

The Use of ICT in Teaching and Learning at Makerere University

The Case of College of Education and External Studies

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Abstract

That many, if not all, universities the world over have made heavy investments in putting up ICT infrastructure is perhaps a clear attestation to the unwavering confidence they have in the ability of ICT to transform the way higher education institutions conduct their core activities. This investment in technology is informed by the perceived advantages it brings to the process of knowledge creation, management and dissemination. Nonetheless, an important question arises out of this; just how exactly do students and faculty use ICT at their disposal? This research project aimed at unraveling this ICT puzzle by investigating how ICT is used at Makerere University College of Education and External Studies.

A qualitative case study approach was used with qualitative interviewing as the main data collection tool. Rogers' (2003) Diffusion of Innovations theory is used as the main theoretical framework forming a backdrop against which data is collected and analyzed to establish why ICT use, a relatively "new" educational innovation, has become pervasive in higher education institutions in general and the case under study in particular and the factors that hamper its further development.

The findings of the study show that there is a limited formal academic use of ICT at the College. The latter is primarily used as a tool for preparing lectures, for record management and for socializing. Results also indicate that the ICT environment at the College is fraught with a plethora of challenges that hamper its full integration in teaching and learning.

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Abbreviations

ADEA	Association for the Development of Education in Africa
AVU	African Virtual University
CEES	College of Education and External Studies
DATAD	Database for African Thesis and Dissertations
DoI	Diffusion of Innovations
FCIT	Faculty Computing and Information Technology
HE	Higher Education
HEI	Higher Education Institution
HES	Higher Education System
ICT	Information and Communication Technology
INASP	International Network for Availability of Scientific Publications
JSTOR	Journal Storage
LMS	Learning Management System
MUK	Makerere University-Kampala
NEPAD	New Partnership for African Development
NORAD	The Norwegian Agency for Development Cooperation
NPM	New Public Management
OECD	Organization of Economic Cooperation and Development

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1 Introduction and Background

1.1 Introduction

Universities, since time immemorial have been deemed to be bottom-heavy institutions where the decision-making process goes against the grain, as it were; from bottom to the top (Clark 1983). Faculty has a bigger say in what goes on in the institutions and decisions are usually arrived at through consultations and consensus-building by the academic oligarchy (ibid). As a result, reaching a mutual consensus in matters affecting the latter is often a laborious task more so when vested interests take center stage.

This as Clark asserts means that change in the way universities conduct their core activities is a slow and incremental process; an evolution rather than a revolution. Paradoxically, the University has been deemed to be one of the “... *institutions most responsible for the changes that make our society the most changing in the history of man*” but it is itself “...*sluggish, even heavily resistant to change*” (Clark 1983: 182). This characteristic of the university, as *The Chronicles of Higher Education* (2013) points out, is still exhibited now as it was in the university’s formative years.

Nonetheless, it is argued in the pro-technology literature that ICT has fundamentally changed the way universities conduct their core business more especially in knowledge creation, management and dissemination. This introduction of ICT in the teaching and learning process is considered to be a major milestone in the way contemporary instruction is conducted especially at the university level (Koller 2012).

Even though the role of ICT in enhancing learning outcomes is a contested one, most of the researches done in this area suggest that there are a number of benefits that ICTs bring to the knowledge creation, management and dissemination frontier. Some of the perceived benefits cited include: improved access to information, creation of an enabling environment for a wider participation in higher education (Laurillard 2000; Koller 2012), improvement of communication among students and between students

and teachers,(Hill et al 2004; Stensaker et al 2007) promotion of collaborative learning and supporting learner -centered approaches to teaching, (Sellinger, 2003) increased flexibility and the development of competence-based curriculum, Collis and Wende 1999), to mention but a few.

Notwithstanding the aforementioned benefits of using ICT in instruction, many university students and faculty make only limited formal academic use of technology (Breen et al 2001; Marriott et al 2004; Moule 2003; Selwyn 2007; Stensaker et al 2007). Several reasons have been posited to explain why universities have been slow in fully utilizing ICT resources at their disposal in the teaching and learning process and key among them are “...usually attributed to a variety of operational deficits on the part of students, faculty, and universities” (ibid). In an empirical study done by Stensaker et al (2007) in 5 Norwegian HEIs, it was discovered that ICT is used more indirectly in instruction as a tool for organizing courses and educational programs, information gathering for students and for communication.

This digital disconnect, they posit, is a residual outcome of a lack of an effective link between purpose, people and pedagogy inside the institutions. Put variously, the biggest impediment to ICT integration in teaching and learning in HEIs, according to them, is attributed to the missing (or insufficient) links between ICT and human resource management activities, and between ICT and organizational development initiatives. The situation is further exacerbated by lack of internal marketing and reward systems that incentivizes those who take the initiative and go out of their way to learn how to fully integrate ICT in teaching and learning (ibid).

This is a somewhat ironical scenario considering that many HEIs, in the recent past, have been investing heavily in putting up ICT infrastructure with the intended motive of improving how they conduct their core activities (Selwyn 2007; Adam 2003) as well as increasing access to higher education (Scott 1998; Laurillard 2000). Even in the global South, it is argued, ICT infrastructure is adequate with many universities having infrastructure comparable to HEIs in the global North, in spite of the limited resources at their disposal. As Adam (2003:197) concisely puts it, “*The*

underlying (ICT) infrastructure is adequate anywhere in Africa,” and this includes Makerere University which is deemed to have a better capacity in the region, (ibid.). But whether this assertion holds true now as it did then when his survey took place is a matter of empirical inquiry.

The underlying puzzle is however not whether or not the ICT infrastructure is adequate across many HEIs globally but rather how the available infrastructure is used by students and faculty alike. Yet, as Bekele (2004) asserts, there has not been sufficient studies in Africa to examine the extent to which ICT is being utilized in the African context. His belief is supported by the fact that there exists a huge knowledge gap in as far as ICT application in the instructional process goes. Lack of substantial research output in the form of articles and books on this area is a clear attestation of this knowledge gap. In his doctoral dissertation published in 2009, a claim is made of the existence of only one study conducted in this area within the African context at the time of the study. He observes too that, “...most theorization and/or conceptualization is also based on the socio-economic and cultural contexts...” of the developed world; and yet, the conspicuous development gap between the global North and South renders any generalizations, in as far as the use of ICT is concerned, wanting and even questionable.

This digital divide between universities in the global North and South is deemed to be a result of differences in affordability, availability and accessibility of ICTs (AAU 2009). In scenarios where there has been some research output on the state of ICT use in the African context, this has been dominated by research from South Africa, Nigeria and Botswana in that order (Chiafie 2011). A summation of all the research output in this area reveals that only 9 % of it is done by African institutions (ibid).

Despite the rhetoric on this digital divide, Africa still lacks consolidated documentation of the ICT situation in the continent (Farrell and Shafika 2007). As a result, attempts by different stakeholders including donor agencies, the private sector, governments and civil societies to carry out surveys on the use of ICT are usually thwarted by the lack of crucial information or reliable data (ibid).

This research project set out to bridge this knowledge gap by investigating how ICT is used at Makerere University College of Education and External Studies (hereafter CEES). Emphasis on how technology is used in scaffolding the performance of the college's core activities of teaching and learning and the perceptions of faculty and students on the role of technology in education was given primacy. Additionally, the major impediments to ICT use were identified and analyzed. It is only by doing so that the aforementioned ICT puzzle can be fully unraveled.

1.2 Research Objectives

The main purpose of this study was to investigate how ICT is integrated in instruction at MUK. Since no known similar study has been previously done in this area, it also aimed at bridging the existing knowledge gap in as far as the use of ICTs in teaching and learning goes. By contributing knowledge on how ICTs are used at MUK, the study will, hopefully, stimulate more research efforts in this domain and hopefully, better inform practice. The focus of the study therefore revolved around the conceptions about the role of ICTs in instruction and the extent students and lecturers at Makerere University-Kampala (hereafter MUK) use them in their academic work.

1.3 Research Questions

Research questions play a vitally important role in ensuring that the study is focused on only certain issues. They help in identifying what puzzles the research seeks to unravel. They in fact play a pivotal role in guiding the researcher to better understand the phenomena under study by focusing attention on what is not clear about the issues under investigation (Bryman 2012). An important feature of this component is the interrelatedness of the research questions; in other words, how the research questions are related to one another and how this helps in solving the puzzle. To achieve the aforesaid objectives, the research was guided by one overarching research question: "How are ICTs integrated in teaching and learning at

MUK College of Education and External Studies”? The specific questions that the study sought to answer are:

i) How and to what extent do faculty and students use ICTs at MUK CEES?

This question aims at investigating, first, whether or not ICT is used at MUK at all, then illuminating on the purpose for which students and faculty use it and the approximate amount of time they allot to it. The question would best be addressed by putting ICT usage in different perspectives. Hill et al (2004:443, 448) suggests three perspectives of ICT use under which different users can be categorized. These perspectives are: *learning with*, *learning from* and *learning through*. (For a detailed discussion about these, please refer to the analytical/theoretical framework). Additionally the, Diffusion of innovations theory will scaffold the above analysis by putting individuals in different adopter categories (depending on how fast they adopt new innovations) in a bid to explain why different people respond the way they do to new innovations.

ii) How do faculty and students at MUK CEES perceive the role ICTs play in teaching and learning?

The fact that ICT is used at MUK is a clear attestation that it plays a role (or multiple roles for that matter) in the conduct of its core activities. This question therefore aims at unraveling the perceptions of students and faculty on the said role(s) of ICT use in teaching and learning.

iii) What factors and or conditions, if any, impede the use of ICTs in teaching and learning?

This question aimed at uncovering the factors that impede the optimal use of ICT at MUK College of Education and External Studies. Discussion revolved around endogenous factors as well as exogenous factors that stand in the way of using ICT resources to full advantage.

1.4 Scope of the Study

Owing to limited resources viz time and finances, the study is confined to a single faculty i.e. Makerere University College of Education and External Studies. It would have required a longer time to study the whole university and this also could have had a big financial implication. Narrowing the scope of the study was therefore a practical consideration. Secondly, the term “ICTs” has been used in its narrow sense to denote the use of computers and the internet. Even though there is more to ICT than the use of the latter two, the research does not, in any way, investigate how other forms of ICTs are used at the CEES. Lastly, the participants comprise of regular undergraduate students and fulltime lecturers only.

1.5 Limitations of the Study

This research project had a number of limitations. At the outset, data collection during field work was ill-timed. The researcher travelled to Kampala to collect data at a time when students were pre-occupied with mid-semester assessment tests. It was not so easy to get students who, on their own volition, wanted to participate in the project as respondents. This, in part, informed the decision to use purposive sampling where only those who were deemed to have the information were approached through gate-openers. They also had to volunteer as volunteers are considered to have a huge advantage over non-volunteers (Kvale & Brinkmann 2008). On the other hand, faculty was busy marking students’ scripts and supervising the assessment tests and those who volunteered were mainly accessed through heads of different departments and through a special request from the faculty dean.

To ensure that those who had been requested by their superiors to participate in the project did so willingly and were not in any way coerced to, their responses to questions were pitted against their counterparts who volunteered only after being asked by the researcher. This was aimed at mitigating any falsehood, if any, as their responses to some questions were not expected to be diametrically opposed to those

of their colleagues because they were working under the same conditions and in the same faculty.

With regard to the literature relating to ICT use at MUK, the researcher strived to get the most recent information on how technology is actually integrated in teaching and learning to no avail. A comprehensive search both on the internet and in the main Makerere University Library was an effort in futility. There exists a huge knowledge gap which prompted the researcher to use literature from a supranational level. Even then, some of that which was available was rather old and therefore not reflective of the possible changes that may have occurred in the ICT policy arena. The literature covered however, sheds some light on the ICT situation in Africa despite it not being more current or substantial.

Finally, the fact that the research was not concerned with making generalizations about the state of ICT use at Makerere University CEES, an opportunity was missed to come up with findings that would have applied to the entire student and faculty population. The findings in this study therefore, relate only to the sample of the population. However, the general tendencies in the responses are assumed to be crosscutting; the norm at the College (and perhaps the University as a whole) rather than relating only to the respondents.

2 Literature Review and Theoretical Perspectives

Reviewing the existing literature around the topic of research interest is vitally important because it helps in understanding not only the body of knowledge that relates to the research topic but also in developing an argument about the relevance of the research (Bryman 2012). Literature review also serves as a roadmap that aids the reader in understanding where the researcher is headed in his/her argument (ibid).

In the same vein, this chapter will systematically review the related literature to guide the reader in understanding what has already been done by other researchers in as far as the use of ICT in instruction is concerned; what concepts and theories are relevant in this area of research amongst other things. The reason for doing so is the fact that knowledge is cumulative in nature. More often than not, scholars build up on already existing body of knowledge by refining it, adding to it or in some instances, refuting it. The latter could be as a result of differences in ideological stances held by different scholars or simply because of a preference to a certain school of thought as opposed to others. The discussion helps in making inroads into the rationale of using ICT in instruction in addition to providing a theoretical background for analysis of the data in order to make a meaningful conclusion.

2.1 The Rationale of Using ICTs in Instruction

It would be much ado about nothing to invest heavily in ICTs before critically analyzing the relative advantage the latter have over other traditional ways of knowledge creation, management and dissemination. This section will try to explore what motivates HEIs to integrate ICTs in performing their core activities then analyze the advantages of using the same.

First, the drastic change in the students' demography has occasioned mounting pressure for HEIs to utilize ICT in instruction. This change has been brought about

by the aftermath of massification¹ of higher education which has opened educational opportunities to all and sundry in hitherto elite systems that have, for many years, had restrictive entry requirements for prospective students (Scott 1998). This means that besides the traditional on-campus full-time students, there has been an exponential increase in the number of the full-time\ part-time students where many people take part-time jobs and at the same time attend university. Additionally the quest for lifelong learning where adults either voluntarily or by compulsion take up supplementary courses in order to remain relevant in the ever-changing and competitive job market has led to many adults taking up part-time courses alongside their full-time employment. Some opt for sabbatical leaves to pursue the same (European Commission 2001).

Secondly, marketization of higher education has resulted in a burgeoning for -profit higher education private providers who offer a myriad of certificates, diplomas and degree courses (Altbach 2007). Many of these educational programs that are offered in these institutions are delivered through ICTs in the so-called distance learning modules (ibid). In the recent past, higher education has also witnessed the emergence of virtual university education providers who primarily use ICT modes for delivering their course content to overcome geographic and time barriers or financial constrains in the case of free online courses. A case in point is the African Virtual University which uses an online platform called The AVU virtual classroom that allows qualified students to access course material through “MyAVU Virtual Classroom”.

Third, the external pressure from other stakeholders notably the government, for institutions to provide “value for money” provides ground for universities to re-think how best they can conduct their core activities in a more efficient way. This is often done by setting parameters of performance that address issues of equity and access to educational opportunities, and commitment to lifelong learning (Adam

¹ A term coined to denote the shift from elite higher education that was characterized by restrictive entry requirements to one that allowed all qualified students to participate (Trow 1970)

2003). This is in tandem with resource dependency theory which posits that an institution which relies on another institution to get crucial resources that are the nerve-center of its operation has to, inevitably, adhere to the demands of the institution it depends on in order to ensure a steady flow of these much needed resources without which operation would be difficult or even ground to a halt (Gornitzka 1999). In retrospect, pressure from the government for the university to pay attention to lifelong learning and ICT use leaves no option for the latter but to integrate ICT in its operation.

2.2 Advantages of Using ICTs in Instruction

The foregoing rationale for blending ICT into the day-to-day operation of HEIs can be termed as the “overarching rationale”. The following discussion on the advantages of using ICT in instruction, however, is based on the typologies put forward by Bekele (2004) to facilitate ease of understanding. In his analysis of the advantages of using ICT in instruction, four typologies have been used:

- (i) Psychological advantages,
- (ii) Educational advantages
- (iii) Sociological advantages; and
- (iv) Economic advantages.

These will be discussed in greater detail and in their order of mention. Worth noting at the outset is the overlap between some of them and the tenuous line that separates them.

2.2.1 Psychological advantages of using ICTs in Instruction

Psychological advantages are those that aid learning in a more indirect way. They affect students’ motivation, attitudes, interest, thought processes, attention, problem-solving, decision-making to name but a few (Bekele 2004). Research has indicated

that the locus of control of the learner plays an integral role in their motivation to learn; i.e. the extent to which learners perceive tasks as being under their control as opposed to being controlled by the teacher builds not only their self-confidence but a positive self-concept that plays a crucially important role in achieving positive learning outcomes (Blumenfield, 1992). This is also in agreement with the research findings by Sellinger (2003) that found out the effects ICT has on learning outcomes. According to him, "ICT generates enthusiasm, interest and involvement in student learning." It is an amalgamation of the aforementioned factors i.e. enthusiasm, a positive self-concept, a keen interest to learn or put differently "intellectual curiosity", high level of student involvement in learning, that help in creating a conducive environment for learning on the part of students on one hand and for teaching on the part of the teachers on the other.

In addition to the above, ICT -assisted learning helps in maintaining students' attention by increasing their attention span. It is a given that the amount of time a person can concentrate on a given task without being distracted plays a crucial role for the achievement of one's set goals (Cornish 2009). Attention span varies greatly from one individual to another. In a mixed ability class, the onus is on the teacher to provide thought-provoking stimulus that can sustain students' attention if effective learning is to take place, (Bonnett et al 1999). ICTs can play an integral role in achieving this end especially when using multimedia presentations that appeal to all the human senses (ibid.)

Research also shows that using ICTs in instructions has a profound positive effect on students' attitude towards learning (Trimmel and Bachman 2004; Collis and Wende, 1999). The cliché attitude determines altitude is not one without credence. A positive attitude towards learning is paramount in ensuring that students acquire knowledge and skills that will be used in solving real life problems.

In retrospect, ICT supported learning goes beyond downloading material from the internet for academic purposes or using the computer and other ICTs in creating knowledge and disseminating it. It, in addition to these, play a more covert role of

scaffolding learning by providing favorable conditions (psychological) within which learning can take place. That students need to be both intrinsically and extrinsically motivated in order to enjoy their studies and make the most out of them is not in contest. The foregoing argument on the psychological advantages of using ICT in instruction underscores this.

2.2.2 Educational Advantages of Using ICTs in Instruction

The advantages that will be discussed in this section will be those that relate directly to pedagogy; viz content preparation and methods of teaching and learning. It is worth noting that psychological advantages of using ICT and the educational ones are not mutually exclusive. There may be some overlaps between the two.

The teaching and learning process has hitherto been considered a one-way traffic with the omniscient teacher taking charge of the learning process and learners remaining passive receptors of knowledge. Learning experience was not a mediation of knowledge but rather students were expected to “sit still” and maintain pin-drop silence in order to learn from their all-knowing teacher (Brew 2006; Wang et al 2012). Education was suffering from “narration sickness” (Freire 1996; in Bekele 2008) and consequently rote-learning became the norm where students were inadvertently compelled to memorize lecture notes and later reproduce these notes on demand during examinations in what Freire terms “the banking concept of education”. Freire, the education thinker suggests reconciliation among the student-teacher relationships and problem-solving approach as a way of remedying this.

Nonetheless, the rebirth of liberal education in the 20th century has been regaining momentum in the recent past across the globe with HEIs placing greater emphasis on a wholesome education that empowers an individual to live in an ever-changing society that we live in now (Axelrod et al (2001). This liberal education, purportedly, produces products that are open-minded and free from dogma, preconceptions and ideology. Individuals who are supposedly, conscious of their opinions and judgments and who are reflective of their actions and are aware of their place in the

social and natural worlds (ibid.). Whether this happens in practice is beyond the scope of this project. But one thing is certain, integration of ICT in instruction has immense power in promoting this student-centeredness that was proposed by Freire and other educationists like John Henry Newman, F.D Maurice and Sir Wilfred Griffin Eady.

At the advent of ICT in instruction, the teacher's role significantly started being relegated to that of a mediator or even a facilitator, in the learning process. Students are increasingly taking a hitherto unheard of leading role in their learning (Bonnett et al 1999). Just a few decades ago, to propose a student-centered approach would have been considered heretical as many authoritarian governments adopted a centrally controlled system of governance that dealt a deathly blow to academic freedom where the academic oligarchy could no longer have the liberty to decide what to teach (Clark 1983). Learning experiences are increasingly being transmuted into mediation of knowledge where both the teacher and learner take active roles in the learning process (Oliver 2002; Collins and Wende 1999; Means et al 1995).

The use of ICT affords Students the opportunity to progress according to their own pace; they are free to choose the content, free to use the appropriate media, and are able to study anywhere anytime (Koller 2012). Consequently, learning is directed towards problem-solving and is based on inquiry and construction of meaning (Oliver 2002).

In constructivist classrooms where learning experiences are transmuted into authentic tasks, learners are given the opportunity to perform tasks that simulate real-life experiences (Means et al 1995; Wang et al 2012; Fry et al 2009). For instance, when using ICT in the learning with perspective (see Hill et al under Theoretical perspectives) where students are given the opportunity to use ICT to perform real - world tasks like writing official letters using Word processor, creating spreadsheets in accounting classes or making PowerPoint presentations in Communication Skills classes, learners acquire the requisite knowledge that is needed in the real world

situations which knowledge undoubtedly improve their employability upon graduation (ibid.)

From its very humble beginnings, the University has always been deemed to be an international institution of learning (Altbach 2007). The notion of *studia generales*² in the middle ages that saw the unprecedented movements of students and faculty beyond their national borders from Bologna to Paris and to oxford is perhaps the earliest and clearest indication of the international aspect of the University (Scott 1998). Altbach et al (2001:3) meticulously supports this notion thus:

Universities started as truly international institutions. The original universities that were founded at Paris and Bologna in the 13th century and quickly expanded to other parts of Europe used a common language, Latin, and provided training to students from many countries. Professors were internationally recruited. The international authority of the Roman Catholic Church provided some supervision of degrees. The knowledge base was also international: The universities helped translate books from Arabic and Greek to bring the latest scientific knowledge from more advanced parts of the world.

The movements of students and staff across national borders described in the above quote was arguably restricted to a small group of students and faculty who had the wherewithal to finance such educational endeavors. Save for the students who get financial support either by winning scholarships or accessing educational loan facilities, such cross-border educational activities reminiscent of the medieval Europe is still a costly affair that is way beyond the reach of many students. However with the introduction of ICT in instruction, students and faculty do not have to move from country to another in pursuit of knowledge and this has made access to education easier even for those without the means. ICT affords them the ability to gain knowledge from far-flung institutions even in the comfort of their homes or offices and in most instances free of charge or at a comparatively cheaper cost (Koller 2012).

² The term has its roots in the 13th century Europe. It does not have a standard definition but it was used to denote academic freedom that allowed students and staff from all walks of life to assemble-unhindered- for the sake of scholarship

The increased cross-border educational activities and collaborations aided in part by technological advancement have a big effect on research output (Scottt 1998). This increased research output improves the quality of teaching as faculty wittingly or unwittingly create a symbiotic nexus between their research and their teaching by transmuting their research findings into lectures (Brew 2006; Neumann 1996). This synergy between teaching and research can be traced to medieval Germany when the then minister for education Wilhem von Humboldt advocated for, amongst other things, the coupling of teaching and research as a way of providing a holistic education that would ensure the development of self among students as embodied in the concept of *Bildung*³ (Anderson 1994).

2.2.3 Sociological Advantages of Using ICTs in Instruction

Research shows that many universities use ICTs as a communication tool between teachers and students, teachers and teachers and students and students (Stensaker et.al 2007; Oliver 2002; Collis and Wende 1999). This ICT- supported communication makes it easy to have immediate feedback from students and teachers alike on an array of subjects of mutual interest. Inadvertently, social skills which play a key role in learning are acquired as members learn to live and work with each other. The extensive use of social media among students also helps in this regard.

According to a recent research by Harvard University, more than 90% of college students have profiles on Facebook (Harvard 2011). That students across the globe spent a considerable amount of their time on social media is a fact that cannot simply be wished away. These social media play an integral role in supporting the psycho-social aspects of learning (Davis et al 2011). In this research conducted by Davis and colleagues, it was discovered that students are increasingly using the social media to provide emotional support to their peers if and when it is needed.

³ The term is German for “education” and “formation”. It is associated with the ideals of Wilhelm von Humboldt, a medieval Germany’s minister for education. The concept of education in this context goes beyond mere training to gain certain external knowledge and skills. The notion of *Bildung* exemplifies a lifelong process of learning wherein individuals’ spiritual and cultural sensibility, personal and social skills continually grows (Anderson 1994).

2.2.4 Economic Advantages of Using ICTs in Instructions

From the time when Ronald Reagan and Margaret Thatcher ascended to power in the 1980s, a prevailing trend in public policy promoted the use of private sector management models to the public sector in what was dubbed New Public Management (Hughes 2003). The proponents of NPM believe that marketization of the public sector may result in substantial cost-efficiency without necessarily affecting other objectives and considerations (ibid). An obvious and important change that was born out of this NPM is the running of the university like a for-profit enterprise resulting in what Clark (1998) christened the entrepreneurial university.

The residual outcome of this marketization of HE has been a stiff competition among HEIs for talented students and staff not just within systems of higher education but in fact on a global scale (De Freitas & Oliver 2005). More than ever before, universities, in a bid to raise more money, are reaching out to non-traditional students in order to increase their financial base (Maassen et al 2002). In this quest, the role of ICTs is by no means less profound especially when it comes to providing education through the so called online modules and at a cost.

Additionally, the quest to massify higher education in many HEIs has resulted into bulging classes in many HEIs (Scott 1998). This exponential increase in the student population in HEIs is usually not backed with a commensurate increase in instructional material and infrastructure which consequently put a lot of stress on the teachers as they try to cope with the large classes not to mention overstretching the available resources (Chacha 2004). The use of ICTs has eased the strain that comes with teaching and managing large classes in institutions where ICTs are used in the teaching process. For instance, the use of power-point presentation ensures that the instructor “keeps an eye” on students in the “while” situation while handling mammoth lecture halls (OER 2013). Record management has also been made easy through the use of technology and learning management systems have ensured a closer contact between teachers and students (Oftebro 2004). All these are aimed at increasing efficiency by doing more for less (Maassen 2003).

The paradigm shift from brick and mortar to click and mortar (Selwyn 2007) is perhaps the most conspicuous benefit of ICT integration in instruction. The ease with which students and academics alike are able to access educational materials, some of which are available in the open-source platforms, has significantly reduced the cost of learning materials. (Koller 2012). There exists a plethora of publications on the world wide web for free which materials could have otherwise been beyond the reach of many students especially those from low social- economic backgrounds. This ease of access to educational material creates an enabling environment where learning is not confined to the four walls of the lecture halls and conversely where teaching is not a preserve of the omniscient teacher. This is rooted in what Sfard (1998) calls the participation metaphor of learning where learning is considered to be an active participation in the community of practice and where students take an active role in the process.

Additionally, many HEIs, have subscribed to innumerable on -line resources like books, journals, articles, databases, to name a few, as a conscious effort to reduce the cost of education especially on the part of students. The aforementioned resources provide students and staff a wealth of information on virtually every topic of interest. A case in point is the OECD database, The World Bank, JSTOR etc. Learning management systems (LMS) like the class frontier have made access to learning materials even cheaper as articles, lecture notes and sometimes audio and audio visual recordings of lectures are posted for students to access at their own convenience.

Conclusively, integrating ICTs in instruction has far-reaching benefits. The student has the opportunity to learn from, with and through them and this, as the fore-going discussion has revealed, has a positive effect on the latter's attitude towards learning not to mention the significant reduction of the cost of obtaining learning materials and the time that would have otherwise been spent looking for the same.

Academics, on the other hand, are able to manage and control large classes, get involved in cross-border academic initiatives without necessarily having to travel,

and interact with students without being compelled to be physically present as a result of using ICT tools. And as national governments exert a lot of pressure on HEIs to finance their own activities the latter have found it necessary to adopt the ethos of for-profit institutions to ensure greater efficiency and effectiveness. (Maassen 2003).

2.3 The Extent of ICT Use in Teaching and Learning

According to the principle of individual differences, humans differ greatly in the way they respond to stimuli. Some of these differences may be related to their genetics, gender or past experiences. By the same token faculty and students embrace the use of ICT differently. And because the perceptions of the role ICT plays in education may inadvertently influence the extent of use, the latter will also be reviewed. And of course there are mixed opinions on whether or not ICT should be used in teaching and learning with some educationists arguing in favor of it and others fronting a more blended approach (Bonk 2012; Breen et al 2001).

In the recent past, a trend in higher education institutions has been witnessed where universities are increasingly being compelled by the new wave of globalization to think global even though they have a mandate to act local. The term “glocal” coined to depict this phenomenon is only too familiar in the higher education field. ICT in higher education institutions is perceived to be a major actor in building capacity and capability in addressing the changing global pedagogic needs which includes enhancing the delivery of content to a global education market (James, 2008).

According to a study conducted by James (2008) in Bangkok University, lecturers gave different reasons that played a decisive role in their integrating ICT in teaching. About 68% of them perceived cost-reduction as a major influence while about 18% stated that ICTs helped them in managing large student numbers. About 45% of the lecturers cited improved and focused teaching as a big driving force while about 31% posited the ability of ICT to encourage student-focused learning. Nevertheless, James

noted that the failure to fully integrate ICT into the day-to-day teaching is basically a result of operational insufficiencies on the part of students and lecturers alike.

In 2009 AAU identified the various ways universities used ICTs in their operation. These were: admission and recruitment, assessment of students, scheduling of lectures and meetings, allocation of classrooms, record-keeping and management, analysis of students' performance, catering services among others. This analysis points to a modicum of success in as far as the extent of use goes but how ICT is used in the actual process of knowledge dissemination remains a puzzle.

In 2007, Lindfors conducted a study whose findings revealed that teachers wield immense powers in influencing the use of ICT by students. He asserted that the teacher's confidence in using ICT influenced the degree to which his students used the same. This means that the teacher determines to a large extent, the extent of ICT use by the students.

Kwame (2008) also noted that the competing interests in the global higher education arena necessarily calls for a change in the way universities perform their basic functions of teaching and research. He asserts that African academics need the requisite skills in using ICT in performing their academic duties. Additionally, he noted, there is an urgent need for capacity building at the national level geared towards the development of the human resources in the use of technology in teaching. With specific reference to the University of Ghana's department of political science, Kwame claims that despite the availability of internet connection, some lecturers and specifically the older ones were unable to use the internet to send and receive emails. This might sound like an isolated case but the author remarked about its replication in many higher education institutions in Africa. He concludes by affirming that African higher education institutions have a very long way to go if they are to fully blend ICTs into teaching and learning.

Oliver (2003) predicts that the role of ICT in teaching and learning will become more pervasive in the 21st century as higher education institutions strive to benefit from the new opportunities that technology is likely to afford them. Unlike in other fields

like tourism, banking, architecture, medicine, travels and business to name but a few, which have witnessed rapid changes as a result of integrating ICTs into their operation, he affirms that the education sector still lags behind.

However, the existence of inhibitive factors in the change process that hamper steady progress in the use of ICT in education will undoubtedly play a significant role in this new educational setting described by Oliver where the teacher will cease to over rely on the traditional modes of content delivery that was built around the use of textbooks. The aforesaid factors comprise of inadequate financing, inaccessibility to these ICT resources and the requisite skills needed to use them, to name but a few. Contrary to Oliver's claim that the aforementioned inhibitive factors were in the process of being eliminated, they still play a huge role in slowing down the ICT adoption process in the developing countries. Understandably though, his assertion is context-specific i.e. the global North and therefore does not necessarily paint the picture of the ICT situation in developing countries.

In a separate study conducted in Italy in 2004 by Fleonora and Fasano, pre-service and in-service mathematics teachers seemed to have different opinions about the role of ICT in education. Whereas in-service teachers believed that ICT can be used as a motivating tool in aiding learners' understanding, the pre-service teachers did not see how ICT could support teaching with regard to generating new knowledge and creating attractive and stimulating learning environments. Nonetheless, a common standpoint between these two groups was the assertion that ICT was superfluous in teaching and therefore its presence in the teaching process would not impact on their practice. Nevertheless, they agreed that ICT tools could help students in solving complex mathematical problems. Fleonora and Fasano conclude that the above views on ICT are influenced mainly by the discipline.

In a similar vein, the conditions under which faculty operate significantly affects their choices and practices. Shelton (2006) believes that the socio-cultural context within which faculty work informs their choices by either supporting or curtailing them. The disciplinary differences within universities that Beacher (1994) aptly

describes create academic tribes and territories and distinct cultures that are diametrically different from each other. These differences in cultures, as Trowler (2008) asserts, play an important role in influencing how (if at all) and the extent to which technology is used.

2.4 2.4 Negative Effects of Using ICT in Instruction

As earlier mentioned, technology was not meant to substitute the traditional ways of knowledge creation, management and dissemination. It is in fact supposed to augment the latter in order to make teaching and learning an engaging, worthwhile and rewarding experience. Proponents of ICT advocate for “blended learning” where the good aspects of traditional methods are used in conjunction with ICT (Bonk & Graham 2012).

Nevertheless, there is a kernel of truth in the sharp criticism with regards to the adverse effects of using ICT's in instruction. These negative effects are primarily due to misuse or abuse. One such effect is information overload which has been said to increase stress levels (Alter 1999).

Critics of educational technology also emphasize the invaluable physical contact between the teacher and the learner which contact is being threatened by the extensive use of technology in education (Leer 2000).

The shift from elite to mass higher education on the global higher education arena has resulted in the inclusion of hitherto marginalized groups of students especially those from low social economic backgrounds (Trow 1970). Studies conducted in the Unites States in 1997 however indicate a huge digital divide between these minority groups (especially Blacks and Hispanics) and the white majority (Leer 2000). There is a huge disparity in terms of internet connectivity between these groups, a scenario which has widened the gap between the haves and the have-nots (ibid).

Last but not least, the infringement of intellectual property rights is made easier with technology. According to Nancy Willard (2004), an expert on copyright law, there

have been many cases over the years of reproducing copyright materials without seeking prior consent from the copyright holders. It is a common practice amongst many students to photocopy books, articles, and other academic work and then distribute the same to their colleagues even when the author or publisher has explicitly stated that doing so is against copyright laws (ibid).

The story of Aaron Hillel Swartz (November 8, 1986 – January 11, 2013) warrants a mention in this regard. A staunch champion of the right to access of information, the American computer programmer and internet activist might have gone a tad too far by downloading academic journal articles from JSTOR without prior permission, an incidence that culminated into his arrest and criminal proceedings. He commits suicide as a result.

2.5 Factors that Impede the Use of ICT in Teaching

The ICT environment in higher education institutions is not one without inhibitive factors that hinder full adoption of educational technology. Far from it, there is an array of barriers that emanate from the institutions themselves, the would-be user and as well as from pedagogical constraints. The section that follows highlights some of these barriers.

Birch Burnett (2009) tried to find out what motivates faculty to use technology, what the latter's attitude towards educational technology was and the factors that enabled and hindered their use. The study revealed that there exist institutional barriers which include: lack of academic leadership, unclear vision and the absence of formal strategic planning as well as wanting institutional policies. On the other hand, barriers emanating from the individual were discovered to be heavy course loads that left faculty less time to do little else whereas pedagogical barriers had something to do with course designs.

In its 1999 African Economic Forum, The United Nations Economic Commission for Africa deliberated on what factors impeded higher education institutions in Africa to integrate ICT into education. These obstacles were broadly categorized as external,

internal, and human. The external factors were deemed to be those that were beyond the ability of the University to manipulate and these were, unreliable power supply, poor national telecommunication infrastructures, high import duties that resulted to high pricing of ICTs, inadequate funding from national governments, low bandwidth connection and exorbitant licensing fees for new providers. The internal factors included: unclear ICT policies, lack of internal marketing within the university to encourage faculty and students to use ICT, sluggishness on the part of the universities to respond to change, lack of coordination and poor maintenance of ICT infrastructure and absence of goodwill from leaders to prioritize technology. Human factors included: lack of support staff and training for would-be users, low level of motivation, poor remuneration that made it hard to attract ICT talent or retain the existing one where it existed and failure by curriculum designers to plan for its integration in teaching and learning.

In a study conducted by Fulton et al (2004) the teacher-education course was faulted as the root cause of technophobic teachers in educational institutions. The latter are expected to blend ICT into their teaching yet they are not given requisite skills to use them in the classroom. In the curriculum development and implementation continuum, the role of the classroom teachers is special one them being the last in that continuum. As curriculum implementers, teachers play a crucial role in ensuring that policies and designs with regards to the curriculum translate into practice. Fulton and colleagues suggest making it mandatory for teachers to learn ICT during their training and to every now and then update their knowledge while practicing in order to keep up with the rapid technological changes.

Though a seemingly radical proposition and one that is only likely to find a place in the developed world, Fulton and colleagues believe that the answer to integrating ICT in education lies on the active participation of the teacher. In contexts where meager resources would be a stumbling block, an add-on approach suggested by Adam (2003) would be a better pathway to successful ICT integration.

It is not a given that the presence of ICT infrastructure presupposes their use in teaching and learning in higher education institutions. A study conducted by Barry and colleagues in 2007 shows that there is underutilization of ICT resources in Eastern Europe, Africa and some parts of North America. This underutilization is born out of a number of barriers. Lack of ICT-support personnel, intermittent internet connection, absence of ICT-related projects, lack of teacher-training programs in ICT use and the nature of the curriculum were cited as some of the overarching impediments to ICT use. A similar study conducted in the same year in Norway by Stensaker and colleagues also identified similar bottlenecks to ICT integration. The foregoing revelation explicitly suggests that underutilization of ICT resources is not a thing of the developing world. It is in fact a global phenomenon with only slight variations in the causative factors.

In a single case study conducted in Holland by Könings et al (2007) a somewhat different take on the failure of ICT initiatives to take off in colleges was posited. Their conviction is that the sheer scale of ICT ambition in HEIs is their biggest undoing because teachers who are deemed to be the most influential in the ICT implementation continuum fail to implement this over-ambitious "ICT blueprints." The authors present factors that play a significant role in integrating ICT in teaching like the size of the class, the time allotted to lectures, learner-characteristics, the level of ICT skills possessed by the teachers, eagerness and willingness to learn, the level of consciousness(of the teacher) of the learning behavior of students among others. Stensaker et al (2007) echoes these opinions. They argue that the seemingly overambitious ICT initiatives as spelled out in strategic plans are not usually backed by a clear link between the people expected to integrate ICT in teaching, the purpose of using ICT and the pedagogical requirements of different courses. Though the above 2 studies are hardly a representative sample in the higher education spectrum, they point out that ICT initiatives in universities seldom start on a firm enough footing that could facilitate their take-off.

While conscientiously striving to adopt best practices from other higher education institutions, Wende and Beerkens (1998) suggest that it would be helpful for a higher

education institution to ask itself what the situation in its own country is as compared to other countries. This reflective practice would help universities to identify gaps within their own systems and then try to find lasting solutions to the problems. The study revealed that many higher education institutions in Europe lack clear and comprehensive ICT policies that clearly spell out the role of the latter in instruction. It also revealed that albeit on an ad hoc basis, ICT in teaching and learning has achieved a commendable success in many developed countries. Nonetheless, they suggest that to achieve even greater success, the fusion of ICT policy into the institutional policy framework would be of paramount importance. These policies would play a major role in positioning universities in the global higher education market which in turn would increase its attractiveness to prospective students and staff. Additionally, ICT has the potential to strengthen higher education institutions' academic core, improve efficiency and effectiveness and to promote student centeredness in learning (ibid).

In order to ensure that ICT is at the center of the university's day-to-day operation, the aforementioned reflective practice should also entail finding out the difficulties that are encountered by lecturers and students in their quest to blend ICT in teaching and learning respectively. Needless to say, it is only after identifying these gaps that the university is able to come up with a comprehensive ICT strategy that would ensure optimal utilization of the ICT resources at hand (Agbonlahor 2006).

Gilmore (1998) emphasizes the primacy of training of end users of technology i.e. faculty and students. If equipping the latter with the necessary skills is given precedence, he affirms, they will more likely have a positive attitude towards the technology as a result of their ability to use it with minimal difficulties (if any). This study explains how competence in the use of technology ignites the desire to use it and therefore suggests incessant training. The flipside of this is a general lack of enthusiasm to use technology owing to lack of necessary skills and competences (ibid).

There is a growing pool of literature that finds investment in ICTs and the use of the latter in higher education as a cost-effective way of conducting the latter's core activities (Banks et al. 2003; McIsaac 2002; Burbules & Torres 2000; Tucker 1997; Hackbarth 1996; Oliver 2002; Collis & Wende 1999; Bekele 2004; Tusubira 2002). Notwithstanding this acclamation, the initial investment that is required to put ICT infrastructure in place and the cost of hiring a competent personnel to run the system is quite exorbitant and far beyond the reach of many HEIs in Africa. It is for this reason that many HEIs without the financial resources, have decided to adopt a piecemeal, add-on approach as a way of ensuring that ICTs are used in the day to day running of the universities (Adam 2003). This approach is laudable even though at the end of it all, it seldom meets the high demand for ICTs by faculty and students alike.

The aforesaid budgetary constraint is worsened by the financial cuts by governments to universities prompting the latter to seek funds elsewhere. These incessant cuts in budgetary allocations by governments to universities to fund ICTs initiatives is mainly because of the finite resources at the disposal of national governments which resources have to be distributed equitably across other equally important sectors of the economy that include provision of healthcare, provision of basic education to all school-going children, infrastructural development, to mention a few (Clark 1998; Gornitzka 1999; Scott 2007). In the recent past, there has been an observable trend of African universities' ICTs initiatives being funded by foreign donors notably, The Ford Foundation, Rockefeller Foundation, Bill and Melinda Gates Foundations, NORAD, JICA to mention but a few (Adam 2003). A case in point is the Makerere University's faculty of ICT which was put in place by funds from NORAD.

This lack of substantive budgetary allocation makes it very difficult to have a long term ICT plan that is sustainable. Yet, "...higher education's investment in ICTs requires long-term planning that should take into account sustainability and the development that ICT-enhanced education may bring," (Sayed 2003). Besides the general lack of sufficient funds to put up modern ICT infrastructure, ICTs initiatives

in many universities in Africa is often relegated to the tail -end of the latter's priority list (Adam 2003).

3 Theoretical Perspectives

“There is nothing as practical as a good theory”, goes the old adage in social research that underpins the important link between theory and research. However, “characterizing the nature of this link between theory and research is by no means a straightforward matter” (Bryman 2008:6). At the outset, the various ways in which the term “theory” is used in research warrants a clear distinction on how it has been used in this particular research project. The standard meaning of the term is “an explanation of observed regularities” (ibid.). In the context of this project, the theory that fits this definition is the Diffusion of Innovations Theory by Rogers Everett. The theory plays an important role in describing the pattern of adoption when a new invention comes into existence. It, additionally, explains the mechanism through which this new innovation is adopted by different people who belong to different adopter categories. Perhaps most importantly, the Diffusion of Innovations theory helps in predicting whether or not the said innovation will be successful or not by assessing its relative importance and the ease with which it can be adopted and used.

Another way of defining the term “theory” is the relevant literature that guides a study. “In many cases, the relevant background literature relating to a topic fuels the focus of an article or a book and thereby acts as an equivalent of a theory. The literature in a certain domain acts as the spur to an enquiry” (ibid.). This is a more abstract way in which the term “theory” is used but one that is, nonetheless, important in many social research projects. In this research project, the term “theory” will be used to denote “an explanation of observed regularities.”

3.1 Diffusion of Innovations Theory

In a bid to understand how HEIs adapt to technological innovation, the Diffusion of Innovations theory put forward by Rogers (2003) will guide the study. The theory, as mentioned above, purports to describe the patterns of adoption, explain the mechanism, and assist in predicting whether (and how) a new invention will be successful making it a more fitting theory in this context.

Achieving complete success (if at all) in the adoption of a new innovation might usually take a considerably long time and sometimes this adoption is met with a lot of resistance from certain quarters of the society in which the innovation is to be diffused. And as Niccolo Machiavelli (1513) succinctly explains: “There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new order of things...” The “old order” of things in academe insofar as knowledge dissemination goes is the teacher standing in front of a class facing the students and imparting knowledge (Kuh 2001). The teacher in this old order is the “all-knowing” custodian of knowledge and the student the passive receiver or in some instances just a knowledge repository (ibid.) In this old order, the use of chalk and talk method, variously referred to as the exposition method of teaching, has been the predominant way of this kind of knowledge dissemination in HEIs (Koller 2012).

The use of ICT in teaching and learning therefore is a relatively new innovation in this regard within the educational sector and indeed a fundamental change in the way HEIs conduct their core activities qualifying it to be “the new order of things” (Rogers 2003). Universities are known to be systems that are virtually hard to change. This is not only because of their inherent characteristic of bottom-heaviness but also for the fact that the latter usually find themselves stuck in path dependencies and historical legacies that they try to uphold and protect making change in the way they conduct their core activity an evolution and not a revolution; a process rather than an event (Clark 1983). Notwithstanding this characteristic of being resistant to change, there has been a proliferation of ICTs in most if not all campuses around the world (Selwyn 2007; Adam 2003). This increase in ICT use has essentially changed how teachers teach and learners learn (Pascarella et al 1998).

3.2 A Synopsis of the Theory

Diffusion of innovations, according to Rogers (2003) occurs through a five-step process. These stages through which a technological innovation passes are: Knowledge, Persuasion, Decision, Implementation and Confirmation.

Whether or not an innovation is accepted depends entirely on the benefits it is perceived to bring to the adopter. Rogers further argues that an individual might reject an innovation at any time during or after the adoption process.

Explanation of the five stages of the innovation adoption process:

Knowledge: Here, the individual or organization is exposed to the innovation for the first time but does not have concrete information about it and is therefore inspired to find out more about the innovation.

Persuasion: At this stage would-be users develop a keen interest in the innovation and the individual actively seeks detailed information about it.

Decision: Here, the decision on whether or not to adopt the innovation is reached based on the supposed merits, comparative advantage and demerits of using it.

Implementation: At this stage, the individual puts the innovation into practice and assesses its usefulness depending on the situation and may be spurred into seeking more information about it.

Confirmation: At this stage the individual makes up his/her mind on whether to continue using the innovation or not. S/he may decide to use the innovation optimally, sparingly or reject it.

Additionally, Roger also explains the characteristics of innovation that foster or hamper its adoption.

Relative advantage – how better it is compared to what it replaces. The level of relative advantage can be measured not only in economic terms but also the social prestige it brings to the user, the convenience of its use and the amount of satisfaction the user derives from it.

Compatibility –its consistency with existing values, past experiences and needs of potential adopters. The speed with which an innovation diffuses to the general public also depends with its compatibility with societal values and norms.

Conversely, adopting an innovation that contravenes societal norms and values more often than not necessitates the changing of the value system of the society in question so that there is compatibility with the new innovation. Needless to say, it takes a very long time for any society to form a value system and even more so to change one.

Complexity -the ease with which the technology can be used. Naturally, some innovations do not necessitate the acquisition of new skills and knowledge in order to be understood by potential users. On the other hand, others are not easily comprehensible and call for would- be users to acquire new knowledge and skills on how to use them. The easier it is to understand an innovation the quicker it will be to diffuse it and the reverse is also true.

Trialability -this has something to do with the level at which the new innovation can be experimented on. Many people would adopt an innovation in an incremental manner. They would rather have a piecemeal add-on process of adoption than adopting it wholesale. So, the more trialable an innovation is, the better its chance of adoption.

Observability -this simply means the visibility of its results to others. If the results of a new innovation can easily be observed by peers then it is a lot easier to spread it to the general population because it becomes a topic of discussion consequently spurring interests among members of a social group and hence giving it a better chance of adoption.

In order to understand how individuals respond to new innovations in a system, the classification of people in different adopter categories will be fundamentally important.

3.3 Adopter categories

Rogers defines an adopter category as a classification of people within a social system basing on their level of innovativeness. In Diffusion of Innovations, Rogers posits five categories of adopters in order to standardize the usage of adopter categories in diffusion research. The categories of adopters are: innovators, early adopters, early majority, late majority, and laggards (Rogers 2003:282). These categories are described in greater detail below.

Innovators

They are otherwise referred to as “venturesome”. As their name suggests, this category comprises of individuals who are obsessed with new innovation. Their keen interest in new ideas makes them stand out from the masses. Their willingness to take big risks makes them the first individuals to adopt an innovation. They are described as being the youngest in age, have the highest social-economic class, good interpersonal skills and have closest contact to scientific sources and have a greater interaction with other innovators. They are risk takers and sometimes adopt innovations which may fail. This willingness to take risks is perhaps what makes them innovators. They also have one saving grace; their financial resources which help them absorb the shocks of failure if and when this happens.

Early Adopters

In terms of speed of adoption, this group of individuals comes second to innovators in the innovativeness continuum. Individuals in this category have the highest degree of opinion leadership compared to the other adopter categories. They are typically younger in age compared to late adopters. Additionally, they have a higher social standing, have more financial resources, advanced education level, and have a higher social mobility than late adopters. However, they exhibit discretion in adoption choices than innovators. Put variously, they “tread carefully.” It is this category that spurs more interest in a new innovation when they adopt it. People look up to them for advice on such new ideas and this earns them respect in the

society. As a result, when they adopt an innovation, they put a “stamp of approval” on it making others to follow suit by adopting it.

Early Majority

In this category, individuals adopt an innovation after a relatively longer time than their counterparts in the aforementioned 2 categories. Their salient characteristics include: a slow-paced adoption process, an above average social standing, contact with early adopters and usually are not opinion leaders in a system.

Late Majority

Individuals in this category will only adopt an innovation after the average member of the society has done so. This is why they are variously referred to as skeptics. They approach an innovation with a high level of skepticism and that’s why their adoption comes after the majority of society has adopted the innovation. Typically, they have a below average social status, very little financial resources, are in contact with others in late majority and early majority but have very little opinion leadership.

Laggards

This category comprises of individuals who are the last to adopt an innovation. Many individuals in this category are near isolates and only have close contact with members of their families and close friends. They are usually at an advanced age compared to those in the aforementioned categories. Owing to their financial difficulties, they approach new innovations with a lot of caution and must be convinced of the relative advantage of this innovation before considering adopting it because they are more suspicious of new ideas and change agents. Additionally, they possess little or no opinion leadership.

3.4 Conclusion

In retrospect, Diffusion of Innovation Theory is, at best, a descriptive tool which is less strong in its explanatory power and less useful still in predicting outcomes and providing guidance as to how to speed up the adoption rate of innovation. Many of its elements are culture-specific given that the society this theory is based on is North America in the 1950s and 60s, and therefore its relevance in, say, developing countries not to mention in different time contexts is unknown. This is not to say that the theory is inapplicable in the context of this study. Despite these limitations, DoI theory will provide a useful road- map for this research project. Broadly, the theory will play an important role of illuminating how students at MUK, College of Education and External Studies respond to the use of ICT in instruction and why they respond the way they do.

The theory succinctly explains how a new innovation springs from obscurity to being widely accepted and used by the masses. More importantly, it will help answer the first and third research questions. The first question that seeks to uncover how and the extent to which ICT is used can best be answered in tandem with what DoI theory says about the stages of adoption and the adopter categories (refer to the theory in the preceding section).

Impediments to the use of a new innovation are related to the inherent features of that innovation that makes it unattractive to use. Therefore, characteristics of a new innovation that makes it possible for it to be accepted and used (or rejected) ie its relative advantage, compatibility, observability, complexity and trialability as described in the theory can be viewed as the advantages or disadvantages of that innovation and therefore the basis for which would-be adopters decide whether or not to adopt the innovation. This will help answer the third research question.

Nonetheless, the researcher is also cognizant of the fact that other factors play an influential role in the adoption process of a new innovation. These are, amongst other things, institutional factors that provide an enabling environment for the innovation to thrive like: availability of finances, ease of access to this innovation as well as the

presence of a favorable institutional ICT policy framework. The absence of the above mentioned factors create an unfavorable environment in which ICT integration becomes an uphill task. The others are the attitude of the would-be users of the technology and the pedagogical requirements as discussed in the literature review.

3.5 Learning Theories and the Use of ICT

Hill et al (2004:443, 448) presents different perspectives in the use of ICT (more specifically the internet), in relation to learning theories. They focus on 3 major ways in which people use the internet in the teaching and learning process i.e. learning with, learning from and learning through perspectives.

Learning from perspective entails the transmission of information from the medium to the learners with the latter taking a passive role in the process. The learning from perspective is grounded in the behaviorist school of thought where the teacher is the transmitter of knowledge and the role of the learner is that of a passive receiver of information with minimal or no interaction. The learning process is not participatory but rather the teacher is an omniscient transmitter of knowledge.

The *learning with* perspective is rooted in the constructivist school of thought (Piaget 1954; in Hill et al 2004) where, unlike the aforementioned behaviorist view that learning is a passive process, it emphasizes active creation in the learning process. The learner here is an active contributor to the knowledge base and does so by helping in designing and creating artifacts which enable the learning process to occur (Perkins, 1986). The major assumption in this school of thought is that teachers hardly, if ever, write on a blank slate. Unlike in the learning from perspective, the learning process here is a mediation of knowledge between the teacher and the learners.

The *learning through* perspective focuses the discussion on interactions and connections in online environments. There is the creation of a virtual learning environment with a marked shift from brick and motor to click and motor (Selwyn 2007). In this perspective, interactions and connections in online environments

facilitates interpersonal exchanges between and among students and between students and teachers therefore enabling a learning environment which is not limited by time and space.

This framework will support the DoI theory in answering the research questions. More specifically, the framework will help in answering the first and second research questions i.e. how and the extent to which students and faculty use ICT and the perceived role (by students and faculty) of ICT in teaching and learning. For instance, whether students at MUK CEES learn from, through or with ICT is partly determined by the inherent characteristics of this innovation that make them use it in the abovementioned different ways. With regard to the stages through which a new innovation goes through as discussed in the theory, it is assumed that students at MUK CEES might not be at the same level when it comes to having the requisite knowledge in as far as using ICT goes. And as discussed in the theory, the decision to adopt a new innovation wholly or partially is usually based on its relative advantage over what it replaces. Students and faculty might not use ICT in the same way based on this assumption.

As it has already been discussed in the literature review section, empirical research shows a significant relationship between the teacher's approaches to teaching and the learners approaches to learning (Trigwell 1999). Basing on this argument, it is assumed that the level of ICT integration in teaching by the faculty partly determines the level of ICT integration by students in learning.

4 Methodology

This component of the research design explains what the researcher will actually do in the “while” situation of the study; the approaches and techniques that are to be used to collect and analyze data. According to Maxwell (1989), this component has four parts, namely: a) the relationship the researcher establishes with the participants in the study; b) the choice of the setting, participants, time and places of data collection, other sources of data like documents; c) methods of collecting data and; d) the techniques and strategies of analyzing this data. The data is collected and analyzed to answer the research questions.

This chapter presents the procedure the researcher used in the study. An explanation is offered on the rationale behind the decision to use the research design employed in the study as opposed to the others. It also explains the data gathering process and analysis and how these helped in meeting the set objectives.

4.1 Choice of the Research Design

This study employed a qualitative case study research design because it aimed at exploring how ICT is used in instruction by students and staff of a single university (and a single faculty). Bryman (2008:52) describes a case study as one which “... entails the detailed and intensive analysis of a single case”. On the outset, the term “case” is synonymous with a particular location e.g. an organization. A case study design is concerned with the complexity and particular nature of the case in question (ibid.). This strategy aids the researcher in getting a deep grasp of the social phenomena under study (Creswell 2007). Its biggest shortfall, nonetheless, is the inability to generalize findings to the larger population owing to the small and often unrepresentative sample size and the chances of researcher bias during the collection, analysis and interpretation of data (Hesse-Biber and Leavy, 2011).

Makerere University is atypical (flagship) university and that makes it my preferred case. It is comparatively well funded and with substantial ICT infrastructure. Each

faculty and school has a computer lab and internet services (though intermittent) available to both students and staff. This is in addition to 3 computer labs located in the main library; one exclusively for postgraduate students and the other for undergraduate students. The third one is still a “work-in-progress” and is meant to serve students with disabilities. There is also a fully equipped faculty of Computing and Information Technology (FCIT).

The unit of analysis is the College of Education and External Studies. Besides focusing on an in-depth analysis on how ICT is used in this single faculty, the choice of this particular college is informed by the fact that it is the only faculty that is concerned with pedagogical issues it being at the center of teacher education. Other practical considerations also played a decisive role. One is the availability of get-openers, the researcher having been a member of the school while taking a bachelor’s degree, and two, prospects of easily obtaining a research permit from the administration. Last but not the least, the resources, in terms of money and time, at the researcher’s disposal were meager making a case study design the most fitting in the situation.

4.2 Sampling procedure

A sample can be defined as, “...a smaller group or subset of a total population in such a way that knowledge gained is representative of the total population under study” (Cohen et al 2007:100). It is worth reiterating, however, that this is a qualitative research that is not geared towards generalization. Sampling in this context, therefore, has been used as a practical considerations viz because studying a whole population is an overwhelming task, if not an impossible one, not only in terms of the time it would take to complete the project but also because of the enormous financial resources that would be needed to accomplish the task. (Marshall 1996). Because of this impracticability of studying the whole population thus, sampling is inevitable in research. In this study, the main technique of sampling that was used is purposive sampling. In purposive sampling, respondents are handpicked on the basis of their possession of qualities sought after and which are

central to the study and therefore generating a sample which is suitable for their particular needs (Cohen et al 2007, p. 114).

In as much as purposive sampling is consciously selective and biased, Patton (2002, p. 230) posits that the logic and appropriateness of purposeful sampling is in choosing information-rich participants. The latter are deemed to be those who possess information which is pertinent to issues of central importance to the research area. Moreover, purposive sampling is key in accessing individuals who, by the virtue of their professional roles, power and or experience possess in-depth knowledge about a particular topic of interest (Cohen et al 2007, p. 115; Patton 1990).

Purposive sampling was primarily used to select participants both among students and faculty. Students and faculty deemed to be information-rich were selected. However, there was no way the researcher could ascertain the level of knowledge these would-be respondents possessed other than asking those who used ICT in their academic work to volunteer as participants. This was aimed at saving time and limiting the chance of having a lot of data that may not have been useful in the study.

Additionally, convenient sampling was also used in the process of data collection. As the name suggests, this technique entails picking respondents who are easily available and who are willing and ready to participate in the study. During the interviewing process of one of the respondents among faculty, the interviewee had a class to teach later that day and agreed to ask volunteers from her class to take part in the study. Though not planned beforehand, the researcher found himself conducting an impromptu focus group interview which comprised of 2 female students and 3 male students from the third year cohort because these students admitted to being busy with preparations for the continuous assessment tests that were on-going at the time of data collection. Interviewing them separately was therefore not an option.

4.3 Sample size and Characteristics

The size of the sample in research should be determined by whether or not the data obtained from the sample adequately answers the research questions that the research project seeks to address (Marshall 1996:523). This implies that there are no hard and fast rules when it comes to deciding the sample size in research. What this means in practice therefore is being able, on the part of the researcher, to be flexible in deciding the sample size. "Clearly this requires a flexible research design and an iterative, cyclical approach to sampling, data collection, analysis and interpretation" (ibid.). This weaving back and forth between data collection, analysis and interpretation as the study progresses, helps the researcher to determine whether the additional respondents are providing different perspectives to the puzzles s/he intends to unravel or different ideas or even ideas that may seem diametrically opposed to what other respondents have already posited Stauss (1998). It is futile, even counterproductive, to continue interviewing more respondents if the responses obtained are similar or the same, or if the "new" discovered would not necessarily add value to the overall story, Stauss and Cobrin (1998:136) It therefore goes without saying that when this point of data saturation is reached, and the researcher is convinced that the research questions have been answered adequately, then the sample size at this point in time becomes the appropriate sample size (ibid.).

Since generalizability was not the ultimate goal of this study, the researcher did not, at the outset, have a clear sample size in mind. But with regards to using the research design as a blueprint of sorts, it was deemed necessary to come up with a preliminary, workable size of the sample to start with. The sample size, in the research proposal comprised of 15 students and 9 lecturers. The students were to be chosen from the different years of study i.e. year one to year three. However, during the interviewing process, a "same script, different cast" scenario presented itself as it was discovered that respondents seemed to be reading from the same script, so to speak, by the time 9 students and 6 lecturers had been interviewed. At this point of data saturation, a sample size of 9 students and 6 lecturers was decided upon.

By sheer coincidence, the researcher got an opportunity to conduct a focus group interview. While asking one member of the faculty to volunteer as a participant, she asked the researcher if he would be interested in interviewing her students that she had a class with later on that day. The focus group interview was with students from the language department all having an English Language and English Literature subject combination.

The researcher obtained a timetable of scheduled classes for different groups of students attending common units like Psychology of Education, Curriculum studies and Sociology of education which were mandatory to all students regardless of subjects of specialization. The 9 students comprised of 2 students from year one, 5 students from year two and 2 students from year three. Even though care was taken to ensure representation of gender, there were no female volunteers from the first year group. The rest of the students comprised of 3 females and 2 males from the second year group and 1 male and 1 female student from year three.

Having volunteered from common unit classes, their subject area of specialization was varied. Unwittingly, the first year students were drawn from the language department alone while the second and third year students were teacher-trainees drawn from a number of departments in both science and arts with a varied combination of subjects like Biology and Chemistry, Mathematics and Physics, History and Kiswahili, Mathematics and Economics, English and Literature and History and Religious Studies.

Among faculty, 2 among them were heads of different departments while the rest comprised of 1 subject coordinator and 3 full-time regular classroom teachers without leadership responsibilities. In total, there were 20 participants (including the 5 from the focus group interview).

4.4 Method of Data Collection and Analysis

Every piece of research employs a certain strategy in collecting and transcribing data. A research strategy is "...a general orientation to the conduct of social research" (Bryman 2008:22). It is a road map that should be followed in order to gain credibility. There are three types of research strategies: Qualitative research, Quantitative research and the mixed methods research. In general terms, "Quantitative research can be construed as a research strategy that emphasizes quantification in the collection and analysis of data." On the other hand "...a qualitative research can be construed as a research strategy that usually emphasizes words rather than quantification in the collection and analysis of data" (Bryman 2012; Stauss et al 1990).

This research produces findings which are devoid of statistical procedures or other means of quantifications. While a quantitative research strategy often aims at generalizing the findings to the larger population and often finds causal relationships in the phenomena being studied, a qualitative research strategy usually aims at a deep understanding of the same. Mixed method research, is a research strategy that use methods related to the other two. Writers on research method caution against driving a big wedge between qualitative and quantitative research because often times, elements of either strategies inadvertently creep into each other. In this study, a qualitative research strategy has primarily been used because the research does not aim at coming up with generalizations but on detailed qualitative treatment of the research. The methods employed in collecting data are therefore geared towards eliciting responses that will give insights into the perceptions, beliefs and experiences of the respondents in as far as ICT use in teaching and learning goes.

This choice of a qualitative strategy was influenced by the researcher's epistemological predisposition towards interpretivism as opposed to positivism. Bryman (2008:13) describes positivism as "...an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond". The positivistic paradigm is characterized by numerical and measurable quantities and objectives and universal definitions, often much

associated with the physical sciences. The assumption here is that the social world can be studied in the same way as the natural world.

Conversely, interpretivism argues along the qualitative paradigm. It is characterized by subjectivity, particularity and reflexivity. This is in sharp contrast to the positivist view which is often criticized for not recognizing the difference between natural objects and human-beings, people and their institutions (ibid.). The qualitative methodology focuses on the meanings of social interactions and processes, emphasizing in various ways that reality is created and given meaning. It is therefore argued that human beings cannot be studied as natural objects since they interpret situations differently and give meanings as required (Silverman, 2006).

As previously mentioned the study sets out to investigate how ICT is integrated in instruction at MUK and the teachers' and students' attitudes and experiences with it. Questions that seek to elicit responses that show attitudes and experiences can be answered best by such methods as interviewing which is a data collection method associated with a qualitative research design. By the same token, interviews were used in order to get an in-depth understanding of the experiences and attitudes of teachers and students insofar as the use of technologies in education goes.

4.5 Interviews

In this research project, semi-structured qualitative interviewing was used as the main data collection method. This is principally because the researcher found interviewing attractive not only because of its flexibility in allowing the interviewer a lot of freedom in what questions to ask, when to ask and the freedom to follow up on what the interviewee says that may not be in the interview guide but useful to the research, but also because of the inherent feature of the method of allowing the interviewee a lot of leeway on how to respond to the questions Bryman (2012:471).

Having set out to investigate how ICT is used at MUK and the perception of students and faculty alike on the role ICT plays in instruction, the researcher deemed it fit to hear "from the horse's mouth", as it were, on what the latter think is the significance

of using ICT in instruction. Kvale & Brinkmann (2008:1) write of what makes interviewing a viable data collecting method in qualitative research thus: "...in an interview conversation the researcher asks about and listens to what people themselves tell about their lived world. The interviewer listens to their dreams, fears, and hopes; hears their views and opinions in their own words; and learns about their school and work situation, their family and social life"

During the interviews, an interview guide was used to give direction to the sessions and to avoid deviations. Notes were taken in addition to tape recordings. The respondents were informed beforehand about the need to record the interviews and their consent was sought before doing so. Although it was not easy to find a completely quiet room for the interviews, every effort was made to keep the outside noise to the lowest possible under the circumstances (e.g. closing all the windows if the venue was a lecture hall). Permission was also sought from the librarian to use discussion rooms at the main library to interview students while lecturers were requested to allow the interviews to be conducted in their respective offices. In situations where offices were shared among lecturers, interview sessions were scheduled outside official working hours i.e. early in the morning and late in the evenings.

There was an easy rapport between the researcher and the respondents partly because the get openers introduced the latter as an alumnus. Each interview session lasted between 45 minutes to 1 hour depending on how fast the interviewee responded to questions, how much information they would volunteer and the level of digression from the topic of discussion. Special attention was paid not only on what was said but how it was said. Despite having an interview guide, it was at the researcher's discretion to follow up interesting points and to prompt and probe when it was deemed necessary not just for the sake of getting information but also in a bid to draw attention to any inconsistencies in the responses given by the interviewees. The focus group interview lasted for approximately 75 minutes. This impromptu focus group interview provided a good platform to engage participants in a discussion that shed light on differences in opinions, attitudes on ICT use and the

common thread in the participants' views on what they considered to be the merits and demerits of using ICT in instruction.

4.6 Data Analysis

The data collected in this study was of a qualitative nature. "In qualitative research, the interview is usually audio-recorded and transcribed whenever possible" Bryman (2012:482). Each hour of speech was given 5 hours on average during the transcription process. To avoid a huge backlog, it was deemed necessary to make the transcription process an on-going activity as advised by a number of writers on qualitative research like Lofland and Lofland (1995), Kvale & Brinkmann (2008) and Bryman (2012). At the end of each day of interviewing, the audio-recorded material was transcribed into written text. There were at least 2 interviews per day though there are some days when it was only possible to conduct one interview. On days when it was possible to conduct 2 interviews, a day was reserved for transcription before conducting another interview. Doing so helped in not only avoiding the accumulation of too much work but also ensured that the data collected is transcribed soon after its collection when the context of interaction was still fresh in the memory of the researcher. Transcribed interviews were then categorized in themes for ease of analysis. Each research question formed the basis for which these themes were established. These themes were, "How and the extent of ICT use", "Perceived role of ICT in education", "Impediments to ICT use in teaching and learning". This thematic approach of data analysis helped in sorting out which responses from the interview related to which research question. In addition to this, the handwritten notes made during the interviewing process were used alongside the recorded responses.

4.7 Trustworthiness and Authenticity

These two terms have been used in place of validity and reliability respectively. The researcher is cognizant of the contentions in the research sphere on whether the terms validity and reliability that have roots in quantitative research should bear the

same meaning in qualitative research such as this one (for instance Lincoln and Guba (1985) and Guba and Lincoln (1994). Mason (1996:21), however, defends the use of these terms in qualitative research by sticking to their original meaning as in quantitative research i.e. whether or not the research is measuring what it purports to measure and whether the measures used show some consistency, but omitting the element of measurement that is synonymous with quantitative research.

The former two suggest Trustworthiness and Authenticity, as the criteria for assessing a qualitative study. Trustworthiness has four criteria: a) credibility which entails the acknowledgement of there being multiple accounts of social reality thereby necessitating the strict adherence to the canons of good practice and submitting research findings to peers for review; b) transferability which puts emphasis on depth as opposed to breadth in order to make it possible to make inferences in other contexts or “...possible transferability of findings to other milieux” Bryman (2012:392); c) dependability which has a close relationship with credibility but which puts greater emphasis on peer review as a way of auditing whether or not proper procedures have been followed and finally, d) confirmability which is concerned with keeping the researcher bias at bay.

In a qualitative research project, the one fundamentally important thing that the researcher has to confront in the process of data collection, analysis and interpretation is his or her own bias otherwise referred to in the research methods literature as *researcher bias*. To achieve this, the onus is on the researcher to remain as objective as possible by keeping personal opinions and attitude at bay. Secondly, the effect of the researcher on the setting and the subject(s) under investigation can sometimes be overwhelming. It is practically impossible to completely eliminate this effect the researcher has in the process of the study (Bryman 2012). For instance, in an interview session, the presence of the researcher and recording equipment can be rather unsettling for some respondents bearing in mind that for some, this might be the very first time they are being interviewed let alone being recorded or the feeling that what is said would be preserved for a long time Bryman (2012:483). In the event that the researcher opts to observe his or her respondents, his presence in the natural

setting creates some “unnaturalness” that the subjects are not used to. And then there is the issue of power relations that might also stand in the way of getting sincere responses which are devoid of the respondents' presumptions of what the researcher might be looking for Maxwell (1998). The acid test for the researcher is therefore his or her ability to come up with questions that do not give away his or her biases and also the ability to formulate questions that will check some inconsistencies in the respondents' responses, if any.

In this research project nevertheless, the aforementioned measures that help in dealing with threats to trustworthiness and authenticity were taken. For instance, the fact that the researcher is an alumnus of the MUK College of Education could have, inadvertently, influenced his perceptions and attitude. However, having gone through rigorous training and being aware that researcher bias was something to watch out for, it was not too difficult to deal with this. While creating the interview guide, the researcher had, at the back of his mind, not only the need to ask questions that would not give away his opinions and perceptions but also those that could check any inconsistencies that could arise from responses on the side of respondents.

On the other hand, authenticity raises “...a wider set of issues concerning the wider political impact of research” Bryman (2012:393). These issues include a) fairness ie whether or not the research represents different viewpoints among participants, b) ontological authenticity which is concerned with whether or not the research helps members to better understand their social milieu; c) educative authenticity which is concerned with whether or not the research helps members to appreciate perspectives held by other members better; d) catalytic authenticity which is concerned with whether or not the research has provided impetus to members to act to change their circumstances and finally, e) tactical authenticity which is concerned with whether or not the research has empowered members to take steps necessary in engaging in action. Measures were taken to ensure both trustworthiness and authenticity. For instance it has been stated in chapter one that the main purpose of this research is to contribute knowledge about how ICT is used at MUK, CEES and therefore to inform practice. By doing so, authenticity of the study would be

achieved. Fairness as a criterion was considered as different viewpoints were presented. Trustworthiness as a criterion was achieved through strict adherence to canons of social research. It being a qualitative research, the researcher was more preoccupied with depth and not breadth of the research and this was manifested in the intensive interviewing that sought details.

4.8 Ethical Considerations

The importance of ethical considerations in social research cannot be overemphasized. According to Cohen et al (2007) this helps in protecting the integrity of the research process and the data obtained therein. On the outset, an introduction letter from the University of Oslo was obtained to authenticate the status of the researcher as a registered member of the university who was required to conduct fieldwork in relation to the topic under investigation. This letter was then used as a stepping stone to obtain a research permit from the dean of faculty at the College of Education at MUK.

To clear any misconceptions about the intentions of the study, a synopsis of what the research entails and how the findings could be utilized, was given to the university administration and respondents. In order to get an informed consent, the researcher also conscientiously explained in person the purpose of the study and what contribution it hoped to give to MUK in general and the College of Education and External Studies in particular. The researcher also deemed it fit to promise confidentiality of respondents so that they would speak freely without the fear of being identified as having provided information.

5 Research Findings

The main purpose of this study was to investigate how faculty and students at MUK, College of Education and External Studies use ICT in teaching and learning. To achieve this, the research project was guided by three research questions. These questions aimed at finding out how ICT is used in teaching and learning by faculty and students, their perceptions on the role technology plays in academe and the factors that impede full utilization and or the development of ICT at the CEES. The research findings will be presented in relation to the aforementioned research questions around which the collected data was themed and in their order of mention as in chapter one.

5.1 How and to what extent do faculty and students use ICT at MUK CEES?

This is the first research question of the thesis. First and foremost, it aims at finding out whether or not ICT is used at all in teaching and learning at the CEES. Secondly, it also seeks to find out the purpose for which (and the extent to which) ICT is used at CEES by students and faculty. To systemize the discussion, respondents have been categorized according to the user perspectives proposed by Hill and colleagues.

5.1.1 Learning with ICT

According to Hill et al (2004), the *Learning With* perspective is rooted in the constructivist school of thought which emphasizes active participation of learners in the learning process. The learners, it is presumed, is an active contributor of knowledge and s/he helps in creating and designing instructional artifacts that aid learning (Perking 186). In a similar vein, the use of ICT at MUK exhibited this perspective.

Makerere University has a learning management system (LMS) that helps students to monitor their progress academically, register for courses and access marks for different examinations. Students seemed particularly happy about the possibility of seeing their grades by logging into the learning management system even during

recess terms. They did not have to wait until the semester start to know how they had performed. "...because it is easy to see for myself the differences in my GPA's (Grade Point Average) I'm able to adjust accordingly to improve my performance. Everyone wants a good CGPA (Cumulative Grade Point Average) at the end of the day," one final year student observed. The learning Management System in this regard serves as an artifact that makes it easy for students to monitor their academic progress. Since it was possible to access all the final marks for all semesters it was easy for students to take stock of their academic strengths and weaknesses by making a comparison of how they had performed in different semesters and therefore make the necessary adjustments in the way they approached their studies to better their performance.

On the other hand, all the lecturers interviewed pointed out that they use ICT basically as a tool for preparing and organizing lectures. Asked to describe how exactly this is achieved, they explained how they read extensively and then typed lecture notes which notes would be availed to students through photocopying. This, according to them, saves the time which would have been spent dictating notes or writing on the boards. Here, the *learning with* technology is seen from the teacher's perspective. Lecturers seemed to extensively use the computer and the internet as teaching aids. Typed notes in this context serve as an important teaching material for some of the lecturers.

However, lecturer A had a different point of view with regards to this mode of delivery. He argued that he did not see the need to type notes beforehand and preferred letting students make their own notes. He strongly believed that "*spoon-feeding*" students with prepared lecture notes created a dependence syndrome on the part of students which is hard to break. The lecturers who disagreed with the above assertion claimed that time limitation was the main factor that influenced their decision to provide typed lecture notes which spared them enough time to complete the syllabus on time.

On the other hand, lecturer B opined that preparing notes for students and allowing them to photocopy was "*a necessary evil*". He explained that he was cognizant with

the fact that giving students notes discourages autonomy of thought and encourages rote-learning when students attempt to memorize the notes in order to reproduce them in examinations. He affirms that he more often than not read examination scripts that were a close replica of his own notes, a phenomenon he strived to discourage, but nonetheless preferred giving students notes to save time.

One student believed that he scored highly in his take-home exams if he typed his work as opposed to when he hand-wrote the same. This notion came up in the focus group discussion but the other members disagreed saying that they did not think a relationship existed between typed/handwritten assignments and the marks they fetched. One member of the group claimed that she scored similar marks whether she typed her assignments or whether she hand-wrote them. Incidentally, one of the teachers seemed to concur with this perception. He says,

"...correcting assignments which are typed makes work easier on the part of the lecturer. And that is not to say that I have a big problem marking handwritten work. But you know it is sometimes a struggle to read some (handwritten) work yet we mark thousands of them (scripts). So if I can't read your work, how do you expect me to award you good marks even if you deserve them?"

Whether or not this is a perfect demonstration of *halo effect*⁴ is a matter that can be delved into through empirical study. But one thing is certain though, the student who believed that typing his take-home assignments made him score a bit highly learnt with ICT when he did so. The computer is viewed by this student as an important tool that helps him to achieve his academic objectives. This notion is reinforced by the above lecturer who also found typed assignments to be more appealing.

Worth noting, only two of the lecturers interviewed used a computer in the class to teach students and only when teaching technology-related course units that aimed at

⁴ Generalization from the perception of one outstanding personality trait to an overly favorable evaluation of the whole personality (Merriam Webster)

exposing teacher-trainees to educational technology. They pointed out the absence of other support tools like projectors, public address systems and the unstable supply of electricity in lecture halls which ruled out the use of power-point presentations or audio-visual materials. On the other hand, literature students claimed that they were compelled by the course requirements of “Literature and the Media” to use educational technology. As part of their assignments, they were required to give a 15-20 minute presentation in class on how they would teach different aspects of literature.

All the lecturers claimed that they used office application packages to manage class records for example students’ marks in different assignments and exams. Since there was no provision in the LMS to post results of continuous assessment tests, some lecturers said that they would print these results with the students’ admission numbers and pin them on the notice boards for the latter to access them. They further claimed that they processed students’ exams on their own using office application packages (setting, typing, editing, and proofreading).

Disciplinary differences seemed to play a role as well even though this role was not easy to isolate. The Literature fraternity came across as the more adept in using ICTs as instructional artifacts. This, the researcher could infer, came as a result of the course content that required the teacher to demonstrate to teacher-trainees how instructional media could be used in the classroom. Students in this course were also required to demonstrate an understanding on how different media i.e. visual and audio-visual could be used to augment the traditional chalk and talk method of teaching. A case in point is the use of the film adaptation of literature texts to teach certain elements of the subject and the use of video clips for illustrations. This is a clear manifestation of what Hill et al (2004) called “The learning with” perspective. The scenario presented here is of students taking an active role in their own learning with the teacher playing a mediatory role.

However, this trend did not cut across the whole language department. Students taking Kiswahili as one of their teaching subjects claimed that they had never

watched any film adaptation of the texts they were tackling as part of their course load. They cited unavailability of these films as the reason why this was the case.

Interestingly, one interviewee taking Christian Religious Education had a penchant for watching film adaptation of Bible stories claiming that they helped her to understand the subject better. She said she had watched “The Passion of the Christ”, “Jesus of Nazareth”, “Eli”, “Joshua”, to name but a few. She was however quick to point that this was neither obligatory nor the course requirement. One respondent who had Mathematics as one of his teaching subjects, claimed that he had never used the computer and internet to study the subject. He pointed out that the only technology he used was a scientific calculator. However, the same student claimed that he used the internet to get information on Economics which was his other teaching subject.

Students from the Department of Science and Technology (popularly known as DOSATE, at CEES) with varied science subjects like Chemistry, Biology and Physics also claimed to use ICT on their own accord. Neither the teacher nor the respective subjects compelled them to do so. In this case, a blend of “Learning From” and “Learning With” perspectives is evident. Students used ICT to enhance their understanding of the subjects by watching video clips on different topics (Learning from) and the fact that this was their own initiative makes “learning with ICT” an apt way of describing it.

Among the student respondents 1 claimed that he used his personal computer as an entertainment unit by watching movies on it, listening to music or playing games. He claimed that he had installed a TV card on his personal computer so that he could be able to watch his favorite TV channels and listen to the radio.

5.1.2 Learning from ICT

Learning from perspective has a basis from the behaviorist school of thought where learning is considered to be a means through which behavior can be modified. The teacher is perceived as the “all-knower” and the student as the passive receiver of this knowledge. “The teacher’s role in the *learning from* model is that of manager-managing the use of the pre-established, often “teacher-proof” content” (Hill et al 2004). This is a stark contrast with the *learning with* model that advocates for active participation of learners in the learning process. “When ‘learning from,’ the internet is a vehicle for the delivery of information” (Kozma, 1994; in Hill et al 2004:11).

All without exceptions attested to using the internet as a source of educational materials. Students would for instance download educational materials and then print them to be used outside the computer rooms and during their private studies. One student is quoted to have said that by doing so, he saves the limited time allocated to students. Yet another one commended “...it helps to have a flash disk so that you don’t spend all your time reading, instead I just save the downloads onto the flash (flash disk) then I go to print when I leave the computer room”. The student who had his personal computer in his room would download the material then save it on his computer and would have no need to print it. This is also what lecturers claimed to have been doing. The difference between how the latter did and how the students claimed to do it is that lecturers had personal computers in their respective offices and had no time limitation in as far as using computers goes.

There seemed to be a major variant, in terms of time allocation, on how faculty used computers and the internet compared to how students did. This ranged (on average) between one hour to three hours per day on the part of students and more than 3 hours on the part of faculty. All the lecturers interviewed however, were hesitant to estimate the time they spent using ICT. Lecturer X claimed,

“I can’t for sure estimate that, because I use my computer, and the internet for that matter, whenever I’m in my office. And of course there are almost always a few interruptions. It could be a phone call from a friend, a colleague, a family member, (you know) or somebody coming

to the office for something and mark you; this is a shared office, and sometimes this take up more time than expected"

Though all the lecturers were noncommittal about the time they spent using ICT, all of them, after being asked to estimate the minimum time stated that this was not less than 3 hours per day.

It also emerged that some lecturers did not only enrich their knowledge base by reading online sources but also found guides on how to teach (available online) very useful. One lecturer gave the example of a YouTube video he had watched entitled, "Teaching Teaching and Understanding Understanding" which highlighted the different study habits of students that called for different styles of content delivery. He claimed that after watching the video, he became more conscious of the different needs of his students and this impacted on his teaching styles.

Two of the lecturers from the language department specifically found online reviews of Literature material useful as they provided "*...a good platform to compare notes with other experts*" One of the 2 affirmed,

"...you can't really claim to know everything. There is always something new coming up. And as you may already know, literature is a mirror of society, and societies change. Since writers more often than not borrow material from their immediate societies, contemporary literature will usually reflect contemporary issues"

Also worth noting is that some students lived in halls of residence where internet was provided while others did not. Those who had easy access to the internet in their halls of residence tended to use it more than their less fortunate counterparts. The frequency in which students visited the computer rooms at the university also varied greatly with some claiming that they did it every day and others who only visited whenever they could. The latter said there were days when they did not visit these rooms at all depending on how occupied they were with other academic and non-academic activities.

5.1.3 Learning Through ICT

As already mentioned, the *learning through* model is concerned with interactions and connections in online environments. The online exchanges between teachers and students have various ways in which they scaffold learning. For example, it could be that the teacher is emailing students to motivate them to work harder, or perhaps creating an opportunity for students to brainstorm over a topic that is the subject of discussion in the forthcoming lecture or interaction between students and mentors (Hill et al 2004).

From both individual interviews and focus -group interview, it emerged that students spent a considerable amount of time on social media with Facebook taking the bulk of their time followed by Twitter. *"Facebook has made it easier for us to stay connected even during long breaks from campus. It is almost like we are always in each other's' lives even when distance separates us."* One student offered. Students also claimed to support each other psychologically through Facebook messages and status updates⁵. By visiting friends' Facebook walls⁶, it was possible to catch a glimpse of what was happening in their private lives and if the situation warranted it, unsolicited emotional support would be offered. *"At times you read the status updates of a friend or classmate and realize that they are not ok. Sometimes one would be sick or bereaved and it is only natural to offer support,"* student Y explained.

In a bid to understand just how much time students spent on social media as compared to using the internet for academic purposes, they were probed further and asked to estimate the time they spent on Facebook and or on Tweeter in terms of hours per day. The responses were as varied as the respondents themselves. Time spent on social media ranged between 20 minutes per day to 2 hours per day. Some students claimed that they were almost always on Facebook as long as their mobile

⁵ A Facebook status is a feature that allows users to share a small amount of content on their friends' wall (or their own). It also allows users to receive information about what their friends are doing (techopedia.com)

⁶ A Facebook wall is the original profile space where Facebook users' content is shown. It allows the posting of messages, notes for the users to see while displaying the time and date the message was written (Wikipedia)

phones were on and would every once in a while check messages and updates if and when the situation permitted.

Students having said that they use the internet for an average of between 1 hour and 3 hours in a day (in general) and between 20 minutes and 2 hours on social media, the researcher can deduce that the latter spent more time on social media than they spent using the internet for academic purposes. This scenario evinces a “Learning through” perspective as described by Hill and colleagues. Here, the online interaction of students seems to dominate other ICT usages that have a direct connection with their learning.

On the side of faculty, one interviewee used the internet to communicate with students especially when passing information to different groups with regards to assignments or change of lecture venues. He however said that he only communicated (through emails) with class representatives in this regard and not the entire classes.

But for this one particular faculty member who communicated with students (representatives) through emailing, online interaction between faculty and students was conspicuously absent. One of the lecturers interviewed said he used social media as a means of communication but only with his colleagues and mostly on nonacademic matters. From the data, it was clear that the students who were interviewed did not have direct online contact with their lecturers. There seemed to be a huge social gap between the two groups with interactions occurring mostly within each group.

Nonetheless, two of the lecturers interviewed did not find the use of social media to be an appropriate way of communicating. One lecturer commented, *“I just don't see myself ever being on Facebook or any such (social) media. It is just too intrusive for my test”*. While the other one felt that social media was for younger people that he called *“dot-com generation”*.

In Retrospect

Comparatively, (the data reveals) faculty use ICT in education more than students. They spend less time on social media and more time doing teaching- related activities. The influence of age on ICT use was not easy to discern. Among the lecturers, whose age difference was negligible, similar responses on how they use ICT were posited as the foregoing paragraphs have highlighted. But for the lecturer who admitted that he preferred typed assignments from students as opposed to hand-written ones, the others were indifferent about it stating that it did not matter to them how students' assignments were presented. They however emphasized legibility as an important quality of students' work.

On the part of students, the education level seemed to play a distinctive role in determining the amount of time spent on the internet doing academic work. Students in their first year on average spent more time on the internet socializing than doing academic-related work as compared to students in their second and third years.

Having established that indeed ICT is used at MUK College of Education and External Studies in various ways, it is of paramount importance to find out the perceptions of students and faculty on the role ICT plays in teaching and learning. This will be discussed in relation to the second research question.

5.2 How do faculty and students at MUK CEES perceive the role ICTs play in teaching and learning?

During data collection, it was apparent that both faculty and students attach some importance to using ICT albeit in varying degrees. Incidentally, some of the responses from respondents unconsciously categorized, (though haphazardly) these roles into economical, psychological, educational and sociological. Even though participants did not necessarily mention these adjectives, (and when they did it was seemingly accidental) their responses either implicitly or explicitly fell into these categories.

5.2.1 Academic Benefits

All the respondents mentioned (or implied) the fact that the internet is a one-stop information portal without which access to some educational material would be difficult or even impossible owing to either their exorbitant prices or inaccessibility. This notion was captured clearly in one student's remark: "*...last year we were required to read Shakespeare's "Othello" yet I did not have money to buy the book. But I kind of just bumped into the book and others as well on the internet which I downloaded for free...problem solved*". From the tone of this student's voice, one could easily tell that were it not for the free texts mentioned (obtained from the internet) getting the same through other means would have perhaps been a tall order.

Additionally the ease with which both students and faculty retrieved educational material from the internet seemed to play an influential role in their using it. The above student epitomizes many students who use the internet as a source of educational material.

Faculty on the other hand used ICT to prepare for lectures by reading online material to enrich their knowledge base. Although respondents argued that the university had not subscribed to any paid online sources of academic knowledge, they basically accessed what was available free of charge.

Generally, ICT at CEES was viewed as an important instructional artifact that aided the teacher while preparing for lectures. Students taking the course "Literature and the Media" found it especially useful as they used audio-visual aids (mostly computers) to practice how to teach using technology. This same view was held by all the students who took the course "Educational Technology". However, the difference between the aforementioned courses was that while in the former students were required to use technology in the classroom in make-believe classroom sessions, the latter was teacher-dominated and there was hardly any opportunity for students to put into practice what they were taught.

Three students, one taking Christian Religious Education and the others taking Biology and Chemistry stated that the use of ICT by students supplements what they learn in class during lecture periods. The CRE student would watch stories from the Bible adapted into film to get a better understanding of what was taught in class while the science students stated that it was not always easy to follow some chemical or biological processes in class especially those presented in complex diagrams. Watching these processes on the internet gave them a better understanding of the concepts they were learning.

5.2.2 Economic Benefits

The economic benefits that both students and faculty alluded to encompassed reduction in the cost of educational material and reduction in the time that would have otherwise been used to gather information or to perform educational related duties through other means.

Faculty found the use of computers particularly useful in reducing their work load. By using computers and the internet as tools for organizing and preparing lectures, they claimed that they saved the limited time they had focusing on content delivery. This they did by not only reading extensively but also by typing lecture notes which notes would be availed to students during or after the lectures. All the lecturers pointed out that they used the same notes over the years and only had to update them when it was deemed necessary. However, lecturer A discussed in the previous section had a completely different view with regards to giving students typed notes. He believed that it helped to let students make their own notes as this (he argued) would help in developing autonomy of thought among students.

Faculty also viewed computers as important gadgets that helped them to process, store and retrieve documents whenever needed. This was essential in keeping students' records which included class attendance, marks scored in different examinations and assignments, a database of previous assignments and examinations, to name but a few. One of the interviewees among lecturers who was a course coordinator stated that other subject teachers were supposed to send her marks of students which marks would be compiled and then later students' grade

point averages computed before they are released to the students, a process which she said could have “...taken forever to complete” if she was to do the work all alone.

5.2.3 Psychological Benefits

Psychological benefits are those that are deemed to support learning in a more indirect way (Bekele 2004). Their affect on students’ motivation, attitude, interest, thought processes to name but a few, is not less profound. Both students and teachers pointed out that the use of ICT in education increases students' engagement with the course materials more so when the latter are asked to go and find certain information on their own. This, in the words of one student, “...makes learning enjoyable because the monotony of the teacher lecturing for the entire lecture period is reduced”.

Among the teachers, one of them explained how the availability of video clips on the internet has made it easier to teach some elements of Drama. She asserts:

“...when you read a book, you rely on your mind's eyes and mind's ears, you know, to understand the underlying message that the author intends to convey or sometimes moral lesson s/he intends to teach. But when you watch a video adaptation of the same text, you are given the opportunity to see and hear for yourself because the video vividly re-enacts the scenes and acts that may not be obvious to the readers when they just read the text”.

This same view was held by the students who admitted to watching the film adaptation of literature texts and especially ones set in cultures that were diametrically different from theirs. One student pointed out how these films especially the ones adapted from Shakespeare helped her to understand the archaic language used in them and to appreciate the setting and context of the texts. The above role can also be categorized as an educational role but the overriding role remains the bit about it that increases students’ engagement with the course material and thus qualifying as a psychological role.

5.2.4 Sociological Benefits.

In section 5.1.3, the discussion centered on interaction in online environments that supports learning more covertly. The emotional support students claim to give each other during difficult times would be difficult to categorize as it seems to allude to both psychological and sociological benefits. Psychological in the sense that the student(s) who is going through a hard time is helped back to a state of emotional stability and sociological in sense that interaction, which is the mainstay of mutual coexistence, takes place and therefore fosters social cohesion. Just like it was pointed out in the literature review chapter, there is a blurred line between these categorizations and care was taken not to drive a big wedge between them. For example, when respondents point out that they access educational material on the internet for free; this could be categorized as both an economic advantage (saved costs) and academic advantage (information gathered). The other is the sociological/psychological divide discussed above.

As the foregoing presentation has revealed, both teachers and students view ICTs as playing important roles in teaching and learning. The roles these ICTs play as described by both groups suggest a positive attitude towards educational technology. With regard to Roger's Diffusion of Innovation theory, both teachers and students appreciate the usefulness of ICTs in education basing on their knowledge of these roles. This knowledge of the importance of ICT in teaching and learning informed their decision to use them. However, the kind of usage described by faculty suggests a very minimal utilization of the ICT resources available to them. But for the 2 lecturers who used ICT in the actual teaching, the rest did not ever use the same in class while teaching.

Adopting or rejecting an innovation according to Roger (2003) depends on four major aspects of the innovation in question. These are: relative advantage, compatibility, observability, complexity and trialability. The relative advantage of using ICT over the traditional methods of knowledge dissemination was clear as both teachers and students were full of praise for educational technology. The previous sections have highlighted these advantages posited by the two groups. There seemed not to be big compatibility issues with educational technology.

Students who attended lectures that used ICT tools showed a heightened enthusiasm in their studies which enthusiasm was discernible in their responses about the role ICT played in education. And even though the college did not have formal training for the use of educational technology (academically), students claimed that they did not encounter any big challenges while using technology yet some learnt by “default” as they experimented with different applications on their computers.

The scenario presented above is a depiction of an ICT environment that has a huge potential and opportunities that could be turned into a success story. However, the fact that ICT is underutilized at this college is hard to miss and it raises the question “why?” As it was discovered in the interviewing process, a number of barriers stood in the way for ICT to be used optimally at CEES and this will be discussed in the section that follows and in relation to the last research question.

5.3 What factors and or conditions impede the use of ICTs in teaching and learning?

Khalid (2009) affirms that it is only after closely analyzing the factors that hamper the use of ICT in education that an institution can come up with solutions on how to fully integrate it in its day-to-day operation. In the same vein, presenting the factors that impede the use of ICT at CEES will also help in this regard. These factors are both endogenous and exogenous. Endogenous factors are those that emanate from within the institution while exogenous factors are those that emanate from outside the institution.

5.3.1 Exogenous Factors

One challenge that seemed to be beyond the control of the CEES was the incessant power cuts occasioned by the nation-wide load-shedding program. By sheer coincidence, while interviewing one of the lecturers during the fourth day of interviewing, there was a power cut to which she said, “...you see, it is always like this. You cannot rely on technology here because of this load-shedding thing. Imagine if this

happened while you were using a power-point or if students were watching something in class.” This power cuts adversely affected the use technology which depended on stable power supply. This unreliability of power supply made it implausible to use technology while teaching.

5.3.2 Endogenous Factors

It was noted during data collection too that the absence of inter-faculty collaborations was a big hindrance to the use of ICT at MUK. For instance, there were faculties with stable power supply because of the presence of standby generators that supplied the faculty with electricity during times of load-shedding. The CEES did not have this power backup plan at the time the researcher was conducting the interviews. Students claimed that they did not have permission to use the internet in these faculties which had power back-up plans during times of power outage. This lack of inter-faculty cooperation also seemed to come to bear when students complained that it was virtually impossible to access internet labs of other faculties because they were restricted to using the ones in their respective faculties and the main library regardless of whether or not some internet rooms were virtually empty.

In addition to these, students claimed that only a selected number of faculties and halls of residences had Wi-Fi and that during examination periods, internet was switched off. The halls of residence that had Wi-Fi housed mainly students who had support from the government in terms of tuition payment and accommodation. Noteworthy is the fact that the bulk of students reside outside the university compound in privately -owned hostels, them being self- sponsored students and forming the majority of all the admitted students. But for one student who claimed that he lived in a hostel that had internet connection, the rest of the students did not have this provision where they lived and relied on the internet services provided by the university.

Slow and intermittent internet connection also seemed to discourage some students from using technology. Some students claimed that there were times when the

internet connection on campus was either a tad too slow or would be on and off and this would prompt them to use commercial internet cafes located outside the campus. But this did not seem to be a better option for many students because the said commercial internet cafes were expensive. *"...if and when I'm forced by circumstances to visit these (internet) cafes, I wouldn't want to spend more than thirty minutes there because then I would starve,"* one student opined.

The disproportionate ratio between students and computers was a big challenge while using educational technology. From the interviewing sessions, it emerged that using computers provided by the university was a tag of war (literary) and only those who had the tenacity to wake up earlier and queue in order to be allocated the much desired 1 hour of usage benefited. Often time, the jungle "survival for the fittest" philosophy reigned supreme when students pushed and shoved inside the computer rooms to register for the one hour, a factor that discouraged some students from visiting the internet frequently.

"We are just too many students in this faculty and yet the computers here are not enough for all of us. I sometimes get a feeling that it is a complete waste of time to try when you know very well that the chances are slim." One student commended on the situation during the focus group interview.

There seemed to be a huge disconnect between the rhetoric on the advantages of using ICT and the actual use in teaching and learning at CEES. Even after affirming the said advantages, only two lecturers used ICT while teaching. And as already mentioned these two were compelled by the course requirements to teach using technology and they did not use the same in other units they taught. By the same token, only students taking "Literature and the Media" said that the course compelled them to demonstrate in class how they would use technology while teaching when they eventually go to the field as trained teachers. The other students taking various subject combinations claimed that there was no course in the curriculum that required them to use technology. Those who used ICT to process take-home assignments did so on their own volition.

6 Discussion of the Findings

This chapter will focus on discussing the research findings that have been presented in the foregoing chapter and will be dovetailed by the main theoretical perspectives already discussed in the previous chapters. To systematize the discussion, the chapter will endeavor to fully answer the research questions in their order of presentation and in tandem with the literature review and the theoretical underpinnings on educational technology.

6.1 How faculty and students use ICT in MUK

The “how” part of the question sought to investigate the “purpose for which” students and staff use ICT with regard to the user perspectives suggested by Hill and colleagues (2004:443, 448) i.e. learning with, learning from and learning through dovetailed by elements of innovation that makes it adoptable or not as presented by Roger (2003)

Information gathering is the most basic activity in the *learning from* model. This was also the case at MUK. In the recent past, there has been an exponential increase in online resources, a trend that can give a glimpse of what the future of ICT in academe will look like. If the current trend is anything to go by, then the gathering of information is likely to continue being the most used applications of the internet (Grant & Wang 2000; in Hill et al 2004).

The respondents who used ICT as described above found downloading educational materials from the internet and the ability to use and share the same with their peers more intuitive than having to physically visit the library or book banks to get the same or similar material. These assertions allude to the academic advantages of using ICT in education as covered in section 2.2.2. Perhaps more important is the opportunity ICT affords students to study at a pace that is convenient for them which allows them to get a better grasp of the course content (Koller 2012), a process that undoubtedly plays a more covert role of encouraging deep learning.

This is consistent with what Rogers (2003) describes as the relative advantage of an innovation that makes it more appealing to use than what it replaces. That the need

for educational materials is met through online access makes ICT compatible with the needs of students. That respondents claimed that they did not face major challenges while using ICT despite having little or no specialized training on the same is a further indication of the willingness and enthusiasm they have in as far as using technology is concerned. In part, these explain why despite a myriad of challenges they face in accessing ICT i.e. limited access in terms of time allocation, intermittent internet, incessant power cuts, to name but a few, they still attach a significant importance to the use of ICT in their studies which makes a good number of them to strive to make the most of what is available to them.

In the process of gathering educational resources from the internet, a number of mental processes occur. According to Hill and colleagues, learners are engaged in evaluating the material, purposeful thinking, acting, transformation and integration. Similarly, Fitzgerald (2000) argues that adult learners in post-secondary education level evaluate, choose, analyze, argue, construct, critique, and synthesize this material in the process of gathering. This presents the task itself as a somewhat complex but rewarding cognitive activity a number of challenges notwithstanding.

The most obvious challenge students encounter while gathering information is the risk of losing oneself in what Marchionini (1995) calls “hyperspace.” The sophistication that is the internet is the genesis of this loss and he recommends simplifying the process of information gathering so that students can easily locate and use material which they need.

Curiously, some students only use ICT when the teacher compels them to do so, an attestation of just how much power the teacher wields in shaping the study habits of students (Trigwell 1999). This is in line with the assertion by Lindfors (2007) that when the teacher is confident in using technology, his influence on the students to use the same cannot be underestimated. In a similar vein, when the teacher has a penchant for educational technology and uses the same while teaching, students will tend to want to use the same therefore creating a conducive environment in which technology can flourish (ibid).

It is little wonder then that the supposed failure by the universities' administration systems in HEIs to include the teaching staff in decision-making processes that affect pedagogical issues, for instance adoption of ICT in instruction, has been deemed as one of the biggest impediments to ICT use in teaching and learning (Stensaker et al 1997). But whether students use ICT on compulsion or on their own volition is irrelevant in this context. What is of importance however is that they learn from ICT (internet) when they have this kind of access to educational materials (Hill et al 2004).

Evidently, students' enthusiasm to learn with ICT is high when they push and shove early in the mornings to get space in the internet cafes at the university. This heightened eagerness to learn goes a long way in ensuring a greater engagement with the course material which is a precursor to deep learning (Trimmel and Bachman 2004; Collis and Wende, 1999). This phenomenon is consistent with Sellinger (2003) who posits that ICT plays an important role of stimulating interest in learning among students. And as elucidated in the literature review, enthusiasm by students to take an active role in their learning creates a positive attitude towards learning. The benefits of deep learning as opposed to surface learning are well documented (Sfard 2010; Trgwell 1999).

Drawing from the findings of this research, faculty predominantly uses ICT as a tool for lesson preparation and record management. This confirms the findings of an earlier study conducted by Stensaker and colleagues that revealed a more indirect way of using ICT in HEIs. The rhetoric about the benefits of using ICT posited by both faculty and students therefore came across as more of a hypothetical overview rather than actual benefits that accrued to them since there was very minimal use of technology in the teaching process. The seemingly insuperable challenges including the lack of supporting equipment and infrastructure, makes it impossible to use ICT in the classrooms while teaching. A case in point is the absence of public address systems and projectors in the lecture halls that makes it implausible to use ICT in a more direct way while teaching. Furthermore, the absence of computers in the lecture halls means that one cannot even imagine using one for teaching.

The decision on whether or not to use ICT in the teaching process, it seems, is by and large influenced by the aforementioned structural deficiencies. And this, it appears, has a ripple effect that further complicates matters. The “enthusiasm” to use ICT by faculty does not translate into action. Faculty did not seem eager to learn skills that had very minimal chances of being utilized. Despite a claim of free courses for faculty on how best to use ICT, all but one were oblivious of this training. And as James (2008) found out in his study, teachers need formal training if they are to use ICT optimally. This training, he observes, is paramount in instilling confidence in the teacher which confidence inadvertently finds its expression in the students’ use of technology.

The aforementioned structural deficiencies contradicts what Adam (2003) writes about the state of ICT in Africa in general citing MUK as having a better capacity in the region. Well, MUK might arguably have a better capacity in the region but this does not say much about how adequate ICT facilities are at the university in general. His claims that “...*the ICT infrastructure is adequate anywhere in Africa*” is therefore farfetched or perhaps just contextual. Understandably, there is a big time lag (10 years) between Adam’s study and this one and since universities operate in dynamic environments, the latter might not be a true representation of the current state of affairs.

The abovementioned enthusiasm to learn (on the part of students) arguably created (in part) by the use of ICT seems to be constrained by the said structural deficiencies as well. The student quoted as saying that she did not see the point in striving to get time allocated to her to use the internet is one such manifestation of this constraint that finds its expression in students despair. This scenario clearly shows a missed opportunity that has the potential to turn the available ICT resources into an important educational tool.

The learning through perspective is best manifested in the students' extensive use of social media, notably Facebook. That all students (but one) interviewed admitted to having a Facebook account confirms the findings of a recent research by Harvard

University that 90% of students in higher education the world over have Facebook accounts. Although this extensive use of social media does not necessarily have a direct impact on students' learning (Hill et al 2007), it plays a pivotal role in creating social interactions that is vital in the learning process. This is evident when students acknowledge the importance of "*staying in touch even during long breaks*". However, the way in which the MUK community interacts in online environments leaves a lot to be desired. The very minimal contact between faculty and students is perhaps a telltale sign of the huge social gap between these two groups that hinder interaction, a matter that only empirical research can determine with certainty.

Whereas all the respondents claimed to use ICT, the extent of use varies from individual to individual. Some students spent more time than others using the internet. Those who have personal computers also use ICT extensively for not only academic purposes but also for entertainment. The common thread is the extensive use of social media as opposed to using ICT for academic purpose. This revelation supports empirical findings that ICT in schools is used mostly as a communication tool between students and students and teacher and students (Selwyn 2007; Stensaker et al 2007). The kind of communication described above is however, diametrically opposed to the one described by the respondents. In the former, the communication between teachers and students is usually on academic-related matters while in the latter the communication is basically between students and their peers and for the most part for socializing. The important issue of access is raised in this regard. There seems to be a relationship between ease of access and the extent of use. The student who had a personal computer typifies this relationship.

Worth noting also is the fact that all the respondents seem to have gone through the 5 step- process that a new innovation passes (Roger 2003). They all have the knowledge of what benefits they could get when they use ICT in education and this is clearly manifested in their responses on the question about the benefits of using ICT. This knowledge stage, the first stage in the adoption process, often leads to the second one (persuasion). Again, all the participants after presumably assessing the relative advantage of using ICT in education seem to have been persuaded and the

positive feedback about the perceived benefits that ICTs bring to them is a clear testimony (save for the few who only used ICT when compelled to). This persuasion stage informs their decision to use it, albeit in varying degrees (academically).

With regard to the adopter categories posited by Rogers (2003), it is virtually impossible to make such categorizations at CEES given the ICT environment in which the College operates. It is obvious that students and even faculty do not have the same access to ICT. Yet, equitable access to ICT could have played a pivotal role in assessing their level of enthusiasm in the use of technology and therefore facilitating a clear categorization. Nonetheless, a number of students presented themselves as being more enthusiastic than the rest in as far as the use of ICT goes. The best manifestation of this is perhaps the zealous lot that had the tenacity to go to campus very early to book time in the internet rooms. Among this group, one showed characteristics of innovators by his obsession with technology. He claimed to have a personal computer in his room complete with a TV card, typed his take-home assignments and spent more time using technology in his studies than the rest.

The other students appeared to have some characteristics of both early majority and late majority. They were not as enthusiastic as the student described above and some had to be compelled to use ICT. The student who thought social media as “a big time waster” and the teacher who believed it to be “too intrusive” exhibit characteristic of late majority and laggards (Rogers 2003).

6.2 The perceived role of ICT use in instruction

This section will address the second research question that seeks to identify the perceived role of ICT at MUK CEES seen through the lens of faculty and students. These roles will be discussed alongside the literature on ICT use in education covered in chapter two of this thesis and rooted in theories on technology use in instruction.

Basing on the diffusion of innovations theory, would- be users of a new innovation have to perceive the innovation as offering benefits that supersede the existing and

or comparable ones. Additionally, this new innovation must be compatible with existing values, past experiences and the needs of prospective adopters. The above two are also influenced by the level of complexity of the innovation i.e. the ease with which the technology can be used, or experimented on (trialability) and how visible the outcomes of using it is to others especially peers (observability) (Rogers 2003)

Clearly, as inferred from the interviews, both faculty and students are fully aware of the benefits ICT brings in instruction. Educationally, both use ICT as a source of educational materials. The two groups admitted to downloading educational materials and sharing with their colleagues. Accessing materials, it seems, is no longer a hassle, thanks to the abundant availability of the latter on the internet. The student who is quoted as having accessed Shakespeare's books at no cost perhaps epitomizes a huge number of students who benefit from these open-source materials on the internet in the global higher education arena.

The findings of this study indicate that students at CEES actively get involved in the learning process by looking for information that the teacher wants them to and then presenting it in class as part of their course requirements in some course units as discussed in the foregoing sections. The learning process witnessed here shows a marked shift from the traditional information transmission to a mediation of knowledge (Trigwell 1999; Bonnett 1999). The concept of participatory learning (Sfard 2010) is clearly discernible in this regard when students actively get involved in the learning process as the teacher adopts a more learner-centered approach to teaching. This kind of approach to teaching and learning is deemed to be a remedy to rote learning and one that is essential in eliminating the “banking concept” of education described by Freire (1996) and as discussed in section 2.2.2

In a similar vein, constructivists believe that the learning process should be an active one as opposed to a passive one (Piaget 1954). By the very fact that students at the CEES are able to take up an active role in the learning process and therefore becoming active contributors of knowledge, is in itself a key factor in instilling autonomy of thought that is crucial in creating products that have requisite skills

needed in the job-market, (Perking 1986). Similarly, as one teacher put it, involving students in the teaching process breaks the hitherto dependence syndrome that characterizes education when the “omniscient” teacher “spoon feeds” learners.

The economic advantages of using ICT at MUK appeared to transcend cutting down the costs of educational materials. The one thing that stood out prominently was the value both students and faculty attached to the ability of ICT to cut down on the time that would have otherwise been spent looking for educational materials. Thus, most lecturers at MUK either use computers and internet to prepare lectures by reading the available materials on the internet and preparing lecture notes or by simply typing notes which are given to students. Students on the other hand are able to access these lecture notes by photocopying them and hence avoid spending a lot of time taking notes in class which time is then used for other classroom activities like group discussions, role-playing, to name but a few. This makes ICT use to have an edge over the traditional way of knowledge creation and dissemination because of the enormous relative advantage it has over the latter (see literature review for a detailed discussion).

Consistent with the study findings by Sellinger (2003), students and faculty alike hailed the use of ICT in teaching and learning as a means through which students' enthusiasm in learning can be generated and their interest and involvement in the learning process spurred. Students and one of the teachers acknowledged that watching the video adaptation of (literature) books is more exciting than just reading the book. They believe that they get a deeper understanding when they see rather than when they read. This is perhaps because of the ability of audiovisual materials to appeal to more than one of the human senses: taste, smell, hearing, touch and sight (Bonnett et al 1999). Basing on this argument, ICT use in teaching has the capability of increasing the attention span of students especially during graveyard periods (afternoons or just before breaks). “...students get engaged in discussing, say similarities between the texts and the film adaptation or their dissimilarities,” one teacher opined. The above perceived role that technology plays in teaching and learning alludes to the psychological advantages discussed in the literature review.

Listening to faculty and students explain how their work has been made easier thanks to the use of ICT, one realizes that their choice of words i.e. ICT reduces workload, it saves time, helps in record management and other such statements is actually synonymous with “efficiency”, a buzzword in the modern university. And to borrow a phrase from Maassen (2003) to describe the same, “*doing more for less*” seemed to be the most important element of using ICT at CEES and especially among faculty.

However, it is worth noting that Rogers’ diffusion of innovation theory does not take into account other important factors that affect the adoption process of an innovation. For instance, the theory does not explicitly discuss the possibility of external factors affecting the diffusion of innovation process or the presence of veto players that may hamper full adoption of the innovation in question. Making inferences from the data presented in this thesis, there are other factors besides the characteristics of innovation that make it difficult for ICT to be fully integrated in teaching and learning at MUK. The extent of use, it was discovered, is greatly influenced and affected by both endogenous and exogenous factors. Some of these factors are discussed with respect to the last research question.

6.3 Major Impediments to ICT use in instruction at MUK

This section will attempt to answer the last research question i.e. “*What factors and or conditions, if any, impede the use of ICT in teaching and learning?*” These factors will be discussed alongside the factors identified in the literature review and illuminate the similarities and dissimilarities.

6.3.1 Inadequate ICT infrastructure

It was evident during data collection that the use of ICT at MUK CEES is plagued with innumerable challenges. Contrary to what Adam (2003) claimed, the ICT infrastructure in place in this faculty is somewhat inadequate when one considers the

students to computer ratio. The aftermath of this disproportionality is the pushing and shoving by students witnessed when trying to get an hour allocated to them in the university's internet labs. It is little wonder then that many students shy away from them since their effort to get time to use computers and the internet is more often than not futile.

The absence of other related equipment like projectors and public address systems also seemed to play a big role in discouraging faculty from using technology in the classroom. Lecture halls at the CEES are not equipped with computers which can be used in teaching let alone projectors and public address systems. Given this ICT environment, it becomes foolhardy to strive to acquire knowledge on how best one can use ICT in education yet not get a chance to put into practice what has been learnt. This partly explains the reason why only one lecturer had gone through formal training on how to use ICT in teaching. Training on how to use technology in teaching is crucial and has a ripple effect as it gives the would-be users confidence to use it which confidence sometimes translates into the desire to use it more (Lindfors 2007). When the teacher gains the said knowledge and confidence in using technology, students tend to want to emulate him/her and this creates an environment where ICT can flourish (ibid).

Without seeming to suggest a causal relationship therefore, it can be inferred from the above scenario that the lack of a heightened enthusiasm to take advantage of the free training offered by the university is a consequence of the abovementioned systemic deficiencies. The aftereffect of this is the laxity to use ICT witnessed at the CEES.

The computer room at the College of Education and External Studies has at least a hundred (100) computers most of which are in good working condition. With the large student population however, these computers are far from being adequate. Bearing in mind that only a few of the students own their personal computers, the pressure on the available facilities at the university is too high. Inadequate ICT

infrastructure at CEES remains a big impediment to full integration of technology in teaching and learning.

6.3.2 Lack of inter-faculty Collaborations

Basing on students' arguments, there are faculties at MUK which are endowed with adequate ICT infrastructure but which facilities are not accessible to students from other faculties. They pointed out the faculty of Computing and Information technology (hereafter FCIT) which has the largest ICT center complete with Wi-Fi connection. This situation is true to the inherent characteristic of universities as loosely coupled organizations (Clark 1983; Weick 2000). MUK, like many other universities is organized in faculties, colleges and schools and then in departments. Each faculty or school is geographically separated from others creating a picture of a mini-city. Just like in a city, what happens in one building or street does not necessarily affect what happens in another street or building. Using this analogy of a mini-city, what it means in practice is that deficiencies in one faculty or department do not affect operation in the others.

Though under the umbrella of one organization, each faculty or school has a unique culture which is perhaps a residual outcome of disciplinary differences (Beacher 1994). This is in addition to a separate leadership structure that functions independent of others. Clark (1983) in his book *The Higher Education System: Academic Organization in Cross-national Perspective* describes how this oligarchic faculty leadership wields immense power over the decision-making process.

The loose- coupledness described above has a big bearing on funding especially externally funded initiatives. For instance, the putting up of ICT infrastructure at FCIT was bankrolled mainly by external funders with NORAD contributing the lion's share. ICT infrastructure at The College of Education and External Studies on the other hand was internally funded. This conspicuous lack of a harmonized ICT strategy creates "winners" and "losers" in as far as technology goes because a

disparity in funding affects the development of ICT at the faculty level and by extension, accessibility of these ICT resources.

As already mentioned the overall ICT infrastructure in MUK as an organization is incommensurate to the big number of students. What came across as the biggest impediment to the possibility of all students at MUK having equitable access to these ICT services however is not the inadequacy but rather the lack of cooperation and coordination between different schools and faculties.

6.3.3 Incessant Blackouts

Uganda is faced with an acute shortage of electricity supply which shortage affects all sectors of the economy. There is a lack of capacity to meet the growing demand for electricity as power generation in the central grid is outstripped by the exponential increase in demand for electricity (Rugumayo 2010). Consequently, the government has been compelled to introduce a load-shedding program that regulates the supply of electricity to ensure equitable distribution in all sectors of the economy. MUK as a public university is thus grossly affected by this program.

During the interviewing process, there were indeed a number of blackouts that lasted sometimes for as long as 6 hours. Unlike a handful of other faculties, The College of Education and External Studies, at the time of data collection, did not have a power back-up plan like a stand-by generator. So when there is power outage, the whole college remains in darkness. This obviously, affects the use of computers. During these periods, it is impossible to use the internet as well. Even though the main university library has a standby generator that is used during these periods of load-shedding, the large student population cannot access the computers in the computer laboratories equitably. This unreliable supply of electricity is among the factors identified by The United Nations Economic Commission for Africa in 1999 which characterize the ICT environment in African higher education institutions and which impede the development of the latter. It goes without saying that a steady supply of electricity is a prerequisite to a well-functioning ICT environment.

6.3.4 Internal Marketing and Reward System

Makerere University seemed to have achieved a significant success in teaching students how to use computers. Indeed there are a number of computer courses that equip students with basic computer skills and especially the office application packages and these are offered at student-friendly rates. As one lecturer claimed, the university also has a program that helps faculty to improve their ICT skills, and this is offered free-of-charge.

Ironically, despite the availability of this training opportunity at the university level for lecturers, only one of the respondents knew about it and had actually taken the course. The rest of the lecturers were not only oblivious of this but had not taken any formal training on how to use technology in their teaching. Perhaps it would not be too farfetched to conclude that individual factors also play a big role in the use of ICT as evidenced by a general lack of interest in taking formal training to use it. As already discussed in the literature review, equipping would-be users of ICT with the requisite knowledge on how to use technology does not only increase their confidence in using it but also makes them use it in a more effective way (Barry et al 2007; Gilmore1998; Fulton et al 2004). But perhaps, this also says something about the level of internal marketing by the university to put ICT at the center of its daily operation and especially in performing its core activity of teaching.

In retrospect, both students and teachers have sufficient knowledge on how to use ICT and the benefits found therein. Paradoxically, all the lecturers (but two) at the CEES do not teach using computers and the internet in the “while” situation. A significant number of students on the other hand, use ICT only when circumstances compel them to and hardly, if ever, on their own accord. The reason for this is, amongst other things, the lack of a comprehensive ICT strategy that involves all the stakeholders and especially the end users that is, students and teachers.

This is congruent to what Stensaker and colleagues (2007) found out in a study conducted in 5 Norwegian HEIs. According to them, the slow- pace of ICT integration in teaching and learning is attributed to the lack of a clear link between

the purpose of integrating it in instruction, the people who are expected to use it and pedagogical considerations. The fact that decision to integrate ICT in instruction is usually an administrative one, the end users are often alienated from the word go. The result is usually an overly ambitious ICT plan that is so much removed from reality on the ground and it is little wonder then that implementing this ICT strategy becomes an uphill task and to a large extent fruitless (Könings et al 2007; Stensaker et al 2007).

This missing link is exacerbated by the absence of internal marketing that would have helped to popularize the use of ICT in teaching and learning. All the students that were interviewed said they did not have any formal trainings offered by the university on how best they could use ICT in their studies. The office application packages concentrate on *how to use computers* and never on *what to use it for*. Efforts by students to use ICT for academic purpose are therefore only *ad hoc*.

That teachers should spend time out of their already overcrowded work schedules to improve their skills on how to use ICT tools warrants a reward system of sorts that would ensure that they are highly motivated to use ICT in the classroom. At MUK, the extra time spent by the faculty to improve these skills is usually a personal initiative that emanates from intrinsic motivation and which effort goes unrewarded not to mention unnoticed. Besides, because of structural conditions that impede the use of ICT in teaching like incessant power-cuts and the absence of other supporting equipment like projectors and public address systems, it is futile to spend time acquiring skills that do not have a chance of being utilized. Needless to say this is a pointer to a dichotomy of purpose in the whole ICT venture. This is evidently one of the reasons why there seems to be a high level of laxity in using ICT at CEES.

7 Summary and Concluding Comments

Pundits of educational technology believe that the use of technology in education is increasingly being perceived as a major catalyst in changing the way higher education institutions perform their core functions. This change includes, amongst other things, change in styles of teaching as a result of the introduction of new instructional artifacts (e.g. LMS, Power Point presentations, projectors etc.), change in students' approaches to learning and change in the way information and educational materials are accessed.

Notwithstanding this ubiquity of ICT in higher education institutions, empirical evidence suggests that its use for academic purposes remains minimal when one compares the latter to other uses. This strikes a chord with the scenario at MUK College of Education and External Studies where students admitted to spending more time on the internet for other reasons other than academic. What stood out was the use of computers as entertainment units and the internet as a communication tool. Yet both students and faculty seemed fully aware of the benefits they could get when they use ICT in instruction. This digital disconnect at the College of Education cannot be entirely attributed to the endogenous and exogenous factors that have been discussed in the preceding section.

That students would decide to use computers and the internet more for other purposes than for academic purpose has very little to do with the aforesaid challenges. However, these inhibitive factors played a role (though a minor one) in discouraging some students to visit the internet rooms at their disposal as the use of these services could not be relied upon.

The aforementioned inhibitive factors are intricately intertwined with all but one (the lack of inter-faculty cooperation) having a somewhat direct link to financial resource limitation. This amalgamation of seemingly insurmountable challenges paints a vivid picture reminiscent of what Adam (2003) describes succinctly as “...clutters of

computers and networks that have either worked badly or are islands of low bandwidth connections with frequent breakdowns". But this need not be the case for MUK College of Education and External Studies.

The onus is on the College to ensure that its academic culture promotes the use of ICT in teaching and learning. This necessarily calls for a steady break away from the over-reliance on traditional chalk and talk method of teaching to a more blended one that would see ICT being incorporated into instruction. Holding onto the aforesaid traditional way of knowledge dissemination is to assume that there is a one-size-fit-all approach in teaching and learning, a presumption that is further from reality (Koller 2012). ICT has the potential to remedy this as it provides for the different learning styles of students and affords the latter a chance to progress (academically) at a pace that would ensure effective learning takes place (ibid.)

As it has been said already, teachers wield immense power in influencing the learning approaches of students. And therein lies a significant opportunity to influence students to use ICT in their studies. Dealing with human resource needs (faculty) would undoubtedly be the first step towards achieving this end. A lot has to be done to internally market the importance of using ICT in teaching and then designing course materials that will impel learners and lecturers to use it in one way or another. This approach, needless to say, should give scholarship precedence.

A recent incident in South African higher education system comes to mind. In January 2012 as the University of Johannesburg opened its gates for new admissions, there was a stampede that left one parent dead and scores injured as people shoved through the gates of the university to try their luck in getting admission to the university. This could pass as an isolated case to some but it in fact exemplifies the desire by many across Africa to access higher education which is still a preserve of the rich or highly talented students. Despite concerted effort by most African higher education systems to increase their respective higher education participation rates that still lags below 10%, there is still not enough space for all the students who qualify to be absorbed into the universities.

Inspired by the need to fill this gap in many parts of the world where there's either lack of capacity to provide education to all who qualify or access is limited owing to the exorbitant costs of education in fee-paying systems, Daphne Koller, a co-founder of "Coursera"⁷ dared leading scholars from the world's top universities- the so called academic heartland- to create free on-line courses that could be accessed by all and sundry if not for anything else but to help in researching how people learn. Though a highly ambitious endeavor, the underlying message is powerful; ICT can help many (including marginalized groups) to access higher education. And to walk the talk, Daphne, together with her contemporaries at Stanford University created an interactive online courseware for different courses at no cost to end users, a gesture that proves that her suggestion was neither farfetched nor unattainable. And if the bulging enrollment rates are anything to go by, the success story of this project is irrefutable. As of August 2012, this stood at a staggering 1.5 million students.

In the final analysis, blending ICT into the day-to-day business of MUK's College of Education and External Studies should not be done for the sake of expediency. Watson (2001) spearheads placing pedagogy before technology. Indeed, stimulating and strengthening the College's academic core should be its *raison d'être*.

⁷ An interactive online courseware where students have access to e-learning materials created by world leading academics for the sole purpose of increasing access to higher education. The courses are offered on-line and are free of any charges.

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Appendix

Interview Guide

Organized in themes around research questions (RQs)

- **Icebreakers**
 - ❖ Introductions
 - ❖ Level of education
 - ❖ Position at the college
 - ❖ Subject combinations
- **RQ1-How and the extent of use**
 - ❖ Is ICT used? If yes, what forms?
 - ❖ For what purpose?
 - ❖ Extent of use?
 - ❖ Accessibility?
- **RQ2-Perceived role of educational technology**
 - ❖ Benefits of using ICT?
 - ✓ Make inferences from the above
- **RQ3-Impediments to ICT use**
 - ❖ Formal training offered?
 - ❖ Course requirements?
 - ❖ Endogenous factors?
 - ❖ Exogenous factors?