Factors Affecting ICT Adoption in Tertiary Institutions in Ghana: A Case of Kwame Nkrumah University of Science and Technology

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Abstract

Ghana as a country has made ICT its cornerstone for development, this is evident from its ICT policy of ICT4D; part of this policy is to promote ICT in schools in other to turn the country into an information society. This study is to help understand the factors affecting ICT adoption and use in tertiary institutions in Ghana. This is an imperial study utilizing both qualitative and quantitative methods of data collection. The study showed that perceive usefulness and ease of use is a primary factor driving ICT adoption. The study also revealed that ICT is not fully integrated in teaching, research and learning at KNUST. A major obstacle is that though most users are aware of the potential benefits they are not ready or unwilling to fully embrace ICT. Several factors were also identified including inadequate infrastructure and skills to use ICT. The study recommended that management of Tertiary Institutions in Ghana must have a clear model of integration that will help to increase the adoption and use of ICT in their institutions. In fact, the integration of ICT is associated with several factors that encourage and discourage the use of ICT which the researcher termed as enabling forces and restraining forces. Therefore, to increase the rate of ICT adoption, Tertiary Institutions need to improve the encouraging factors and reduce the discourage factors to a minimal.

Keywords: ICT Adoption, Tertiary Institutions, Ghana, Model of Integration, ICT4D.

1. Introduction

Information and communication technology (ICT) is playing a major role in shaping 21st century global education and making impact on tertiary education. Within the past two decades, the ways people in tertiary institutions teach, research and learn have been affected by ICT. Bayindir and Inan (2009) were of the view that, ICT is dramatically affecting the way people teach and learn. Technology can change how people teach, research and learn in our tertiary institutions if the appropriate factors that affect its adoption and use are improved and the core functions of the universities are align with it. ICT creates a powerful teaching, research, learning environment and it transforms the learning and teaching process in which students deal with knowledge in an active, self directed and constructive way to benefit the people (Volman and Van Eck, 2001). The Vision of Ghana developing to attain the status of a middle income country by the year 2012, higher usage of ICT in tertiary institutions may present great opportunities in its achievement.

Technology should be used as a tool to support the educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving which are important for the preparation for knowledge (Drent and Meelissen, 2007) and not as substitutes for it. It will be highly difficult if not impossible to deal away with the traditional method of teaching, research and learning in tertiary education. ICT is an important instrument to support new ways of teaching, research and learning. With the challenges facing the conventional education service delivery in Ghana, under the right conditions, ICT can have a significant impact on education. It can improve the teaching, research and learning process by reforming traditional delivery systems, enhancing quality of learning and sustaining lifelong learning. ICT is very vital in tertiary education hence it should be integrated in our educational pedagogy but not as a sole means of teaching especially in our part of the world where ICT infrastructures are not adequate as study by Becker (1994) on the effect of technology on education indicated that, ICT facilities are not adequate among private and public universities in Ghana**.** The reality is that technology is most often employed to supplement traditional way of teaching, research and learning and have not been fully integrated into learning activities in Ghana. With the challenges facing the conventional education service delivery in the country, government is working to breach the technological gap through improvement in ICT infrastructure and encouraging the use of it in education through its laptop for each students programme, but its impact will not be felt if the factors that affect its usage are not known. UNESCO believes that under the right conditions, ICT can have a significant impact on the expansion of teaching and learning opportunities to wider populations (UNESCO, 2002).

Although ICT may facilitate independent self-paced learning, the potential of ICT may not be optimized if it is not adopted and use for teaching, research and learning. The competition in educational sectors, a requirement for many employment and price reduction in ICT facilities have make the use of technology on education a must in order to sustain and improve on its core function.

Institutional investments in computer-based tools to support teaching, learning, and research are inherently risky.

This is because; end-users are often unwilling to use available technology that, if used, would generate significant performance gains (Swanson 1988). Because of the persistence and importance of this problem, explaining factors that influence users to adopt and use ICT has been a long-standing issue in research (Ginzberg, 1981; Swanson, 1988). However, while there is a great deal of knowledge about how ICT is being adopted and use in tertiary institutions in developed countries, there is not much information on how ICT are being adopted and used in Ghanaian institutions.

Ghana is both technologically and economically less developed and this has led to the slow adoption of information technology. The use of IT has led to major changes in teaching, research and learning. Ghana is among the countries that are currently attempting to promote IT in schools to turn the country into information society. The achievement of this goal implies the adoption and use of IT in our schools. Effectively using ICT into teaching, research and learning is more complicated than providing computers and securing a connection to the Internet. This is because many factors influence the adoption and use of ICT. Because of the persistence and importance of this problem, explaining factors that influence users to accept and use ICT has been a long-standing issue in Management Information System (MIS) research (Ginzberg, 1981; Swanson, 1988).

To better predict, explain, and increase ICT adoption and use, there is the need to better understand what motivates ICT usage, factors encouraging and discouraging ICT use in tertiary institutions in Ghana. Against this background, the crucial research questions: What are the factors that encourage the adoption and use of ICT at KNUST? What are the factors that discourage the adoption and use of ICT at KNUST?

The study serves as a contribution to existing knowledge on the adoption and use of ICT in tertiary institution. In addition, it is assumed that ICT create the opportunity for governments to provide distance-learning programs which make it possible for many people, located far from universities to educate themselves. The study is therefore being carried out to justify the assumptions of the potential of ICT in teaching and learning in tertiary institutions.

2. Literature Review

2.1 ICT Adoption and Use in Tertiary Institutions

There are many factors identified as hindrances to the adoption of ICT in tertiary institutions. Research literature on the adoption of ICT in tertiary institution shows that it involves a large number of influencing factors (Mumtaz, 2000). Rogers (2003) indicates that, "Technological innovations are not always adopted rapidly, even when the innovation has proven advantages".

Pelgrum (2001) listed personal ideas about the contribution that ICT can make to the processes of teaching and learning. He again argued that, teachers' lack of knowledge and skills; insufficient number of computers and ICT infrastructure; and difficulty in integrating ICT instruction in classrooms as some of the factors that impede ICT integration in education. In a similar study, Ely (1993) identified: dissatisfaction with the status quo, existence of knowledge and skills, and availability of resources as major conditions relevant to ICT integration. In comparison, the two studies reveal something similar because existence of knowledge and skills relates to factor relating to teachers lack of knowledge and skills. Also availability of resources is similar to insufficient number of computers and ICT infrastructure. Finally dissatisfaction with the status quo is somehow related to difficulty in integrating ICTs instruction in classrooms. Mooij and Smeets (2001) also assert that, if teachers are not confident in their competence to handle computers, their willingness to use ICT may be affected.

Use of ICT in education for the purpose of teaching, research and learning is a kind of innovation because Rogers (2003) use innovation and technology interchangeably. Rogers (2003) identified five innovation characteristics that influence the decision to adopt innovation as: relative advantage, compatibility, complexity, trialability, and observability. He believed that when an innovation is perceived by users as having greater relative advantage, compatibility, trialability, observability, and less complexity, the innovation will be adopted more rapidly. It can therefore be said that, relative advantage, compatibility, complexity, trialability, and observability have direct relationship with ICT adoption and use while complexity has an inverse relationship with ICT adoption. This supports Technology Acceptance Theory (TAM) by Davis et al. (1989) that perceived usefulness, perceived ease of use, attitude toward using ICT and behavior are factors that influence the use of technology. Usefulness is the same as relative advantage and perceived ease of use is the same as complexity.

Study by Jebeile and Reeve (2003) on teacher adoption of web technology in a secondary college also finds similar innovation adoption variables but throw more light on it as: relative advantage, compatibility, visibility, ease of use, results demonstrability, and trialability. They argued that these factors should be considered to increase the use of ICT within institutions. Jebeile and Reeve's findings build on Rogers' (2003) and Davis et al. (1989) theory. But they focused on web technology (e-learning) and it was limited to secondary schools. This study will further it by extending it to tertiary institutions.

Study by Askar et al. (2006) to estimate the extent to which perceived innovation characteristics are associated with the probability of task related ICT use among secondary school teachers. Their results show that,

complexity or ease of use was found to be a common perceived innovation characteristic for teaching delivery, preparation and managerial tasks in schools. Another study by Martins et al. (2004) also revealed that observability and trialability were two most significant predictors of adoption ICT. All these studies focus on observability, relative advantage (perceived usefulness), compatibility, complexity (ease of use) and trialability but failed to recognize the willingness, attitude and external factors that may influence these variables. As supported by Bennett and Bennett (2003) that, perceived characteristics of instructional technology may influence a faculty members' willingness to integrate ICT in teaching. They have expressed that the most important barrier that teachers face in using technology is not lack of technology or funds but teachers' lack of willingness and their belief that technology is not useful. Despite this, their findings should not be underrated since it contributes to knowledge on ICT adoption and use.

Butler and Sellbom (2002) examined the factors affecting teachers in adopting new teaching technologies and barriers emerging during adoption. This research concluded, among other things, that trust in technology has been identified as the most important factor in teachers' decisions whether or not to adopt ICT. Know-how, difficulty in learning and time required to learn was also an important factor in adoption. Believing that technology enriches and improves education, difficulty using technology and management support appears as other factors affecting adoption.

In a study on the relationship between the characteristics of an innovation and its adoption, Tornatzky and Klein (1982) find that compatibility, relative advantage, and complexity have the most consistent significant relationships across a broad range of innovation types. Tornatzky and Klein (1982) also argue that compatibility and relative advantage have both been dealt with so broadly and inconsistently in the literature on the factors affection adoption and use of ICT on education.

Surrey and Gustafson (1994) suggested that, compatibility, complexity and relative advantage can be important considerations when introducing an innovation into instructional settings. It can be concluded that Rogers' (2003) and Davis et al. (1989) theory on adoption of technology can be a valuable tool for determining the factors affecting the adoption and use of technology in tertiary institutions and to increase its utilization though is too generic. This is because all findings from other studies reviewed were having some similarities with Rogers' and Davis et al. theory, only few discrepancies were encountered.

2.2 Factors that Discourage ICT Adoption and Use

A number of studies investigated why teachers do not use ICT in their teaching (Winnans and Brown, 1992; Dupagne and Krendl, 1992; Hadley and Sheingold, 1993). The following factors were summarized from their studies as factors that prevent teachers from using technology:

- lack of teaching experience with ICT;
- lack of on-site support for teachers using technology;
- lack of help supervising children when using computers;
- lack of ICT specialist teachers to teach students computer skills;
- lack of computer availability;
- lack of time required to successfully integrate technology into the curriculum;
- lack of financial support.

Evans-Andris (1995) also summarized three styles of computing use among teachers as avoidance, integration and technical specialization.

Robertson et al. (1996) were also on the view that, teachers' resistance to computer use was divided into several broad-based themes:

- resistance to organizational change;
- resistance to outside intervention;
- time management problems;
- lack of support from the administration;
- teachers' perceptions;
- personal and psychological factors.

These studies contributed knowledge on factors that discourage teachers from adopting ICT in elementary and second cycle schools, but were not extended to tertiary institutions. It was also conducted in developed countries; therefore its findings cannot be wholly generalized to include Ghana without empirical support. This study will build on these theories from tertiary institutions perspective in Ghana.

According to Mereku, et al. (2009) on Ghana's Report on ICT said, though Ghana's national curricula for the various subjects contain policy statements about the use of ICT in teaching and learning, the limitations imposed by inadequate number of computers in institutions, poorly trained educators and lack of internet connectivity pose a major challenge to the implementation of the policy to integrate ICT into teaching and learning.

Study by Goyal et al. (2010) also reveals the following as barriers for ICT usage which leads to very low

satisfaction levels for them. These are: all courses at the institute to have a course website, availability of a National Government Policy to implement ICT in the institute, providing library reserves electronically, policy to evaluate the effectiveness of the ICT use, time to upload and download (speed), mandatory technology courses such as MIS for all students/teachers, technical support to use ICT at the institutional level, better collaboration among teachers using online discussion boards, availability of resources to promote ICT usage", "Financial readiness of the institute to support ICT and improvement in understanding of complex or abstract concepts. Their studies really contribute to knowledge on factors impeding the high rate of ICT adoption in tertiary institutions in Ghana, but concentration was not given to tertiary institutions. Policies on education in Ghana are highly unfavorable for adoption of ICT in lecturing such as students must be present in Lecture Theater, courses cannot be taken in other institutions and there are no exchange online programmes among tertiary schools in Ghana.

2.3 Factors that Encourage ICT Adoption and Use

Several studies (Hadley and Sheingold, 1993; Sheingold and Hadley, 1990) used survey data to identify factors likely to be in evidence in teachers who to some extent have integrated ICT into their teaching practices. Sheingold and Hadley (1990) conducted a nationwide survey of fourth to twelfth grade teachers in the USA. The three major factors involved in these 'accomplished' teachers' success were:

- teacher motivation and commitment to their students' learning and to their own development as teachers;
- the support they experienced in their schools;
- access to sufficient quantities of technology (Mumtaz, 2000).

Another study by Mereku, et al. (2009) on Ghana's Report on ICT reveals that, availability of ICT syllabuses/manuals, ICT teachers who are willing to provide educators and availability of computers and computer laboratories that can be accessed periodically are some of the factors that encourage the usage of ICT in tertiary institutions. Study by Goyal, et al. (2010) also revealed that, ease of availability of ICT, upgrading teacher's ICT skills, convenience (time and place), time to upload and download (speed), improving communication between students and teachers, reliability of ICT, data security, availability of specialized IT teachers, availability of educational software, improving the presentation of the subject, providing encouragement to teachers to use technology in their teaching more often, ease of navigation of the course content through an ICT device, financial readiness of the institute to support ICT and learners with training are other factors that encourage the use of ICT.

Mereku, et al. (2009) and Goyal, et al. (2010) studies have some similarities despite the fact that they were conducted in different settings. When all these factors are improved, it will provide encouragement to teachers to use technology in their teaching more often. All these studies have contributed toward the knowledge on factors that prevent ICT usage and this study will throw more light into it. Shaikh and Khoja (2011) recommendation on how to improve ICT usage in tertiary institutions include: (i) provision of ongoing staff training in developing ICT skills; (ii) generating consistent finances to support ICT use over the long-run; (iii) developing a systemic and politically committed method of implementation of robust, effective, and target-oriented ICT policy; (iv) adequate provision of technological resources; (v) modifications in current higher education ICT curricula while emphasizing both theoretical and practical uses of ICT; (vi) piloting the chosen ICT-based higher education model; and (vii) careful examination of the current state of HES, including pedagogy, curriculum, infrastructure, capacity building, educational content, and ICT financing.

Though there have been a lot of studies as seen in the literature to identify measures that are linked to factors influencing adoption and use of technology, there have not been any consensus on the determinants. This makes user reactions toward technology use and acceptance complex and multifaceted. But Davis (1989) argues that, cultivating better and better measures and critically examining alternative theoretical models, sustainable progress is within reach. Therefore, this study is needed to gain further insight into ICT adoption and use.

3. Methodology

The purpose of the research is to conduct a descriptive and exploratory research to gather more information concerning the trend of ICT adoption and use in tertiary institutions in Ghana. This study adopted mixed method approach, thus both qualitative and quantitative approach were used. Combining qualitative and quantitative approaches within the same piece of research ensures the overall effectiveness of the research process as one can enhance the findings of the other. The study adopted a case study strategy to explore the factors that affect the adoption and use of ICT in Tertiary Institutions in Ghana.

Questionnaires and semi-structured interviews were the instrument used to collect data from respondents, who comprised of two hundred and twelve (212) respondents. The respondents were thirty (30) lecturers, ten (10) from each three (3) colleges, one hundred and fifty (150) students twenty five (25) from six (6) colleges and three (3) ICT Officers from three (3) Colleges at KNUST, Kumasi. Purposive sampling was used to select IT

officers because we needed officers who could provide accurate and detailed technical information on IT adoption and use. It is also useful for situations where there is a need to reach a targeted sample quickly. Convenience (Haphazard) sampling technique was used to select students and lecturers. This is because both students and lecturers come to campus on time/hourly bases. So a number of visits were made to them until a total number of respondents were reached to respond to the questionnaire. Statistical Package for Social Sciences (SPSS version 20) was used to analyze the data collected.

Total of one hundred and eighty (180) questionnaires were distributed, and each of the responses received was screened properly for error. However, those responses that had more than 20% of the questions left unanswered or incorrectly answered were deducted from the analysis to ensure reliability and validity.

4. RESULTS AND DISCUSSION

4.1 Factors that Encourage the Adoption and Use of ICT

Table 1 shows factors that encourage the adoption and use of ICT at KNUST.

Table 1 Factors that Encourage the Use of ICT (N = 150)

Factors that Encourage the Use of ICT	N	Mean	Std. Deviation
Management support in using ICT	150	2.57	1.206
Willingness to use ICT	150	4.00	1.141
Reliability/Trust in using ICT	150	3.51	1.145
Results/Outcome of using ICT	150	3.83	1.203

Scale: 1= Very Low, 2 = Low 3 = Moderate, 4 = High and 5 = Very High

Source: Field Study, 2012

From the table 1, it can be observed that respondents perceived that, the criteria used really encourage them to adopt and use ICT except management support in using ICT (Mean=2.57).

As perceived from the table "willingness to use ICT" (mean=4.00) was the most important factor encouraging lecturers and students to adopt and use ICT and "management support to use ICT" (mean=2.57) was the least important factor encouraging students and lecturers to adopt and use ICT. This is clear that management does not support the use of ICT in the Institutions. This is consistent with findings by Mereku et al (2009), Sheingold and Hadley (1990), and Mumtaz (2000) which revealed that, willingness to use ICT, reliability/trust in using ICT and results/outcome of ICT are some of the factors that encourage the usage of ICT in tertiary institutions.

Factors that encourage the adoption and use of ICT at KNUST from the interviews and questionnaires can be summarized as: Willingness to use ICT, Reliability/Trust in using ICT, Results/Outcome of ICT, Perceive usefulness, Perceive ease of use, Attitude, Behavior and Self-efficacy, Accessibility of ICT infrastructure and other factors which are very diverse base on the environment. This supports Technological Acceptance Model (TAM) proposed by Davis et al. (1989), Rogers (2003) and Davis (1989), which suggests a prominent role of perceived ease of use (complexity) and perceive usefulness (relative advantage) and self-efficacy theory by Bandura (1982) which states how well one can integrate ICT in teaching, research and learning. It should be noted that, factors that determine the ICT adoption and use cannot be limited to these factors, but varies. It is clear that, for any Institution to increase the adoption of ICT there should be measure to increase this factors that motivate the use of ICT (enabling forces).

4.2 Factors that Discourage the Adoption and use of ICT

The table 2 indicates factors that discourage the adoption and use of ICT at KNUST.

Table 2 Factors that Discourage the Adoption and use of ICT (N = 150)

Factors that Discourage the Adoption and use of ICT	N	Mean	Std. Deviation
Lack of knowledge and skills in using ICT	150	2.31	1.147
Insufficient ICT infrastructure	150	3.66	1.315
Difficulty in using ICT in class	150	3.13	1.244
Unwillingness to change	150	2.47	1.257
Difficulty in linking ICT to the curriculum	150	2.88	1.187
Inadequate IT facilities in lecture theatres	150	3.96	1.310
Expensive to buy ICT facilities	150	3.67	1.168
Difficulty in learning and time required to learn	150	2.95	1.273

Scale: 1= Very Low, 2 = Low 3 = Moderate, 4 = High and 5 = Very High

Source: Field Study, 2012

From table 2, it can be observed that respondents perceived that, the criteria used really discourage them to adopt and use ICT. According to the results, inadequate IT facilities in lecture theatres (mean=3.96), insufficient ICT infrastructure (mean=3.66) and expensive to buy ICT facilities (mean=3.67) were the most important factors discouraging lecturers and students to adopt and use ICT and lack of knowledge and skills in using ICT (mean=2.31), unwillingness to change and difficulty in linking ICT to the curriculum were the least important

factors discouraging students and lecturers to adopt and use ICT. This is because; there is no adequate time for training and learning ICT in the institution.

This supports the findings from researchers (Winnans and Brown, 1992; Dupagne and Krendl, 1992; Hadley and Sheingold, 1993; Robertson et al., 1996; Mereku, et al., 2009 and Goyal et al., 2010) that, inadequate IT facilities in lecture theatres, insufficient ICT infrastructure, difficulty in using ICT in class, expensive to buy ICT facilities and difficulty in learning and time required to learn discourage the adoption and use of ICT. The study did not supports the findings that; teachers' lack of knowledge and skills; unwillingness to change, and difficulty in integrating ICT instruction as some of the factors that impede ICT integration in tertiary institution (Pelgrum, 2001).

From the interview and the questionnaires, consistent breakdown of ICT facilities (faulty computers), inadequate sitting place for wireless (WI-FI) services, inconsistency in power supply, unreliability of the internet (speed of the internet is slow, high rate of down times), limited time given for the usage of ICT facilities (one hour per day is very insufficient), lack of personal computers to enable the use of ICT facilities, lack of knowledge and skills and inadequate accessibility of ICT facilities.

Factors that discourage ICT adoption may be summarized as: Unreliability of ICT infrastructure, Inadequate provision of ICT facilities, Inadequate IT facilities in lecture theatres, Expensive to buy ICT facilities, Inadequate access to ICT facilities, Inadequate sitting place for wireless services, Inconsistency in power supply, Attitude, Behavior and lack of knowledge and skills in using ICT facilities. This also supports the assertion by Bagozzi (2007) that the use of technology is determined by several factors which cannot be limited by only two or three factors. Therefore, factors that discourage the use of ICT are innumerable and individualistic. This makes researching before implementing any ICT initiative very pertinent to receive the necessary outcome. In the nutshell, for any Institution to increase the adoption of ICT there should be measure to decrease this factors that discourage the use of ICT (restraining forces).

5. Conclusion

Factors that affect the adoption and use of ICT has been examines by different researchers as shown in the literature review. This research also confirms the importance of the study of factors that affect the adoption and use of ICT.

The integration of ICT in Ghanaian school systems in Ghana is a major step in promoting technology. However, the proliferation of technologies has complicated the teaching, research and learning. Finding the best ways of integrating technology into tertiary institutions is one of the challenges Institutions encounters. Some of the problems enumerated are: lack of adequate infrastructure, internet and other ICT facilities, poor internet connectivity, lack of adequate resources, accessibility etc. Effectively integrating ICT into learning systems is much more complicated than providing ICT facilities such as computers and securing a connection to the Internet everywhere.

The study showed that; perceive usefulness and ease of use drive ICT adoption more than the other factors. Despite this, ICT is not fully integrated in teaching, research and learning at KNUST. This is mainly because of attitude and behavior of users. Users are not ready to use it, though they are aware of its usefulness. The institution also does not create the right environment to encourage ICT adoption (management support). It also came out that, trust and willingness to use ICT is not encouraging. Several factors were also identified as discouraging the use of ICT; key to these factors are inadequate infrastructure and skills to use ICT. In fact, the integration of ICT is associated with several factors that encourage and discourage the use of ICT which the researcher termed as enabling forces and restraining forces. Therefore, to increase the rate of ICT adoption, there is the need to improve the encouraging factors (table 1) and reduce the discouraging (table 2) factors to a minimal.

This means that, technology integration takes time: time to learn about the facility, time to learn its usefulness, time to be adequately prepared to use it and time to change attitude, behavior etc. In Ghana for example, to really increase the adoption and use of ICT does not only rely on investing in ICT infrastructure. As revealed in the study, that the Institutions has a lot of infrastructure that are not use. Education on its usefulness and how to use it is as importance as investing in the infrastructure. The right environment should be created to increase ICT adoption.

The extent of this restraining force and enabling force determine the extent of ICT adoption and use. If the enabling forces (encouraging force) are very high, it means the rate of ICT adoption and use will be very high, if the restraining force (discouraging force) are very high, it means the rate of ICT adoption and use will be very low. When these forces have kept at moderate level, ICT adoption and use will be at optimum state. Therefore, for us to increase the rate of ICT adoption and use, we need to improve the encouraging factors and reduce the discourage factors to a minimal. This model is represented in the figure below (Figure 5.1).
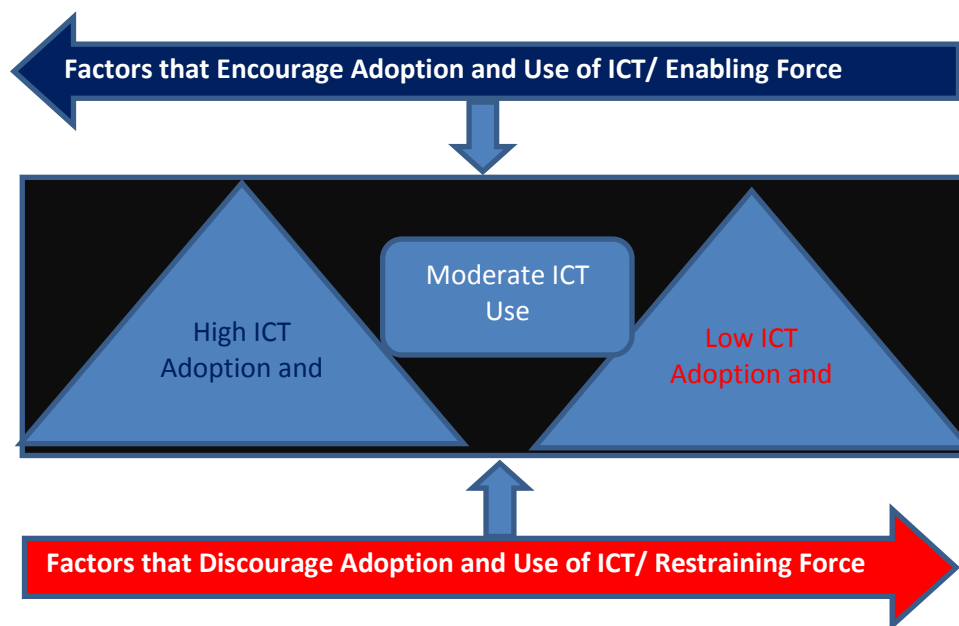
Figure 5.1 Model for Increasing ICT Adoption and Use

Author's own Construct, (2012)

In conclusion, the introduction of ICT in tertiary institutions in Ghana had demonstrated many benefits for teaching, research and learning, through the acquisition of both technology and academic skills.

This study has demonstrated that the progress being made in the adoption and diffusion of ICT in education in Ghana, particularly in this 21st century, is remarkable. However, in terms of broad impact on teaching and learning, the process is just beginning. For the educational system to leap frog in its quest of ICT integration, what follows are some suggestions and comments regarding actions in key areas of ICT in education that will be important to attend to as the adoption process continues.

It would be useful to monitor the implementation of policies in selected countries in order to investigate the processes used to determine if there are lessons to be learned. Investment in ICT infrastructure itself does not foster human development, but must be accompanied by investment in education and health as well.

6. Recommendations

Extension of time student spends in using ICT facilities: The time given to each student per day is not enough to do any meaningful research and the time the lab is close is not favourable for the use of the facilities. The closing time for the ICT lab needs to be review to encourage users.

There should be ICT training for students and lecturers: There should be more education on how to use ICT facilities and be made aware of ICT facilities provided by the university. The training should be made more practical, there should be an ICT course at all (level 100 - 400), especially programmes that helps in research and analysis, there should be a synergy between ICT course taught in class and what is taught at the ICT lab. The training should not only be limited to students alone but lecturers also need to be included. If lecturers are computer literate, there is a high tendency that they will encourage students to use ICT like sending assignment on line, communicating to students through emails etc. This will help for the use of ICT facilities like course website; multimedia facilities etc. that are provided by the university but people do not use it.

There should be adequate technical support for users at the ICT lab: The people in charge at the ICT centre should go round and help people to do their research. When users receive the support that they need it will encourage the use of ICT as ease of use encourage the use of ICT.

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