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TEACHER EDUCATORS' EXPERIENCES OF INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING IN SELECTED NATIONAL TEACHERS' COLLEGES IN UGANDA

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Abstract

Developments in Information and Communications Technology (ICT) and its applications in teaching and learning are calling for teachers to integrate ICT into curriculum and instruction. This requires a strategic ICT training for both prospective and in-service teachers. The literature suggests that integrating ICT into Initial Teacher Education (ITE) is one of the most important options to accomplish the intended change in developing prospective teachers. This study focused on exploring the experiences of teacher educators in integrating ICT in initial teacher education in a selected National Teachers' College in Uganda. The study adopted a qualitative research design. The data revealed that although the teacher educators appeared enthusiastic to integrate ICT in their training of teachers, they experienced a number of handicaps which ranged from inadequate training in ICT integration in teaching and learning, inadequate ICT resources, to lack of technical and pedagogical support. For effective integration of ICT in initial teacher education, the researchers recommended a deliberate inclusion of ICT in the curriculum of initial teacher education, regular continuous professional development programmes for teacher educators, and strengthening technical and infrastructural support in the teacher training institutions.

Keywords: Experiences, National Teachers' Colleges, Teacher educators, Information and Communication Technology

Introduction

With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher- centered, lecture- based instruction to student- centered, and interactive learning environments. Knowledge of ICT and skills to use ICT in teaching/learning has gained enormous importance for today's teachers. Teachers are expected to know to successfully integrate ICT into their subject areas to make learning more meaningful.

This knowledge development during teacher education programs has gained much importance with the notion that exposure to ICT during this time is helpful in increasing student teachers' willingness to integrate technology with classroom teaching. Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) to teach students the knowledge and skills they need in the 21st century.

The development and growth of technology integration in education in Uganda, started with the national ICT policy development process initiated in 1998 by the Uganda National Council of Science and Technology (UNCST) (Torach, Okello, & Amuriach, 2006). Five years later in 2002 the UNCST submitted a draft national ICT policy framework to the cabinet which was approved the following year. In 2003, a national ICT policy framework was, therefore, put in place. Strategic Objective number 2 of this policy highlighted the need for literacy improvement and human resource capacity building. Among the strategies for attaining this objective was to integrate ICT in mainstream educational curricula as well as other literacy programmes and provide for equitable access by pupils and/or students at all levels (Uganda Ministry of Works, Housing and Communications, 2003). Based on this, an educational sector ICT policy was formulated in 2005 aimed at rationalizing and harmonizing ICT-related activities/programmes within the educational sector which were uncoordinated and fragmented (Uganda MoES, 2006). The policy framework docu-

ment recognized that Uganda would need to embrace the goal of lifelong education for all (Farrell, 2007). It is further stated that the use of ICT requires adjustments to more learner-centred and interactive teaching methods, thus redefining the role of the teacher as a facilitator. However, it is more than a decade now since the introduction of ICT policy; yet it seems that what is stated simply remained on the paper and has not been achieved since the level of competence of teachers on the use of ICT as a pedagogical tool in teaching and learning has been criticized by many scholars (Isaacs, 2007; Balanskat, Blamire, and Kefala, 2006; Dawes, 2001). In this regard, it makes sense to state that the use of ICT as a pedagogical tool in Uganda is not a common practice in the teacher training institutions such as National Teachers' Colleges.

Statement of the Problem

The Government of Uganda (GoU) sought to embrace ICT with the partial aim that it would enable the country to improve and sustain development: thus reduce poverty (Uganda Ministry of Works, Housing, and Communication, 2003). In partial pursuit of this aim, the national policy for ICT advocates among other things integrating ICT in mainstream education.

Accordingly, the Ministry of Education and Sports (MoES) developed a draft policy for ICT in education to help guide the integration of ICT into education. The policy recognizes the crucial role of teachers in implementing any education reform initiative and as such points out that "in ensuring that the best use is made of ICT, the key focus must be on the teacher trainers/lecturers and the curriculum that they are expected to follow" (Uganda MoES, 2005, p. 15).

Although such a promising policy is in place, it has been observed that ICT policy implementation is one of the major problems confronting the National Teachers' Colleges in Uganda (Wells & Wells, 2007). There seem to be multiple demographic, attitudinal, infrastructural, as well as technical barriers that intertwine to slow down the integration of ICT in teaching and learning.

This study explored the experiences of the teacher educators in National Teachers' Colleges in Uganda in relation to their attitudes, technical skills, extent of ICT integration in teaching and learning, and the challenges experienced

Research Questions

The study was guided by the following research questions:

1. What are the teacher educators' beliefs about the impact of the integration of ICT as innovative pedagogy in teaching and learning?
2. To what extent do teacher educators in National Teachers' Colleges integrate ICT as innovative pedagogy in teaching and learning?
3. What are the challenges hindering the effective integration of ICT as innovative pedagogy in the National Teachers' Colleges?

Theoretical Framework

The theoretical framework upon which ICT integration in teaching and learning is based is underpinned on the constructivist theory of learning. The core of constructivism is that learners actively construct their own knowledge and meaning from their experiences (Williams & Chinn, 2009) by perceiving various things around them and making sense out of those objects in particular learning situation.

According to constructivist theory, children learn more and enjoy learning more when they are actively involved. In a constructivist classroom students are actively involved, the environment is democratic, the activities are interactive and student-centred and the teacher facilitates the process of learning in which students are encouraged to be responsible. More web based tools are recommended in the curriculum so as to promote self-learning using the constructivist approach.

Research Design

This study employed a qualitative research design which was exploratory in nature. It was used to gain understanding of underlying experiences, attitudes, and challenges surrounding the integration of ICT in teaching and learning. This type of research provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. It is further used to uncover trends in thoughts and opinions, and delve deeper into the problem investigated (Wyse, 2011).

Research Population and Sample

The research population for this qualitative study was composed of 54 teacher educators of a National Teachers' College located in Northern Uganda. A sample of 10 teacher educators was drawn using purposive sampling technique to take account of 2 teacher educators from each of the 5 departments: science, Arts, Vocational, Professional and Languages. The two teacher educators consisted of one novice teacher educator with up to two years of teaching experience only and the other, an experienced teacher educator with more than two years of teaching experience.

Research Instruments

To gather data on the attitudes, experiences, and challenges of both the novice and experienced teacher educators on the integration of ICT in teaching and learning, three research instruments were utilized. The first one was semi-structured interview questions, the second was focus group discussion, and lastly, observation. The instruments were validated by the co-researcher, an expert at the University of Eastern Africa, Baraton.

Data Gathering Procedures

The researcher asked for a separate interview session with each of the two subjects (novice and experienced) respectively, following the questions in the semi-structured interview guide. Each of the interview sessions lasted about 50 minutes. After that, the researcher held a focus group discussion with the entire group while comparing the responses of the subjects from the focus group discussion and their answers on the questions provided in the semi-structured interview. Finally, the researcher observed a lesson where ICT was purportedly integrated in the teaching and learning process.

After the collection of pertinent data from the subjects, the researcher analyzed and established comparability between the responses of the "novice" and the "experienced" teacher educators on the basis of integrating ICT in teaching and learning.

Ethical Considerations

The researcher obtained a letter of introduction and permission to conduct the research from the office of the Director of Graduate Studies and Research of University of Eastern Africa, Baraton before commencing the study. The letter of introduction and permission was presented to the Principal of the target college to seek authorization to conduct the research.

The researcher guaranteed the anonymity of the participants by not demand¬ing them to introduce their names during the interview or focus group discussion. The researcher also thoroughly explained the purpose of the research to the subjects prior to the interview interactions and assured them of confidentiality in order to solicit their informed consent.

Results and Discussions

The results and discussion that follow herein are based on the research questions that were earlier formulated to guide the investigation. The results show interesting revelations.

Teacher Educators' Beliefs and Attitudes towards the Integration of ICT as a Pedagogical Tool

Responding to the question whether the teacher educators liked using ICT in teaching and learning and whether they believed ICT could transform teaching and learning, the teacher educators, in both the interview and focus group discussions, responded in the affirmative. For example, during an interview one teacher educator said:

> I*t is true that I enjoy using computers and other digital tools in my teaching, but the available digital tools are not enough to accommodate our needs. At our college, we have one computer room which is open to both students and teachers; you often find teachers scrambling to get computers when there is internet connectivity.*

During the focus group discussion another teacher educator said:

> *Yes I enjoy using technology in my teaching and my students also do, but some times I ask my students to send their assignments to my email address; some of them manage to do so but the majority fail due to poor internet connectivity at the college and there is no any initiative brought forward by the Principal to improve that situation. I am ready to use ICT even in sharing the i nformation and creating solutions but the infra*

structures are not ready to support the usage.

Asked the experiences of the teacher educators with students, whether the students enjoyed learning with ICT or not, one teacher educator said:

> *When we allow our students to get into the computer room to search for materials that are relevant to their subjects, they be come excited. But you will find some of them watching pornographic pictures and others chatting with their friends in face book instead. Funny enough, many students are using the internet at the college to spread rumours and even discuss issues related to politics and love affairs. Much needs to be done to assist our students to understand the importance of ICT in learning.*

The above citations confirm that the teacher educators in the National Teachers' Colleges believe that ICT could be used as a pedagogical tool in improving their teaching when there are adequate resources and infrastructures. This means that if these barriers are resolved, ICT could be used as a pedagogical tool. The current findings concur with the research findings by Teo (2008) who found that teachers were more positive about their attitude towards computers and intention to use computer than their perceptions of the usefulness of the computer and their control of the computer. In a similar way, Cubukcuoglu (2013) found that in order to create an environment where technology is used frequently and effectively, it is important to support the needs of teachers in using technology in teaching and learning. In other words, it is important to attempt to remove the possible barriers that hinder frequent technology use and to identify the enabling factors that may promote it. The enabling factors would help teachers to be motivated and enthusiastic users of ICT as a pedagogical tool.

The present findings are, however, contrary to the research findings by Buabeng-Andoh (2012) who found that teachers with more years of teaching experience seem to use ICT more frequently to transform their teaching than those with few years of teaching experience. For example, Russell, O'Brien, Bebell, and O'Dwyer (2003) found that novice teachers who were highly skilled with technology more than experienced teachers did not incorporate ICT in their teaching. The researchers cited two reasons: new teachers' focus could be on how to use ICT instead of how to incorporate ICT in their teaching. Secondly, new teachers could experience some challenges in their first few years of teaching and spend most of their time in familiarizing themselves with school's curriculum and classroom management. Unlike the present study, the findings show that both new and older teachers believed that ICT could be used as a pedagogical tool if there is conducive learning environment.

The study by Palak and Walls (2009) investigated whether teachers who frequently integrate technology and work in technology-rich schools shift their beliefs and practices towards a student-centered paradigm. The results showed that teachers' attitudes towards technology significantly predict teachers' ability to use technology and a variety of instructional strategies. Unlike the present findings, it was found that teachers had positive attitudes towards the use of ICT as a pedagogical tool but they did not integrate it in their teaching. Having positive attitudes, does not confirm that a teacher will use ICT in teaching. The use of ICT in teaching and learning will depend on several factors such as the level of understanding, willingness, confidence, motivation, accessibility to ICT tools, level of infrastructure development, and the perceived usefulness of ICT as a pedagogical tool (ChanLin, Hong, Chang, & Chu, 2006; Mumtaz, 2000). It is, therefore, logical to argue that the level of teachers' pedagogical skills is also likely to enhance the teacher in using ICT in teaching. On this ground, teachers need adequate pedagogical training so as to be able to use ICT in their teaching.

Extent of ICT Integration in the National Teachers' Colleges

The teacher educators' integration of ICT in teaching and learning was assessed in relation to the extent they used specific ICT resources such as email, digital media and use of ICT to design instructional materials. The following verbatim reflect the responses of the teacher educators:

> *You don't expect someone teaching history subject to ask students to send their assignment through the email, that task is for teachers who are teaching ICT subject. To be honest as a history teacher, I have never asked my students to do so.*

Another teacher educator of Religious Studies said:

> *..... I even long forgot my email address let alone the password; I last opened and used an email address when we had ICT training in the year 2012 at the college. So how will I ask*

my students to send their assignment through emails? I even doubt whether all the students have email addresses anyway. This is impossible in my class due to the big number of students attending my subject. In my religious education class I teach over one hundred students which is impossible to prepare digital materials for all of them.

One relatively young looking biology teacher said:

.....for us in the science department we are only two teachers who have personal laptops and often use projectors in the college for power point presentations. Other teachers are old and ICT illiterate and they are not conversant with power point presentations. I think with power point presentations, we are the only ones using ICT in presenting the subject matter.

When asked how they use laptops to share information and design instructional materials, one teacher educator responded thus:

I really don't know much about designing instructional materials with laptop. What I know is just preparing notes in power point and sometimes present them to my class. In fact, last year I attended a one day work shop organized by the Ministry and facilitated by UNESCO at the college on instructional media design but I did not understand much due to limited time. But I was even better off than other teachers because I am at least ICT literate. Other teachers who were ICT illiterate had to learn first how to use computers and by the time they started on instructional materials design, the workshop was ended.

Another relatively old looking teacher educator responded saying:

... for me when talking about the use of computers in my teaching, I can say that yes we have the computer lab with many computers, but when students get in the lab to use the internet, it becomes very frustratingly slow. So I simply use the lab computers for typing students' exams when needed for submission to the academic registrar. I also sometimes use the computers to read and send my personal email. Remember I am too old; beginning to deal with computer at this age is time wastage. After all, I was not trained to use computers during my teacher education; even the selection of participants for ICT workshops is discriminative. I have ever attended only a one-day workshop where I learnt how to use email to send and receive messages. Where do I get the skills to enable me integrate ICT in pedagogy?

From the above citations, it is clear that the teacher educators in the National Teachers' Colleges in Uganda have low familiarity with the use of ICT as a pedagogical tool. It is evident that this results from insufficient training at both pre-service and in-service teacher education programmes. These findings are in line with those by Nyarusy (2006) and Mwalongo (2011) who found that the most commonly reported use of ICT for teaching among teachers in Tanzania included preparation for notes, teaching and learning resources and examinations. Such level of ICT use does not enable teachers to use it as a pedagogical tool in teaching and learning. In the similar vein, Kambagha (2008) found that teachers in Dar es Salaam-Tanzania had positive perceptions towards the use of ICT in teaching but they did not use it in pedagogy due to lack of technical support and insufficient training.

As it can be noted from the findings, teachers receive insufficient training whose focus is mainly on basic ICT skills rather than pedagogical skills. This is consistent with the suggestion by (Cubukcuoglu, 2013) who stressed that the training among teachers should not only include basic technology skills but also provide training on improving pedagogical use of technology. This kind of training will help teachers feel confident and competent while using ICT at the right time and opportunity. In my own view, the above discussion sends a very strong message to educational stakeholders in Uganda, particularly teacher education curriculum designers, that teachers need sufficient pedagogical training about ICT.

In a research report conducted by the British Educational Communications and Technology Agency (BECTA, 2004), it is indicated that many teachers who are unskilled in ICT are not prepared to use them in the classroom or in front of students who might probably be more familiar than them. It is further argued that lack of competence in the use of ICT accounts for the inconsistency between training and usage. The report further addresses the issue with a view that most teachers, even if they have received training in the use of ICT, fail to integrate it into the teaching and

learning process because the training received is often inadequate and focuses on basic ICT knowledge and skills rather than the pedagogical use of ICT. In addition, BECTA (2004) indicates that lack of confidence is linked to other barriers affecting the use of ICT in education. Such barriers include: limited technical assistance, lack of competence and the quality of training received. A number of strategies can be put in place to assist teachers to do things that might not be possible within the traditional classroom by using ICT as a pedagogical tool.

Challenges to the Integration of ICT in Teaching and Learning in the National Teachers' Colleges

The teacher educators cited several challenges in their quest to integrate ICT in teaching and learning. A number of key challenges emerged.

Inadequate Training

One of the key challenges to the integration of ICT in teaching and learning that emerged in both the interview and focus group discussion was the inadequate training of the teacher educators to integrate the ICT in teaching and learning. One teacher educator said,

> *You cannot expect us to do what we have never been trained to do. During our teacher education course, there was nothing like ICT pedagogy, now from nowhere we are asked to integrate ICT in teaching and learning. Where do we begin when we have never learnt anything about ICT?*

Another teacher said:

> *If the Ministry wants us to integrate ICT in teaching and learning, it should first include ICT in the curriculum of teacher education and teach teacher trainees ICT pedagogy then such teachers will be able to apply the knowledge and skills of ICT in their teaching practice. For me I can confess I have never been trained to use computers in teaching.*

One other teacher summarized it all:

> *For me I cannot discuss the challenges I face other than that I do not have the knowledge and skills to use computers because I have never been trained to do so. I have never tried to use computers because I fear to spoil them. Let the Ministry first address the issue of training us on how to use the computers and when I begin to implement and fail, then I will realize what challenges I have."*

Inadequate ICT Infrastructure

Another challenge that came out prominently was the issue of inadequate ICT infrastructure. In this regard the teacher educators cited issues to do with inadequate internet band width, slow internet connectivity, inadequate equipment such as smart board and LDC projectors, and others. One teacher educator said:

> *I think the desktop computers are enough because I see the ICT lab full of computers and I am told there are at least one hundred stations. With my class of about sixty students, those computers would be adequate. But I see only one smart board and one digital camera. If we were all able to use these equipments, how would we share them? Even projectors, there are only two against over fifty of us who would need to use them.*

Another teacher educator said:

> *I have tried twice or so to use the internet with my class butI was forced to abandon the attempts because of slow internet speed. The lessons became so boring because the students had to wait for long for the files to download and open."*

The challenges cited by the teacher educators in this particular study are not unique at all. Lack of effective training as a challenge to integration of ICT in teaching and learning is abound in the literature of several studies such as Albirini (2000), Balanskat et al., (2006), and Ghavifekr and Wan Athirah (2015). One finding of Pelgrum's (2001) study was that there were not enough training opportunities for teachers in using ICTs in a classroom environment. Similarly, Beggs (2000) found that one of the top three barriers to teachers' use of ICT in teaching was the lack of training. A research in Turkey found that the main problem with implementing new ICT in education was the insufficient amount of in-service training for teachers. Özden (2007) and Toprakci (2006) concluded that limited teacher training in ICT use in Turkish schools is an obstacle.

According to BECTA (2004), the issue of training is certainly complex because it is important to consider several components to ensure training

effectiveness. These were time for training, pedagogical training, skills training, and an ICT use in initial teacher training. Correspondingly, recent research by Gomes (2005) relating to various subjects concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom and lack of training concerning technology use in specific subject areas were obstacles to using new technologies in classroom practice. Some of the Saudi Arabian studies reported similar reasons for failures in using educational technology: the weakness of teacher training in the use of computers, the use of a "delivery" teaching style instead of investment in modern technology (Alhamd, Alotaibi, Motwaly, & Zyadah, cited in Ghavifekr, Kunjappan, Ramasamy, & Anthony, 2016), as well as the shortage of teachers qualified to use the technology confidently (Sager, 2001).

Providing pedagogical training for teachers, rather than simply training them to use ICT tools, is an important issue (BECTA, 2004). I strongly believe that if teachers are to be convinced of the value of using ICT in their teaching, their training should focus on the pedagogical issues rather than just on the acquisition of basic ICT skills. In line with this argument, Balanskat et al. (2006) indicated that inappropriate teacher training is not helping teachers to use ICT in their classrooms and in preparing lessons. They assert that this is because training programs do not focus on teachers' pedagogical practices in relation to ICT but on developing ICT skills.

Fundamentally, when there are new tools and approaches to teaching, teacher training is essential (Osborne & Hennessy, 2003) if they are to integrate these into their teaching. However, according to Balanskat et al. (2006), inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out full integration of ICT in the classroom. Teachers need to not only be computer literate but they also need to develop skills in integrating computer use into their teaching/learning programmes (Newhouse, 2002).

Conclusions and Recommendations

In light of the findings of the study, the researcher drew the following conclusions:

1. There is generally positive attitude towards the integration of ICT in teaching and learning by the teacher educators in the National Teachers' Colleges The teacher educators believe ICT can transform the educative process in schools.
2. In spite of the availability of basic ICT resources in the National Teachers' College, the resources are hardly used by the teacher educators to integrate in teaching and learning practice.
3. There are a number of challenges constraining the teacher educators from integrating ICT in teaching and learning, including inadequate training, inadequate resources, and inadequate support from ICT experts or technician.

It is recommended that ICT basic course and ICT integration in teaching and learning should be included in the curriculum of pre-service teacher training to enable all teachers graduating from these colleges to possess some minimum level of ICT competences. The pre-service ICT training should then be followed by regular in-service and on-going training on ICT integration in teaching and learning.

Finally, the researcher recommends further investigation to justify and validate the conclusions made herein. Hence, suggestions for further research are highly encouraged involving more colleges and research participants using mixed methods approach.

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