UNIVERSITY OF CAPE COAST

ENHANCHING THE USE OF ICT AMONG TUTORS OF WIAWSO COLLEGES OF EDUCATION

ERNEST KWABENA KORANTENG

MARCH 2012

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BY

ERNEST KWABENA KORANTENG

Dissertation submitted to the Centre for Continuing Education of the Faculty of Education, University of Cape Coast, in partial fulfilment of the requirements for award of Master of Education Degree in Information Technology

MARCH 2012

DECLARATION

Candidate's Declaration

I hereby declare that this Dissertation is the result of my own original research and that no part of it had been presented for another degree in this university or elsewhere.

Candidate's Signature:……Date……

Name: Ernest Kwabena Koranteng

Supervisor's Declaration

I hereby declare that the preparation and presentation of the Dissertation were supervised in accordance with the guidelines on supervision of Dissertation laid down by the University of Cape Coast.

Supervisor's Signature:……Date……

Name: Dr. Emmanuel Kofi Gyimah

ABSTRACT

This study investigated the impact of ICT three initiatives as perceived by Wiawso College of Education tutors at an independent school in Sefwi Wiawso. A qualitative data was gathered for this Case Study by administering questionnaire to 43 tutors of the college and two administrative staff. Data were analysed using descriptive statistics.

First and foremost, evidence was found of an overall increase in the use of ICT since the three initiatives were implemented. Secondly, the provision of personal access to a desktop computer was perceived by the teachers to have had the most impact on improving the use of ICT. However, the inclusion of Ubuntu operating systems to Windows operating was perceived by the majority of teachers as having a negative influence on their use and development of ICT.

On the basis of the findings, some recommendations were made; the National Council for Tertiary Education should be made to assist the college by providing more ICT equipment and its accessories. Also, all future ICT professional development program should be based on learning strategies that make a difference in daily practice. Skilled based training should be conducted informally as and when it is needed.

ACKNOWLEDGEMENTS

I am particularly indebted to my supervisor Dr. Emmanuel Kofi Gyimah for his corrections and suggestions to the study. Also, I would like to express gratitude to all those who assisted me in one way or the other to complete the work especially Mr. Awuku Mantey and Mr. Lavoe, English Tutors, Wiawso College of Education. Mr. addae Donkor Science Tutor, Wiawso College of Education .

DEDICATION

To my mother Madam Sophia Simpson, my wife Stella Adu and children

Kwadwo Koranteng and Kwabena Koranteng.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Throughout the world there is awareness of the fundamental role of new Information and Communication Technologies (ICTs) in the field of education. In Ghana, there is growing concern about the use of computers to support teaching and learning in educational institutions. Information and communication technologies (ICTs) are used to gather, analyse, modify and exchange information. The government and the private sector have undertaken a number of initiatives to install ICT-infrastructure in Ghana in order to bridge the digital divide between Ghana and First-World countries (Intsiful, Okyere & Osae, 2003).

In 2003, the Ghanaian government published the policy document 'The Ghana ICT for accelerated development, or ICT4AD' (Republic of Ghana, 2003). This document "sets out the road map for the development of Ghana's information society and economy…" (Republic of Ghana, 2003, p.6). According to this document, its educational aim, amongst others, is to enhance teaching and learning through ICT in all spheres of the education system in Ghana. The computer and the internet are increasingly making their way into teaching and learning practices and processes. The journey towards the effective use of ICT in teaching and learning is often a story of frustration for teachers, students,

parents and administrators. It can involve an apparent threat to past practices that can lead to a clash of ideologies in a culture that is traditionally very slow to make changes.

This study looks at one such journey. It is a case study based in a medium sized, double sex independent school in the Western Region of Ghana. It will be known in this study as Wiawso College of Education. A Teacher Training College like many others around the world, it is trying to offer the best learning environment for students who have never known what it is like to have the Internet and almost instant access to almost any fact there is to know. Like many schools, most of the teachers at Colleges of Education began their teaching careers without a strong focus on the use of ICT. They have developed what they perceived as an efficient and effective teaching and communication practices that have not necessarily included the use of modern ICT. However, the world has changed dramatically over the last 20 years, especially in relation to the use of ICT. Students are immersing themselves in ICT in almost every part of their lives as an effective form of communication, information gathering and entertainment.

This has resulted in pressures being placed on teachers to use similar technologies to enhance teaching and learning practice in the classroom and beyond. There is substantial evidence that supports the use of ICT as a tool to enhancing teaching and learning in schools. However this study was not about justifying the use of ICT in schools. It made the assumption that ICT are established as an essential element of modern teaching practices and consequently enhancing the use of ICT among tutors of colleges of education.

Many ICT boosters are of the view that ICT on its own can promote quality teaching and learning. In line with this metaphor, the need to provide computers in the classrooms often takes precedence over training teachers to acquire skills in instructional design. However, it is evident in the instructional technology literature that good design of the learning task by the teacher is the fundamental requirement for quality teaching.

Statement of the Problem

Most of the tutors in the colleges of education in Ghana developed their career with little idea in ICT. There are principles, methodologies, communication skills and other teaching practices in the various subjects that are perceived as effective and efficiency teaching and learning practices teacher –trainees are to study. However, most of the teaching and learning practices of trainers and teacher-trainees in the Colleges of Education have been masked by ICT and technology advancement over the past 20 years. McKenzie (1998) argued that staff access to computers should be a priority over student access when undertaking ICT reform in schools.

In 2008/2009 academic year, the staff of Wiawso College of Education were initiated to enhance the use of ICT. The project aimed to increase the use of ICT and provide a more relevant, practical and interesting learning environment for its tutors. The initiatives were:

1. The provision of a desktop computer to the office of each department in the college.
2. The implementation of an ICT professional competency development

initiative.

3. The inclusion of Ubuntu operating systems to Windows operating system.

The study therefore looked at development changes that have occurred on the impact of the 2009 initiative in the provision of quality and ICT-based education at Wiawso College of Education and the perceptions of the teachers and leaders on the impact on the project.

Wiawso College of Education was established in February, 1952 with twenty-nine (29) pioneer male students and three (3) tutors at Kumasi. In September, 1964 the then Minister of Education directed that the college be moved to its completed permanent buildings here at Sefwi Wiawso. The first batch of thirty two (32) female students was admitted in September, 1974.The College is currently in transition to tertiary like all other Teacher Training Colleges in the country. The College offers Diploma in Basic Education, in addition to training regular students for the Ghana Education Service (G.E.S).

In view of the above, by 2011 all tutors of Colleges of Education should have acquired a master degree in their various areas of study. This necessitated the tutors to enroll the various graduate programs and undertake research work online using the internet. This brought pressure on the teaching staff to improve their access to computers; especially in this era of computer advancement.

In addition, Wiawso College of Education started encouraging their teachers to add online content that related to the courses they were teaching via the school's Internet. This was most effectively done via a well furnished ICT laboratory with internet access. With all these changes occurring at such a rapid rate, it was felt by the Wiawso College of Education administration that a

formalized ICT professional competency development initiative should be established to help the teaching staff improved their ICT skills and work effectively with the new systems. All changes were made in consultation with the heads of department and the principal of the college.

Purpose of the Study

The study investigates into the impact of the ICT reforms implemented in Wiawso College of education after two years of insertion. This study is more interested in what happens outside the classroom in terms of using ICT to prepare for lessons, lesson delivery, communicating with students online, and the personal and professional development of the tutors.

Research Questions

The following research questions were formulated to address the problem:

1. What developmental changes have taken place towards enhancing the use of ICT among the teaching staff of Wiawso College of Education after the implementation of the three ICT initiatives in terms of:

(i) Use of the internet?

(ii) Use of ICT equipment for teaching and learning?

2.What are the perceptions of tutors at Wiawso College of Education on the impact of the use of ICT after the implementation of:

(i) The provision of a desktop computer each at the offices of heads of department.

(ii) The implementation of ICT professional competency development initiative?

(iii) The inclusion ubuntu operating systems;

3. What challenges are encountered towards the use of ICT?

Significance of the Study

Research has shown that computers are used less often in the classroom than in other organizations. This study will therefore go a long way to bridge the perceived gap in enhancing the use and acceptance of ICT among teachers and students, and improve the use of ICT in the teaching and learning processes.

Delimitation of the Study

The use of ICT in colleges of education is very broad. However, this study will be narrowed down in scope due to time and financial constraint. It therefore confined itself in the use of ICT among tutors in Wiawso College of Education.

Limitation of the Study

This is a Case Study of a college and its implementation on three ICT initiatives. The researcher acknowledges that gathering data from students could have provided some interesting information on how tutors effectively use ICT at Wiawso College of Education within the classroom context. However, no student was surveyed or interviewed because of the duration of the study.

Definition of Terms

Ubuntu operating system - is a computer operating system based on the Debian GNU/Linux distribution. It is named after the Southern African ethical ideology Ubuntu ("humanity towards others") and is distributed as free and open source software with additional proprietary software available.

Windows Operating system - The main computer operating system used in the world today developed by Microsoft.

Professional Competency Development Program - refers to activities that improve self-knowledge and identity, develop talents and potential, build human capital and employability, enhance quality of life and contribute to the realization of dreams and aspirations.

Stakeholders - are any group or individual who can affect or affected by the achievement of schools objectives.

Organisation of the Rest of the Study

This study consists of five chapters that is chapter one, two, three, four and five. Chapter one, the introduction consists of the background to the study, purpose of the study, statement of the problem , researcher questions, significance of the study, delimitation of the study, limitation of the study and definition of term. Chapter two reviews related literature about what other people have said about the problem and the writers own view about the problem. Chapter three deals with methodology aspect which talks about, research design, population, sample and sampling procedure, data collection, data analysis and research instrument. Chapter four talk about result findings and discussion. Chapter five deal with the summary, conclusion and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Overview

This chapter endeavours to explain the rationale behind enhancing the use of ICT among tutor in teacher training college. It outlines some of the wider body of knowledge available on teacher education in relation to:

1. ICT and the learning process;
2. Stages of ICT development for teachers;
3. Recognising ICT integration;
4. Teacher confidence and access to ICT;
5. Change management in schools; and,
6. ICT Professional Development (PD).

ICT and the Learning Process

The development of information communications technologies (ICT) has 'reorganized' the way we live, the way we communicate and the way we learn over the last twenty years (Siemens, 2004). The impact that the use of ICT has on the learning process has been well documented. The use of technology that it '… weaves itself into learning in many more ways than it's original promoters could possibly have anticipated' (Papert, 1993, p.53). Richards (2002) opines that the use of ICT promotes active learning through interactivity, offering

student centred opportunities and innovative approaches. It extends oral and verbal literacies of human communication and access to information allowing '… a focus on lower-order competencies and higher-order generic skills such as problem-solving, collaboration, and transferable applications' (Richards, 2002, p.4). Only a generation ago, once learners had completed their required schooling, they would enter a career that would in most cases remain the same until they retired. Life knowledge and information gain was much slower than it is today. Important facts and general knowledge was measured in decades, whereas today knowledge is growing exponentially and consequently measured in months and years, not decades.

Siemens (2004) recognises some significant trends in learning that have occurred such as, learning does not stop when you leave university; it is a lifelong process. ICT is rewiring our brain functioning; it is defining and reshaping our thinking.

Stages of ICT Development for Teachers

Theories of Learning

Three traditional models of learning, behaviorism, cognitivism, and constructivism, see knowledge as a state or an object that is to be attained or innate within us. Behaviorism is the theory that human and animal behavior can be explained in terms of conditioning and learning is about changing behavior.

Cognitivism views learning in terms of input, processing and output. Learning is viewed as a system of inserting data into short-term memory and coding in into long term memory for latter recall.

Constructivism is the theory that learners are not empty vessels waiting for knowledge, rather they gain knowledge creating meaning from their experiences (Siemens, 2004). He suggests that the traditional learning theories fall short in the modern world of exponential knowledge and developing ICT. He questions how traditional learning theories such as behaviorism, cognitivism, and constructivism are impacted when knowledge is no longer acquired in a linear manner and when ICT can now perform many of the cognitive operations previously required by the learner.

Siemens (2004) suggests that connectivism is a more relevant learning model for today's changing society. 'Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing' (Siemens 2004, p.6).

Connectivism suggests that learning and knowledge is based on a diversity of opinion and that the capacity to know more is more important

information. It relies on the skill to distinguish between important and unimportant information.

O'Neill and Carr (2006), suggest that the modern learner does not feel the need to deeply engage in everything presented to them in the classroom. They describe the modern student the 'connected learner', aware that due to

the exponential nature of knowledge they do not need to remember or understand lots of things but they do need to know where to find information when required.

Principles of Connectivisim

According to Siemens (2004), the principles of connectivism include: Learning and knowledge being based on diverse opinions; The learning process involves connected specialised sources of information; Learning can be found through ICT; The capacity to know more is more important than what is currently known; Continuous learning relies on nurturing and maintaining connections with learning sources. Peck and Wilson (1999) argue that the role of a teacher is to provide students with knowledge on how to learn. They suggest that ICT can support this by '… providing a medium that is constructive, active, authentic and cooperative'.

Johnson, Schwab and Foa (1999), The effective application of ICT is about using the technology to empower students and a teacher to build a learning environment and experience that is exciting and dynamic. This is supported by Clark (2004), the former UK Secretary of State for Education and Skills, who said that ICT should be seen as an integral element of school reform and a very powerful tool for transforming teaching and learning. Lane (2006) argues that to effectively engage our students today, we need to 'reconceptualize our pedagogy to provide a seamless, flexible, interface between the learner and the learning' (Peck & Wilson, 1999, p.15) The effective use of ICT creates classrooms that are exciting to be in, where the norm is to seek information and to

create knowledge, not just expect information to be provided. The use of ICT by teachers can promote a more holistic approach to teaching and learning, moving away from segregated and isolated subjects and classrooms (Johnson, Schwab, & Foa, 1999).

The ICT revolution in education is described by Goodson and Mangan (1995), as reshuffling the cards but not starting a new game. Tearle (2002) discovered a lack of change to existing structures and teaching practices, or evidence of particularly innovative application of ICT. The British longitudinal ImpaCT2 study of ICT and students attainment indicates that teachers are neglecting to use ICT to stimulate higher-level thinking and reasoning and not many teachers are integrating ICT into their curriculum in a way that motivates pupils and enriches learning (DfES, 2001).

Cuban (2001) argues that the use of ICT is incompatible with the requirements of daily teaching. He suggests that teachers either have so many students to teach, or so many subjects to teach (or a combination of the two), that along with the increasing demands of accountability to parents and educational authorities, the use of ICT is simply too difficult. He argues that computers are hard to master and often break down. Therefore, according to Cuban, investing time, money and effort into integrating them into normal classroom practice is not worthwhile and teachers should not be expected to make such efforts.

Becker and Ravitz (2001) suggested that Cuban's arguments may have had some relevance in the mid 1980's when they were first proposed, but not now that ICT has developed to a point where the capabilities, functionality and reliability of personal computers have improved dramatically. They also suggest

that more teachers are adopting a constructivist approach to their teaching and are becoming more accepting of using ICT and providing more engaging learning environments for their students.

Windschitle and Sahl (2002) were of the view that many teachers (especially those with constructivist ideologies) are using computers as collaborative tools for small group problem solving and project based learning. Cuban's (1986) fears have been demonstrated to no longer be relevant. Jukes (2006) even goes as far as to say that is it essential that teachers integrate ICT so they can engage their digital savvy students and foster the vital personal relationships that Cuban (1986) predicted would be destroyed by ICT.

Jukes (2006) argues that today's secondary teachers need to know what their student's experiences are like in order to be able to effectively integrate ICT into the classroom and provide better learning opportunities. Modern teenage students are labeled by Jukes (2006) as digital natives. He adds that having constant exposure to such a wide range of digital media has changed the way young people process and interact with information and they now communicate in different ways than any preceding generation.

Prensky (2001) writes that the current generation of students in the United States expects to be able to communicate with anyone or anything, anytime and anywhere. Jukes (2006) says this is the first ever generation in human history to have mastered society's tools before the older generations have, '…it's their native tongue – a language in which they are digitally fluent'. Jukes describes the current generation of teenagers as living and operating in a '… multimedia, online, multitask, random access, color graphics, video, audio, visual literacy

world' Jukes (2006, p.41). He argues that educational decision makers do not understand this type of world. They know that ICT integration is important but tend to use it to reinforce old mindsets. He says that educators need to immerse themselves in the world of the modern teenager and embrace new technologies even though they may not relate to them or see their relevance.

Gilbert (2005) refers to today's students as the knowledge society; a group that has unique ideas about what knowledge is how it is developed, how it can be used and who owns it. Much of the ideology of the knowledge society challenges many of the assumptions upon which our schools have been established.

Models to Implement ICT

There have been several models developed to help school administrators and ICT coordinators implement ICT reform in their schools. Newhouse (2005) investigated some of these models, with an aim to establish a framework for ICT development in schools that could be adopted by schools in Western Australia. Part of their framework involved establishing clearly defined developmental stages of teachers' development in the use of ICT. They decided on five levels of development:

1. Inaction;
2. Investigation;
3. Application;
4. Integration; and
5. Transformation.

Inaction is when the teacher shows a lack of interest in using ICT and rarely, if ever, uses it or encourages students to use it. Teachers within this developmental stage are labeled as reluctant users, but should not be stereotyped as older teachers who come from a generation who grew up without being exposed to computers. Teachers just out of teacher training can also fall into this category, especially when they are so concerned about adopting basic pedagogy that they neglect to use the basic ICT tools that are such a part of their student's lives (Newhouse, 2005; McKenzie, 1999; Jukes 2006).

Investigation is the stage when teachers have developed an interest in some form of ICT, see its relevance to their teaching and start acting on this interest. This is a stage where many frustrations can arise and if support is not at hand it is a stage that some teachers find hard to break through and either stay at this level or in some cases go back to the inaction stage (McKenzie,1999; Newhouse et al., 2005).

Application is a stage that teachers reach when they are regularly using ICT with their students and in their planning and preparation of classes, as well as with their daily communications with students and other teachers. At this stage teachers are competent and confident with certain software and hardware, but have some trouble when systems change and new ways of doing things are forced upon them (Newhouse et al., 2005).

Integration (which is often confused with application) is the penultimate stage of ICT development for teachers according to Newhouse et al. (2005). This is the stage reached when the use of ICT is critical to the support of the learning environment, and students are provided with a range of ICT related

experiences that enable effective learning outcomes. Newhouse et al. (2005) use the term 'Critical Use Border' to describe the transition between the application stage and the integration stage. They infer that all teachers should be aiming to reach this boarder and pass through it in order to be making the most use of ICT in the teaching and learning process (Newhouse et al 2005, p.8).

Transformation is the name of the ultimate stage of ICT development for teachers according to Newhouse (2005). It is the stage when teachers are so confident with software and the hardware that they are able to take on formal and informal leadership roles in the use of ICT within their school and even subject association within their state or region. Not only are they knowledgeable about effective ICT teaching practice they are also reflective on their own work and the work of other teachers. The aims of the Newhouse (2005) model of ICT reform were to develop a framework that would '… support, describe and promote good practice in the use of ICT in learning and teaching in schools'. They wanted to develop an ICT framework that was multi-faceted and flexible so that it could be adapted for use by individuals, schools or any other educational institution.

Their framework was divided into five main aims:

1. To describe good pedagogy in the use of ICT that effectively supports learning;
2. To help teachers plan the way they can integrate ICT in their classrooms;
3. To describe the progress by teachers as they go through the stages of development that lead to effective ICT integration in quality pedagogy;
4. To help teachers progress through these stages;

5. To provide a basis of discussion for teachers to have conversations about concerns relating to the effective use of ICT with good pedagogy.

Recognising ICT Integration

ICT integration is an advanced level of the use of ICT by teachers. It is described as the seamless and unnoticeable use of technology within the classroom environment, (Fluck, 2003). Newhouse et al. (2005), in his framework on teacher professional ICT attributes, describe the integration of ICT as being when the characteristics of ICT are used and exploited wherever possible to support outcomes based on learning in a constructivist learning environment. They suggest that teachers have reached this stage

they are capable and independent operators, and don't mind seeking advice when required.

Teacher Confidence and Competence with ICT

Not being confident at operating ICT appears to be a significant factor in teachers' lack of use of ICT. It appears that teachers who lack confidence in using ICT will tend to avoid them rather than be shown to be incompetent in front of their students. Larner and Timberlake (1995) found that there was evidence of anxiety among many teachers about showing their students that they did not know how to use certain ICT, and consequently they were less likely to use ICT in the teaching and learning process.

The Becta (2004) survey on teachers' barriers to the uptake of ICT supported Larnet and Timberlake (1995). Becta (2004) found that a lack of

confidence was the area that attracted the most responses. One respondent in this survey wrote that 'too many teachers are too afraid of public humiliation in front of knowledgeable pupils …' (Becta, 2004, p.8). Russell and Bradley (1997) used the word cyberphobia to describe a real concern that some teachers have when using ICT, a strong fear of getting stuck and not knowing what to do next. In their article Barriers to the effective use of technology in education Fabry and Higgs (1997) suggested that the fear teachers have towards using ICT stems from a fear of losing their professional status. They relate the increased use of ICT in teaching as a downgrading of their traditional pedagogical practices.

In contrast, Newhouse et al. (2005) suggest that when describing best teaching practice , teachers blending their traditional pedagogical practices with effective and efficient use of ICT. Cuban (1999) writes that the regular technical problems that occur when working with ICT can have a direct effect on a teacher's confidence, due to a fear that they may cause the technology to break down. Kirkwood (2000) suggests that teacher competence and effective ICT integration are directly related to the training of ICT. They write that if training is inadequate or inappropriate then teachers will not be prepared or confident to use ICT effectively in or out of the classroom. They suggest that inappropriate PD is a major barrier to teachers' use of ICT.

ICT Access for Teachers

Teachers' perceived confidence and competence with ICT is closely related to a lack of access to ICT (Ross, Hogaboam-Gray & Hannay, 1999). Effective use of ICT is more likely to occur if the teaching staff are provided with

sufficient access. This is the argument of McKenzie (1998), who says that it is initially better to provide teaching staff with a computer each as a priority over student access. He contends it is better to have less student access to computers that are used effectively then high access to rarely used computers. What is most important is not so much the physical availability of computers and the Internet, but rather people's ability to use those technologies to engage in meaningful social practices.

The digital divide is partly socio-economic, but it can also be seen in the gap between students' and teachers' abilities to make use of those technologies (Warschauer, 2004). Sager (2003), on the other hand disagrees. He argues that the benefits of providing ICT to teachers over students are a myth. Many schools make the mistake of believing that kids should not have access to computing resources until their teachers know what to do with the computers. This idea is patently ridiculous since kids are already computer fluent and could be used as a learning resource for everyone in the school (Sager, 2003).

Early research into what can occur when teachers are provided with one to one access to computers, such as in the apple classrooms of tomorrow Project, Dwyer (1991) shows that changes in practice tend to occur, such as a progression of a less teacher focused approach to smaller group interactions. Many would suggest that this in turn leads to increased learning opportunities for the students (Polman, 2000; Sandholtz 1997).

Burnes and Polman (2006) suggest that this type of change can take an average of five or more years to implement, so progress can be slow. However there are other studies that have found that increased access for staff does not

necessarily lead to significant changes in teaching practice Hill and Reeves (2004). Burnes and Polman (2006) suggest that giving teachers access to a computer is the first and most obvious step in the long process of promoting the use of ICT. They say that teachers need to familiarise themselves with the technology before adopting it into their teaching practice. Initial use on ICT may involve allowing students to use word processing or drill and practice programs.

However, according to Pianfetti (2001), this is as far as the use of ICT goes for 30% of teachers. Burnes and Polman (2006) suggest that most teachers then progress to more advanced levels of ICT development in their teaching and even transform existing classroom ICT and increased learning opportunities. This is supported by Newhouse et al (2005) and their framework for leading school change in using ICT.

Burnes and Polman (2006), also found that the provision of a computer (laptop or desktop) for teachers, as well as the increased prevalence of computers in teachers' homes, led to a number of teachers skipping the initial adoption and adaptation stages of ICT development (Dwyer, 1991), ACOT (1995) and Newhouse et al. (2005). They also found a strong correlation between efficient ICT development and integration and the provision of specialist and easily available ICT support staff.

Scrimshaw (2004), in his study on what best enables teachers to make use of ICT, found that the most frequent individual factors that enable effective use of ICT were access to a personal laptop, the availability of quality resources, full access to software and hardware at all times, effective technical support, and the availability of good quality Personal Development.

Changing Management in School

Effective ICT integration has the potential to provide the impetus, tools, and new structures to transform the practice, art, and meaning of teaching (Johnson, Schwab & Foa 1999). There are studies that indicate that the traditional chalk and talk or face to face teaching methods are failing to motivate and interest a fair percentage of students in our schools Marsh, (2004). No longer are teachers the provider of information, they have a different pedagogical role as facilitator and skills developer (Lawson & Comber, 1999). The teachers' job is to help students to a greater understanding of the application and evaluation of information that is now so easily accessible (Davis, 1995).

Kearns (2002), study of national and international policies for ICT in education found that, due to technological advances, ICT were now seen as an instrument for the internationalisation of education. It has provided international resources that are able to enrich education and heighten its relevance in a global society and economy. He suggests that the dream to aspire towards an international information environment where information can be freely available to share between teachers, researchers and students is becoming a reality. Kearns (2002), discusses in his study (on policies in ICT and education) that, while addressing the requirements of what he terms the emerging knowledge society, the ten countries studied across Europe, North America, Oceania, and Asia have all had similar issues to contend with including, dealing successfully with the pace of change; addressing the learning and skill requirements of the new era; providing equal opportunities for all citizens; helping business and

industry to adjust to work within the knowledge society; helping individuals and communities deal with the changes; and most relevant to this study, encouraging schools and teachers to cope and deal with the new order.

Teachers are regularly identified as one of the main limitations to the effective use of ICT in the classroom because of their fear of ICT and lack of skill (Lawson & Comber, 1999). The main obstacle for teachers in effectively integrating ICT in their classrooms is that it demands changes in attitudes, knowledge and teaching practice all at the same time (Fullan, 1993). Fullan and Stiegelbauer (1991) argue that the purpose of educational change is to '… help schools accomplish their goals more effectively by replacing some structures, programs and/or practices with better ones' (Fullan & Stiegelbauer 1991, p.15). When questioning the appropriateness of introducing a change it is important to keep two critical questions in mind: Who benefits from the change (students, teachers, parents, administration)? Is the change feasible?

A good idea can represent a poor investment if not well developed or if the resources to support the idea are not available. As in all walks of life in the modern world, change is inevitable, but when introducing change, one must keep in mind who will benefit and whether the ideas are practical and usable. Good ideas in teaching or learning are wasted if resources for implementation are lacking (Fullan & Stiegelbauert, 1991). Postmodern society is a changing society, used to rapid change, especially in areas related to technological advances.

However, most educational institutions are very conservative. 'The way that teachers are trained, the way that schools are organised, the way that the

educational hierarchy operates, and the way that education is treated by political decision-maker results in a system that is more likely to retain the status quo than to change. When change is attempted under such circumstances it results in defensiveness, superficiality or at best short-lived pockets of success' (Fullan, 1993, p.3). He goes on to say that change cannot be expected to occur alongside a conservative system without expecting constant aggravation. Society expects schools to prepare its young people to deal with change, yet in most cases schools are far from fulfilling this expectation.

Fullan (2003) says that effective and lasting change occurs when a collaborative environment is established and appropriate resources are provided. When people see the value in the change they will respond positively. ICT is accepted as an entrenched characteristic of wider society, yet education has been very slow to make that transformation within the classroom (Cuban, 2001).

Steketee (2005), argues that this has been caused by a range of factors such as negative attitudes of teachers towards ICT and inadequate professional development opportunities. Kearns (2002), found that the slow pace of change was not just an Australian phenomenon. His study of policies for ICT in education and training in ten countries across Europe, North America, Oceania, and Asia found that a number of similar reports from around the world reflected disappointment at the slow pace of change and a common thought that current developments needed to be sped up to realise potential benefits of ICT in education.

The Scrimshaw (2004), report, which aimed to help schools and local and national education support agencies to help teachers make better use of ICT in

their classrooms, found that while most of the literature he reviewed focused on the contribution ICT makes to student-centered teaching and learning, most teachers he surveyed preferred a teacher-centered approach. Fabry and Higgs (1997), also support this point, and emphasize the significance of the change that many teachers are challenged with when realising the potential place of ICT in the classroom and how this can affect their day-to-day practices.

ICT can be used effectively to enhance teaching and learning both in a student-centered and teacher centered classroom environment. The difference between a student-centered and teacher centered models of teaching with ICT is well explained by Gibson (2001) in the following anecdotes. This is an example of a teacher-centered ICT environment model…'At James Madison High School in New York City, 10th grade students (age 15 years), mostly African American and Latino, file into a networked computer lab and find seats at large new monitors and keyboards … James Madison is a large school in a middle-income neighbourhood, but nearly all the students are poor and working class. Drugs and violence are a recurrent problem.

The computer lab, however, is a relative haven: it is quiet here, and as students enter their names into the computer, they find that the software program greets them warmly by name, remembers exactly where they were when they left off the day before with their work, and gently guides them through well-designed exercises in biology, algebra, and American history, praising successful answers and offering patient prompting and another chance - without a hint of judgment - when they miss an answer. The teacher, who monitors the students' individual workstations from a central machine of his own, moves

around the room, helping students with technical problems, finding files, and printing,. The student's work well and mostly silently until the bell rings fifty minutes after they entered the room. In the chaotic context of James Madison, technology is the vehicle of a more individualized, effective - and possibly humane instruction than students might otherwise get' (Gibson, 2001 p.53).

Both the student-centered and teacher-centered models of using ICT have value, and Scrimshaw's (2004) findings indicate that the teacher-centered model is the most widely used. Yet authors such as Fabry and Higgs (1997) argue that the student-centered approach, even through harder to implement, is the preferred model that will lead to more effective learning and teaching. They suggest that for teachers to develop their use of ICT, and reach a stage where they are effectively integrating ICT in the learning and teaching processes, and then a student-centered approach is preferable.

One of the questions coming out of this study is whether or not such an approach is possible at a school like Wiawso College of Education that has limited access to ICT within the classrooms and relies on one to one student to computer access via computer laboratories. The Scrimshaw (2004) literature review indicates a range of strategies that can be put in place to help support teacher development in the use of ICT, these are divided under two headings: school based strategies and externally supported strategies.

School based strategies include ensuring that the role of the school leadership is central to enabling their teaching staff to engage in innovation. Creating a vision statement, a needs assessment and a whole school development plan are three important planning elements. Providing access to

resources that the teachers actually want and need is essential. A variety of ICT Personal Development approaches are required to suit the level of each teacher's progress. Coordination of reliable technical support is recommended.

External supported strategies include using ICT to interact with the local community. Making closer connections with the real work outside the school. This helps make the learning experiences more authentic and within a relevant context. Using ICT to interact with other schools and other teachers. This can help teachers to sustain their motivation and share approaches to the use of ICT. Using external ICT Personal Development agencies to provide expert help and advice. Encourage the staff to participate in local, state wide and national ICT projects and conferences. Teachers are able to gain knowledge and confidence in their own use of ICT by these educational experiences provided by such initiatives.

Linking with other teachers via email lists, electronic networks, blogs and Internet based forums. This can benefit teachers by providing opportunities for expressing good practices and help develop confidence, motivation and better access to information and research, (Scrimshaw, 2004).

ICT Professional Development

Teachers need help integrating ICT in their teaching. Burns (2002), and Burnes and Polman (2006), suggest that most teachers are bound to be anxious about integrating ICT, as few of them have seen good practice modeled as part of their own educational experiences. They suggest that today's teachers need to

be provided with opportunities to participate in communities of learning with their colleagues. This will help them model good practice with each other and encourage effective ICT integration in their classrooms.

Meredyth et al. (1999), study found that the computer training offered to teachers was generally not adequate for their needs, nor were the facilities and ongoing technical support. They also found that the majority of schools that they studied relied on one person at the school to provide the training as well as the ongoing upkeep of the technology. One third of the Principals who were surveyed as part of this study agreed that their Personal Development in this area was not adequate, and that there are consistent gaps between what training is being offered and the extent to which teachers are making use of this training in the classroom.

'Those teachers with greater access to training in the school are most likely to undertake it and they are most likely to make use of … Teachers' use of information technology is directly linked to the level of resourcing and planning in the school, to their access to computers, to the availability of software and to the degree of support provided to in-service education, including time release and opportunity for professional recognition and promotion' (Meredyth et al., 1999, p.33).

The Time Factor

Two of the barriers preventing school leaders effectively integrating ICT into their schools are the lack of perceived time for PD and the often negative attitude toward technology and change (Jones, 2004; Salmon, 2004;

Sandholtz et al., 1997). Teachers need time in order to get to a stage that they are comfortable with ICT, and therefore feel sufficiently confident to integrate it into their teaching. Becker (1999), shows in his research that the type and amount of ICT used in the classroom is determined by the preferred teaching style of the teacher. He found that no matter how much access the teacher had to ICT, a traditional teacher was far less able to integrate it than a constructivist teacher. He argues that one of the major aims of ICT PD is to help the traditional teacher to use constructivist methodologies when appropriate, and therefore enhance learning opportunities for students.

If school administrators expect to see a good return on their investments in ICT infrastructure, they must foster and fund a school culture intent on continual change and learning (McKenzie, 1998). The expectations of the effective use of ICT must be accompanied by PD resources such as teacher support, mentors, study groups and time release.

CHAPTER THREE

METHODOLOGY

Overview

This chapter talks about the method adopted in gathering data for the study. It emphasizes the research design, the population and sample selection, the sample and sampling technique, and the research instrument.

Research Design

The design used in this study is a Case Study. A case study is an all encompassing method which involves research design, data collection and analysis strategies. It is not just a method of data collection, nor a research design feature, but a comprehensive research strategy that allows researchers to '…retain the holistic and meaningful characteristics of real life…' (Yin 2003, p.2). Hitchcock and Hughes (1995), further suggest that, the case study approach is particularly valuable when the researcher has little control over events. They consider that a case study has several hallmarks;

It is concerned with a rich and vivid description relevant to the case;

It provides a chronological narrative of events relevant to the case; It blends a description of events analysis of them and; The researcher is integrally involved in the case. According to Nisbet and Watts (1984), a case study provided a unique example of real people in real situations enable readers to 'understand

ideas clearer than simple by presenting them with abstract theories or principles. (Lincoln & Guba, 1985 p.358), claim that case study enable detailed probing of an instance in question, rather than mere surface description '… they are … epistemologically in harmony with the reader's experience…a …fitting capstone to the continuous reporting process that characterises naturalistic inquiry…'.

Population

This research is conducted in Wiawso College of Education in the Western Region of Ghana. The target population for the study consisted of all the 43 teaching staff of the college and two administrative staff.

Sample and Sampling Procedure

This is a Case Study of a double sex Teacher Training College in the Western Region of Ghana. A total of 43 tutors constituted the entire population of the teaching staff and two administrative staff. Out of this number, 42 were male and three were female.

A census was used. This stems from the fact that the researcher knew that all the tutors of the college were going to be his respondents. Census sampling is form of sampling in which the selection of the sampling is based on the judgment of the researcher as to which subjects best fit the criteria of the study. The researcher chose the sample based on who he thought would be appropriate for the study. The data gathered for this study was found from a questionnaire given to Wiawso College of Education teaching staff about the use of ICT and

leadership team (Vice principals' academic and administration) who were instrumental in the initiation.

Research Instrument

The researcher used only the questionnaire in gathering research data. Questionnaire is a data collection tool in which written questions are presented that are to be answered by the respondents in written form. Hand-delivering questionnaires are given to the respondents and collected later.

According to Amedahe and Asamoah-Gyimah (2002), a questionnaire consists of a list of questions or statements relating to the aims of the study, in which the respondents are required to answer by writing. The questionnaire was made up of 15 items. All the items were closed ended questions. Closed ended questions are an appropriate means of asking questions that have a finite set of answers of a clear-cut nature. Closed ended questions are less time consuming for the respondents to complete, they allow the researcher to ask more questions. They avoid problems of interpreting respondents' handwriting. However, if poorly designed, closed ended questions may be misleading and frustrate respondents, (Nueman, 1994). The questionnaire was used to gather data on enhancing the use of ICT among tutors of Wiawso College of Education.

The quality of the research instrument is determined by both its validity and reliability. According to Amedahe and Gyimah (2002), validity is a unitary concept that requires evidence for the specific use that is cited. Validity is the most single and important aspect of an instrument and findings that result from the data. The questionnaire was structured around the following questions;

Background questions; This section was concerned about information of the respondents, it dealt with gender, the respondent was to indicate either male or female; this is to ensure full participation of the teaching staff, Number of years they have been teaching, Class and indicate the Key Learning Area (KLA) that they teach.

Tutors' use of ICT, This section aimed at gathering data about any changes that had taken place in the tutors use of ICT at Wiawso College of Education and to determine which of the initiatives discussed in this study had potentially had the most influence the developmental changes that had taken place towards enhancing the use of ICT after the implementation of the three ICT initiatives in terms of the use of ICT equipment for teaching and learning through the use of the internet.

Factors that influence the integration of ICT; this section gathered data on the level of influences that the tutors felt were significant factors to their use of ICT integration in their teaching. No names were recorded to provide confidentiality and encourage tutors to provide data less at risk of bias or inaccuracy due to possible identification. A plain language statement accompanied each questionnaire explaining the aim of the study and the fact that the questionnaire only applied to tutors who had been at the school before 2009.

Data Collecting Procedure

The researcher personally administered the instruments during the normal school hours to ensure more cooperation from the respondents. A letter was obtained from the Principal of Wiawso College of Education. The letter

explained the purpose of the data collection. There were no problems in connection with administering the instruments and 100% return rate.

Data Analysis

Data analysis involves examining the assembled relevant data to determine how the respondent answered the research question(s). According to Merriam (1998), data analysis is the process of making sense out of data involving consolidating, reducing, and interpreting what people have said and what the researcher has seen and read.

The data collected from the questionnaires analysis was analyzed using qualitative analysis. All the responses of the participant were summed up and percentages were assigned to the responses. Data and percentages were analysed using descriptive statistics.

CHAPTER FOUR

RESULTS AND DISCUSSION

Overview

The study was designed to enhance the use of ICT initiatives among tutors of Wiawso College of Education. Forty three tutors were involved in the study. The data was organized in the form of a frequency table. The results were then interpreted and discussed.

Background Characteristics of the Respondents

The data generated from the questionnaire on the background characteristics of the respondents was not directly related to answering any of the main research questions. However it provided some interesting background information. It also confirmed that fair cross sections of staff were represented in the survey. Question one to three of the survey helped to determine the background of the tutors in Wiawso College of Education in relation to teaching experience, subject area, and whether they mostly taught levels 100 or 200.

Experience of staff

Majority of the tutors 26 (60%) who responded to the survey have been teaching for 10 or more years, 11 (25%) have been teaching for 6 to 10 years. Those who had taught for less than 6 years were (15%). As the use of ICT has

only been a major issue in tertiary education for about 10 years, it is reasonable to assume that most of the tutors at Wiawso College of Education have spent much of their careers not using ICT in their teaching. Therefore, any change in practice in this area is significant, as most of the teachers would have established their teaching methodology well before they were introduced to computers.

Teaching experience at Wiawso College of Education

Respondents were asked to indicate the number of years they have taught in Wiawso College of Education,

Table 1: Teaching experience at Wiawso College of Education

Years of teaching Experience	No.	%
10 or more years	26	60
6 to 10 years	11	25
0 to 5 years	6	15
Total	**43**	**100**

Source: Field data, May 2011

Key Learning Areas

Out of the 43 respondents, 11 (25.6%) came from the Department of Social Sciences, Seven (16.3%) from the English and Languages Department, eight (18.6%) came from Mathematics and ICT, seven (16.3%) identified that their main teaching area was Science, Five (11.6%) each from the Technical and Education departments.

Key Learning Areas

Respondents were asked to indicate their key learning area

Table 2: Key Learning Areas

Learning Areas	No.	%
Social Sciences	11	25.6
Languages	7	16.3
Mathematics and ICT	8	18.6
Science	7	16.3
Technical	5	11.6
Education	5	11.6
Total Respondents	**43**	**100**

Source: Field data, May 2011

Main Research Questions

In the following sections, an attempt is made to use the data gathered to answer the research questions.

Research Question 1: What developmental changes have taken place towards enhancing the use of ICT among the teaching staff of Wiawso College of Education before and after the implementation of the ICT initiatives in terms of:

(i) Use of the internet?

(ii) Use of ICT equipment for teaching and learning?

Use of the Internet to search for information before and after the initiative.

Respondents were asked to indicate whether they were using the Internet to search for information before and after the initiative

Table 3: Use of the Internet to search for information before and after the initiative.

	Before		After	
Response	No.	%	No.	%
Yes	10	2.3	38	88.4
No	33	76.7	5	11.6
Total	**43**	**100**	**43**	**100**

Source: Field data, June 2011

Item 5 on the questionnaire asked the tutors if they were using the internet to search for information before the initiatives. It can be seen from table three that, prior to the initiatives only 10 (2.3%) respondents used the internet to search for information. However after the initiatives, 38 (88.4%) of the respondents were using the internet to search for information. What this means is that the initiatives have boosted tutors use of the internet to search for information. Cuban (2001) is of the view that ICT is compatible with the ever-increasing requirements of day-to-day teaching, with so many students to teach, and so many subjects to teach as well as an increasing demand of accountability

to parents and educational authorities, teachers need ICT and the internet to make their work easier and successful.

Use of the Internet to gather Information to prepare Lessons for Teaching before and after the Initiative.

Respondents were asked to indicate whether they were using the internet to gather information to prepare lessons for teaching before and after the initiative.

Table 4: Use of the internet to gather Information to Prepare Lesson before and after the initiative.

	Before		After	
Response	No.	%	No.	%
Never	37	86.0	0	0
Rarely	3	7.0	0	0
Occasionally	2	4.7	5	11.6
Often	1	2.3	38	88.4
Total	**43**	**100**	**43**	**100**

Source: Field data, June 2011

Item 6 on the questionnaire sought to find out whether tutors used the internet to gather information to prepare lessons before and after the initiatives. Statistics on table 4 shows that most of the respondents 37 (86%) never used the internet to gather information before the initiatives. Only 1 (2.3%) respondent

often used the internet to gather information to prepare lesson. However, the same table revealed an increase in the use of the internet after the initiatives. About 38 (88.4%) of the respondents now used the internet to prepare lesson. The increase signifies that the initiative has really boosted tutors use of the internet to gather information to prepare lesson.

Communication with students via online before and after the Initiatives

Respondents were asked to indicate whether they were communicating with students via online before and after the initiatives. Their responses are shown in Table 5.

Table 5: Communication with students via online before and After the Initiatives

	Before		After	
Response	No.	%	No.	%
Never	41	95.3	27	62.8
Rarely	2	4.7	11	25.6
Occasionally	0	0	3	6.9
Often	0	0	2	4.7
Total	**43**	**100**	**43**	**100**

Source: Field data, June 2011

Item 7 on the questionnaire sought to find out whether tutors were communicating with students via online before the initiatives. Table 5 clearly shows that before the initiatives 41 (95.3%) of respondents never Communicated with students via online before the initiatives. However, there were 27 (62.8%) respondents who communicated with their students via online, this shows a drop in the number of tutors who did not communicated with their students via online.

The Table 5 shows that whereas none of the tutors 'often' used the internet via online to communicate with their students before the initiatives, at least two (4.7%) did that after the initiatives. In all, tables 3, 4 and 5 have indicated that most of the tutors were not using the internet to gather information to prepare their lesson plan for teaching before the initiatives. However, the same tables have indicated majority of the tutors are now using

the internet as a result of the initiatives, as well as a significant improvement in the use of internet communication to students via online by tutors.

Use of ICT Equipment for Teaching before and after the Initiatives

Respondents were asked to indicate whether they were using the ICT equipment in their teaching before and after the initiatives. Table 6 shows the responses from the respondents.

Table 6: **Use of ICT Equipment for Teaching before and after the Initiatives.**

	Before		After	
Response	No.	%	No.	%
Never	28	65.1	0	0
Rarely	6	14.0	0	0
Occasionally	6	14.0	5	11.5
Often	3	6.9	38	88.4
Total	**43**	**100**	**43**	**100**

Source: Field data, June 2011

Item 8 on the questionnaire sought to find out about the use of ICT equipment in the tutors teaching before the implementation of the initiatives. Table 6 shows that most of the tutors were really not using ICT equipment before the initiatives. Most of the tutors, 28 (65.1%) had never used ICT equipment during teaching, six (14%) occasionally used ICT equipment before the initiatives. However two years after the implementation of the initiatives, majority of the respondents 34 (88.4%) of the respondents improved their use of ICT equipment in their teaching, while 11.6% of the respondents did not realize any significant change. Papert (1993) opines that the use of technology in teaching and learning is the right thing to practice, it is now weaving itself into learning in many more ways than its original promoters could possibly have anticipated.

Research Question 2: What are the perceptions of tutors at Wiawso College of Education on the impact of the use of ICT after the implementation in terms of:

(i).The provision of a desktop computer each at the offices of head of department.

(ii). The implementation of ICT personal development program?

(iii).The inclusionof ubuntu operating systems?

Provision of Desktop Computers each at the head of department offices

Respondents were asked to indicate whether the provision of desktop computer at the offices of their head of department increased the integration of ICT in their teaching. Table 7 provides the responses.

Table 7: Desktop Computer at head of department offices increasing Integration of ICT Teaching

Response	No.	%
Not at all	0	0
Minimal	6	13.9
Significantly	15	34.8
Greatly	22	51.3
Not applicable	0	0
Total	**43**	**100**

Source: Field data, June 2011

Item 11 on the questionnaire asked the respondents to indicate whether the provision of a desktop computer at the offices of heads of departments increased the integration of ICT in their teaching. Statistics in table 7 indicate that 22 (51.3%) of the respondents agreed that the computers have helped them greatly. Another respondents 15 (34.8%) indicate that the computers have helped them significantly, whilst 6 (13.9%) of the respondents indicate minimal improvements. This revealed that majority of tutors were impressed about the provision of a desktop computer at the offices of heads of departments.

Johnson (1999) opines that ICT integration is about empowering teachers to build an exciting and dynamic learning environment. McKenzie (1998) is of the view that teachers should be given priority to ICT access over students, the greater the access to ICT for staff, the more effective the overall ICT integration throughout the school.

Computer Competency Professional Development Initiative

Respondents were asked to indicate whether the computer competency professional development initiative increased the integration of ICT in teaching. Table 8 provides the responses.

Table 8: Computer Professional Development Program

Category label	No.	%
Not at all	0	0
Minimal	0	0
Significantly	29	67.4

Table 8 Continued

Greatly	14	32.6
Not applicable	0	0
Total	**43**	**100**

Source: Field data, June 2011

Item 12 on the questionnaire asked the respondents to indicate whether the computer competency professional development initiative has increased the integration of ICT in their teaching. Statistics on table 9 show that 29 (67.4%) of the respondents significantly improved their use of ICT, while 14 (32.6%) of the respondents greatly saw improvements in the use of ICT in their teaching. The statistics therefore signify that the initiatives have enhanced tutors' competency level in the use of ICT. Becker (1999) opines that one of the major aims of ICT personal development should be to encourage traditional teachers to use it to enhance learning opportunities for students. In support, McKenzie (2001), is of the view that the most effective personal development in ICT should be based on learning strategies that make a difference in daily practice and lead to better teacher performance.

Addition of Ubuntu Operating System

Respondents were asked whether the inclusion of Ubuntu operating system to windows operating system has increased the integration of ICT in their teaching. Table 9 provides the responses.

Table 9: Inclusion of Ubuntu Operating System

Category label	No.	%
Not at all	2	4.7
Minimal	12	27.9
Significantly	14	32.5
Greatly	13	30.2
Not applicable	2	4.7
Total	**43**	**100**

Source: Field data, June 2011

In responding to the item, statistics on table 8 indicate that most of the respondents 14 (32.5%) embraced the inclusion of new operating system. There 13 were (30.2%) who indicated great improvement. This result therefore signifies that majority of the tutors have accepted the inclusion of the Ubuntu operating system. Surran (2003), reflects on a comparable change to open source software in a school in USA, he opines that a surprising benefit of the change to Linux was the enthusiasm of the teachers to learn something new and different, He had to work very hard to maintain teachers' interest and enthusiasm. He concluded that teachers were fascinated with the change to Linux. They recognised that they were learning something new that is on the cutting edge of technology.

Tutors' views on the Use of ICT in Teaching and Learning Process

Item 13 on the questionnaire asked the respondents to state their own view on the use of ICT in their teaching and learning process. Here are some of the

responses from the respondents: *A respondent said* ...'in general I would say my skills have increased and improved in the use of ICT in teaching and learning processes'. *Another respondent said* ... 'the fact that we're working in school has made such a serious commitment to ICT means that we have to use ICT, it's our professional responsibility'.

Lloyd (2005) is of the view that, it is not about using ICT in the classroom but is more about not noticing the technology within the classroom environment.

Factors influencing Integration of ICT in Teaching

A respondent said: 'having a desktop computer at each desk and in front of each tutor provides a very strong impetus to go ahead and integrate ICT'. This may mean that the personal development competency initiative helps to fill in the gaps'. *Another respondent said,* 'having a computer in front of you as a tutor means you are more likely to jump on it and use it to prepare class activities, communicate with students, do some research on the Internet. In a sense, it forces you as a tutor to use it because it is there'. *Another respondent made similar comments*, 'I think the desktops had the most influence on the use of ICT generally amongst the teaching staff, the other initiatives flow on from providing good immediate access to the staff'.

Lloyd (2005) opined that ICT integration is a seamless and natural interaction with technology in and out of the classroom. Papert (1993) was of the view that effective ICT integration is being woven into the learning process, not to be experienced as an optional extra resource outside of the normal learning environment.

Which of the Three ICT Initiatives Had the Most Influence?

One of the respondents said, 'definitely the computer on the desk'. However, another respondent gave equal weighting to all three ICT initiatives, by saying, 'In relation to which initiative has had the most influence for the general teaching staff it would be hard to separate them. All the initiatives work hand in hand, a bit like the chick and the egg. If the access is not available for staff to practice their skills then they won't be encouraged to integrate ICT'.

Research Question 3: What challenges are encountered towards the use of ICT?

Challenges encountered towards the use of ICT

Item sixteen on the questionnaire sought to ask Tutors to indicate the area(s) they encountered difficulties during the program.

Table 10: Challenges encountered towards the use of ICT

Challenges Encountered	No.	%
Ubuntu Operating System	33	76.7
Internet Usage	6	14.0
P D C Initiative	4	9.3
Total	**43**	**100**

Source: Field data, June 2011

Statistics on table 9 show that 33(76.7%) of the respondents encountered challenges during the inclusion of the Ubuntu operating system. However six (14%) of the respondents indicated their level of challenges encountered with the use of internet to gather information. While four (9.3%) of the respondents said they encountered challenges during the implementation of the personal competency development initiative. These results signify that although most of the respondents said the initiatives have been successful, some of the tutors indicated that there were few challenges encountered during the initiatives.

Nature of Difficulty during the Initiatives

Item 17 on the questionnaire sought to ask respondents to indicate the nature of difficulty they encountered during the initiatives.

A respondent said, 'at times, it's a bit frustrating when some of the CD's will not work in the Ubuntu computers … I still have a Windows computer and a Ubuntu computer on my desk, and I use 90% Windows 10% Ubuntu …many science CD's and maths CD's we can't use… those two departments are quite anti Ubuntu platform because … the change from Windows to Ubuntu has been negative. If everyone had Windows again, there'd be a lot more positive use with computers'.

Another respondent said……'The Ubuntu operating system has had a considerable negative effect on my use of ICT in science and math teaching. Previous word processed files containing tables and symbols cannot be used on staff desktop computers'. *Another respondent also said* ...'we have had the whole confusion and problems, Ubuntu and Word.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Overview

This chapter presents the summary, the conclusions drawn from the study and the recommendation for improving the use of ICT among tutors of Wiawso College of Education.

Summary

The aim of this study was to investigate what development in tutors' use of ICT occurred at Wiawso College of Education as a result of the implementation of three ICT initiatives. The college acknowledged these concerns and in an attempt to address them implemented three ICT initiatives namely:

1. Tutors' use of the internet to gather information and the use of ICT equipment for teaching and learning;
2. The provision of the desktop computer for each head of the department's office and the inclusion of ubuntu operating systems;
3. The implementation of ICT personal competency development initiative.

The target population for the study consisted of a total of 43 teaching staff and two administrative staff. Out of this number, 42 were male and three female. Purposive sampling procedure was used because the researcher knew that all the tutors of the college were going to be his respondents. Questionnaire was the main research instrument used to gather research data from the

respondent. Data and percentages were analysed using descriptive statistics that is frequencies.

Main Findings

The findings revealed that several developmental changes had taken place since the introduction of the three ICT initiatives. Majority of the tutors have had improvement in the use of the internet to gather information to prepare their lessons before teaching and access the electronic mail. In addition, it came to light that tutors used ICT equipment to improve teaching and learning.

Again, majority of the respondents perceived that they had improved the quality of their use of ICT as a result of the provision of a desktop computer each at the offices of heads of department. This was perceived by the tutors to have had the most impact on improving the use of ICT. It was also revealed that tutors can now have access to computers for their use any time they want them and it has increased their patronage.

The inclusion of ubuntu operating systems in addition to Windows operating systems was perceived by the tutors as having a positive influence on their ICT development. Tutors indicated that, they can now choose either of the two operating systems as and when they need them. On the professional competency development initiative, the study revealed that majority of the tutors can use the computer to perform various tasks. In terms of the challenges encountered during the initiative, some of the tutors indicated that the Ubuntu operating system was very challenging to learn.

Conclusions

The results of the study have been significant. The tutors of Wiawso College of Education perceived ICT as a very potent tool in their teaching and learning. The provision of desktop computers on the desks of the teaching staff for their professional use has been very successful in generating interest in ICT and promoting greater use of ICT. The ICT professional competency development initiative has equipped tutors' ICT skills significantly. The inclusion of Ubuntu operating system to Windows operating systems has had a positive impact on the initiative.

Recommendations

In the light of the findings of the study, the following recommendations were made:

1. There should be the provision of more access to computers in and around the classrooms for the tutors and students to have immediate access as and when they require it. This could be done through providing pods of desktops in the classrooms, facilitating a laptop program or introducing the use of wirelessly networked Personal Digital Assistant (PDA) for staff by the school.
2. All future ICT professional development initiatives should base on learning strategies that make a difference in daily practice. Specific ICT skills should be taught within the context of how they can be used in a realistic and practical setting. If tutors are shown why the buttons need to be pressed, in what context they should be pressed, and how this will enhance learning opportunities for their students, they are more likely to improve ICT in their

teaching and eventually reach the stage where they are effectively integrating ICT in the learning and teaching process.

3. The National Council for Tertiary Education (NCTE) should be made to assist the college by providing more ICT equipment and its accessories.

Areas of Further Research

To further extend the literature and perceive potential in the use of ICT by teachers, the following recommendation for further studies are made:

1. Investigating into how students benefit from teachers' use of ICT and its integration in their teaching and learning processes.
2. A comparative study is run in other Colleges of Education which have had the benefit of the three ICT initiatives in the country.
3. A follow up study should be made to determine how significant the initiatives are potentially reaching the stage of effective ICT integration in the teaching and learning process.

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APPENDIX

APPENDIX A

RESEARCH STUDY QUESTIONNAIRE FOR TUTORS

In line with enhancing the use of ICT among tutors of Wiawso College of Education, this questionnaire is aimed at determining the developmental changes that has taken place before and after the ICT initiatives. Please you have been selected to be part of this study. Your role is to provide relevant information that will help the researcher determined the extent to which the initiatives have been significant. In responding to the items, please be candid.

I assure confidentiality so do not write your name anywhere in the questionnaire. Thank you.

Section A: Background Data of Respondent

Indicate your choice by ticking the appropriate box and feel free to comment where necessary**.**

1**.** Gender: Male ☐ Female ☐

2. How long have you been teaching?

0-5 years ☐ 6-10 years ☐ More than 10 years ☐

3. What class (es) do you currently teach? Level 100 ☐ Level 200 ☐

Both 100 and 200 ☐

4. Indicate the Key Learning Area(s) that you teach. (Please, tick applicable ones)(English Language, Ghanaian Language, Home Economics, HIV, ICT, Mathematics, Music, Physical Education, Science, R.M.E, Technical) a)……b)……

Other …….

Section B: Tutors' Use of ICT Prior to the ICT initiatives

5. Do you often use the internet to gather information to prepare for your lesson before the program? Yes ☐ No ☐

6. How often did you use the internet to gather information to prepare for your lesson before the program?

Nearly every class ☐ Often ☐

Occasionally ☐ Rarely ☐ Never ☐

7. Did you communicate with your students via online in terms of assessment and feedback before the program?

Nearly every lesson ☐ Often ☐

Occasionally ☐ Rarely ☐ Never ☐

8. Which of the following best describe how you use ICT equipment in your teaching before the three ICT initiatives?

Nearly every lesson ☐ Often ☐

Occasionally ☐ Rarely ☐ Never ☐

Section C: Tutors' Use of ICT After the ICT Initiatives

9. Which of the following best describes your use of ICT in your teaching (preparation and delivery) after the three ICT initiatives?

Nearly every class (lesson) ☐ Often ☐

Occasionally ☐ Rarely ☐ Never ☐

Question	Not at all	Minimally	Significantly	Greatly	Not applicable
10. Has the provision of a desktop computer at the offices of head of department increased the integration of ICT in your teaching?					
11. Has the computer competency professional development program increased the integration of ICT in your teaching?					
12. Has the inclusion of Ubuntu operating system to Windows operating system to increase the integration of ICT in your teaching?					

13. State your view on the use of ICT in the teaching and learning process

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14. What other factors influenced the integration of ICT in your teaching

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15. Which of the Three ICT Initiatives Had the Most Influence?

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16. Tick the area(s) you encountered difficulties during the program. ☐

PD programme ☐ Ubuntu operating system ☐ Internet usage

17. Describe the nature of the difficulty in relation to Q16. above.

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Thank you for the information.