Certificate Diploma PGD
- 1st Degree Masters Others

Specify

5. Department enrolled in Animal Crop Computer
- Horticulture Management Agribusiness

Section B: Independent variables

Scale	1	2	3	4	5
		Strongly Disagree	Disagree	Not sure	Agree

Organizational Support Structures		1	2	3	4	5
A	Management support					
6.	There is supervisory support for ICT capacity building.					
7	Management support guidance & counseling regarding staff career development					
8	Management offers periodic maintenance of computers.					
9	Management is cooperative with staff when implementing new ICTs					
10	Management communicates timely when there are new innovations					
11	Management support team work to develop ICT usage in teaching					
12	Management supports ICT peer group activities on regular basis					
13	Management suggests the ICT usage in teaching and learning					
B	Peer support	1	2	3	4	5
14	Staff members share ICT experiences, knowledge & skills					
15	There is peer departmental trainings when there are new staffs					

16	Staff expert users train novices in ICT skills					
17	Skilled staffs teach using ICTs					
18	Staff members struggle on their own to become ICT elites					
19	There is knowledge sharing among individuals in a dept					
20	A family member supported you to become computer literate					
C	ICT infrastructure	1	2	3	4	5
21	You have a personal computer at your desk.					
22	You give your presentation using PowerPoint.					
23	You have access to MS access, word, excel					
24	Your computer is connected to internet					
25	You have an e-mail					
26	You have access to the college website					
27	You have a laptop					
28	You store your data on flash disk.					
D	Users knowledge and skills of ICTs					
29	Am satisfied with how to use a computer					
30	Am able to type my work quickly using a computer					
31	I communicate to my colleagues using my e-mail address					
32	I find storing files on my flash disk more convenient					
33	Storing files on my computer is most convenient					
34	I can copy, cut, paste, save & open documents on a computer					
35	Am aware of how to use a computer during teaching					
36	I can boot a computer on and off					
37	I can connect a projector to a computer when teaching					
38	I can obtain information from internet					
39	I send and receive assignments from students via my email					
40	I send the results to the registrar using my email					
	User perception	1	2	3	4	5
E	Perceived benefits					
41	Available ICT facilities have helped improve my skills					
42	I started as a novice user but now am an expert					
43	I have gained confidence in use of ICT in teaching and learning					
44	ICT has helped me enhance my career					
45	ICT is for only ICT related courses					
46	ICT and agriculture are not related at all					

F	Perceived ease of use					
47	Computers are complicated to learn					
48	Am able to complete organizing my teaching note in time					
49	I feel comfortable teaching while using computers					
50	I feel easy to use internet					
51	I can troubleshoot my computer					
52	I can easily retrieve information from the internet					
53	When I make a mistake, it's very easy to recover from it					
54	I can work well with Microsoft office programs					
55	I generally use all ICTs at the college					
56	A class without ICTs bore me a lot					

Section C: Dependant Variables: ICT usage in teaching and learning

Please rate how often lecturers use a given ICT facility in teaching using a scale where 1 = No, 2 = Very rarely, 3 = Rarely, 4 = Regularly, 5 = very regularly

G	Computer hardware and peripherals	1	2	3	4	5
57	Computer desktop					
58	Projector					
59	Printer					
60	Scanner					
61	Whiteboards					
H	Computer software	1	2	3	4	5
63	Word processing					
64	Spread sheets (e.g. Excel, Lotus)					
65	Data base management (e.g. Ms-access, dbase)					
66	Power Point					
67	Accounting software (e.g. Pastel, tally, Quick books)					
I	Internet	1	2	3	4	5
68	E-mail (sending and receiving messages)					
69	Electronic learning					
70	Electronic journals (in library)					

Thank you very much.

Appendix II: Observation checklist

The following activities will be observed during course of the study

1. Who goes to the computer laboratory?
2. What actually takes place in the computer laboratory?
3. Kind of support that comes from the management.
4. How internet is utilized?
5. Transfer of documents from one office to another.
6. Retrieval of files from different storages and time taken.
7. Teachers teaching using ICTs.
8. How notes and presentations are prepared?
9. How ICT maintenance is done?
10. Computer laboratory usage.

Appendix III: Interview Guide for management staff

1. What ICT facilities has management put in place so far?
2. How management endeavored to encourage staff to use and utilize these facilities to generate, store, retrieve and apply information using the facilities?
3. Comment on the ability of staff to use ICT facilities comment.
4. About how many staffs have tried to seek permission to undertake ICT training related courses?
5. Comment on the suitability of the available ICT facilities in relation to
 - a. Information generation
 - b. Information storage
 - c. Information sharing & dissemination
 - d. Information application
6. What would you say is the ICT policy at the college on information access, dissemination, storage and usage?
7. What is staff's reaction towards ICT during drafting teaching materials?
8. What are your comments about integrating ICT in the teaching and learning of the college?

Thank you.