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Challenges of Integrating Information and Communication Technology in Teaching among National Teachers' Colleges in Uganda

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Abstract

In this 21st century, educational institutions the world over are faced with increasing demand from society to transform from analogue practices to digital systems using technology. This study investigated the challenges experienced by teacher education college lecturers in their quest to integrate ICT in teacher training practices. The study was qualitative, using focus group discussions, interview and observation with 10 college lecturers from each of the 4 colleges and 4 Principals, one from each college. Snowball purposive sampling strategy was used to draw the participants. The findings revealed a host of challenges, despite a high level of appreciation among college lecturers on the importance of ICT integration into classroom instructional practices. Several debilitating factors evolved including, lack of experience and skills in using ICT, lack of ICT curriculum for the teachers' colleges, lack of clear government policy on the teaching of ICT in the teachers' college curriculum, inadequate ICT resources, obsolete ICT hardware and soft wares, intensive teaching programs due to examination pressures, overcrowded classrooms, lack of time, heavy workload, slow internet connectivity, intermittent electricity supply and, attitudinal barriers from the relatively older lecturers with technophobia. The researchers therefore, recommended government intervention with a clear policy on ICT inclusion in the curriculum, equipping the colleges with adequate and up-to-date equipment, regular training opportunities for the lecturers, provision of alternative and affordable source of power, recruiting more human resource in the colleges to reduce the workload for the lecturers and government subsidizing on the cost of internet connectivity.

Keywords: Challenges, ICT, technology, computer, integrating, colleges, attitude, devices

Introduction

As Uganda's Vision 2040 seeks to transform the Ugandan Society from a Peasant to a Modern and Prosperous Country, the Information and Communications Technology (ICT) Sector is identified in the National Development Plan (Uganda National Development Plan, 2010/11 – 2014/15) as one of the primary growth sectors that can spur the envisaged transformation and as such the country needs to tap into the potential of ICTs (Uganda Vision 2040). Uganda Communications Commission (UCC) using Rural Communications Development Fund (RCDF) in partnership with the Ministry of Education and Sports thus implemented a program for ICT integration in Uganda, which by 2014 was

reported to have made a significant impact in the education sector including declaring computer studies as a compulsory subject in the curriculum at all levels of education in the country (Uganda Communications Commission, 2014).

Uganda, like many other African countries, continues to adopt ICT policies to underpin development in a variety of socioeconomic sectors, education inclusive, to help propel development and competition in a globalized economy. Indeed, there are many ICT project development partners in Uganda that promote ICT for education (ICT4E) and prioritize to train teachers to integrate ICT in the instructional practices. In Uganda, some of the projects that

have been active in the field of education include: The Connect-ED project which was to provide computers and Internet points in teachers' colleges, Curriculum Net Project that was supposed to prepare ICT-based curriculum materials in Mathematics and Geography for primary schools and Mathematics and Science for secondary schools. There were also the VSAT project and SchoolNet Uganda project; Content Development project at National Teacher Colleges; Connecting Classrooms project and UConnect Project which were initiated to support connectivity and training in schools to improve learning outcomes through ICT and help teachers use ICT for effectively teaching.

Whereas ICT integration in the education system has been implemented in most African countries (Barakabitze, Kitindi, Sanga, Kibirige & Makwinya, 2015), the implementation and adoption have not been without challenges (Al-Alwani, 2005; Ghavifekr, Afshari & Amla, 2012; Gomes, 2005; Osborne & Hennessy, 2003; Özden, 2007). The integration of ICT in the instructional practices of teachers is a complex process that poses several challenges for both developed and developing countries. Integration of ICT in teacher education programs is quite slow in developing countries in comparison with developed countries as a result of numerous challenges such as poor ICT infrastructure, lack of appropriate training, attitudinal barriers, obsolete equipment, etc. (Singhavi and Basargekar 2019; Passey et al. 2016). This study sought to investigate the challenges encountered by teacher education college lecturers in their quest to integrate ICT in their instructional practices. The study was guided by the following research question: What are the perceived challenges to the integration of ICT in the instructional practices by the lecturers among the National Teachers' Colleges in Uganda?

Review of Related Literature

As an important step to improve the quality of the instructional practices of the teachers in Uganda, it is worthwhile to identify the possible challenges encountered by teachers in their bid to integrate ICT in teaching and learning. The review of related literature, therefore, examined the significance of ICT in education and then presents the challenges commonly discussed by different scholars.

The Significance of ICT in Education

UNESCO (2018) acknowledges that by bringing together the opinions of policy makers, academics and the private sector, ICT can be strategized to accelerate the attainment of the targets of the Education 2030 Agenda. ICT promotes learner-centered, participatory pedagogy in which learners become active participants in the teaching and learning process as opposed to passive recipients of information (Barakabitze, et al. 2015; Barakabitze, 2014). Through continuous exposure to ICT capabilities, students' perceptions about ICT positively change enabling them to develop better skills on ICT use for academic purposes and engage in deeper forms of learning (Barakabitze, 2014).

In the recent past, educational institutions in Africa have experienced a paradigm shift engendered by the integration of ICTs in the education system. Consequently, educational institutions have realized the cardinal value of ICT in the instructional process (Barakabitze, et al. 2015; Joel & Mussa, 2015; Kisanjara, Today, Side, & Msanjila, 2017; Puentedura, 2018). Teachers need to embrace the integration of new technologies in their teaching and learning practices in order to meet the twenty first century demands of the workforce. Through ICT, students can be facilitated to search for information and other instructional materials on their own by the use of ICTs (Maurice, Charles, Ofori-Darko, 2014). In this generation of science and technology, the application of ICT in the instructional process cannot be overrated. This is because ICT offers abundant access for students to relevant study content through frequent and meaningful engagement with computers and thus, providing opportunities for practice (Kafyulilo, 2015).

ICT enables learners to develop insights into their study content (Chai, Koh & Tsai, 2010), enhance their creativity, create unique learning materials through game-based activities (Lidia, Mark, Thomas & Thomas, 2018) and gain access to their study materials through television or CDs (Birhanu, 2015). It is clearly acknowledged that the integration of ICT in the instructional process motivates teachers and learners alike and helps them to clarify abstract concepts, save time, actively engage the learners and simplify the teacher's work (Mwalongo, 2010; 2011).

Fu (2013) argues that ICT should not be used in education in isolation but in combination with other teaching methods and approaches which are hinged on learner-centered approaches as advocated by the constructivists. ICT is able to change the role of the learners in the classroom from the traditional passive recipients of information to active participants and co-creators of knowledge (Xavier, Tina, Matti & Inocente, 2018). Likewise, the role of the teacher in a technology mediated instructional process changes to that of a facilitator of student learning (Mukelabai, 2011). Whereas it is now acknowledged that ICTs have the potential to transform the face of education globally and particularly in the developing countries which are still grappling with issues of quality, access and equity in education, there are challenges for integrating ICT4E in Africa which are discussed below.

Challenges of ICT Integration in Education

The practice of integrating ICT into the instructional practices by teachers is such a complex process that all educational institutions that engage in it are likely to encounter a number of challenges. A challenge is defined as “any condition that makes it difficult to make progress or to achieve an objective” (Schoepp, 2005, p. 2). Researchers and educators have categorized the challenges encountered by teachers in integrating ICT into instructional practices differently. For purposes of this study, the categorization was based on Bekalu, Elen, Petegem, Bekele and Goeman, (2021) as institutional characteristics, infrastructure and individual characteristics.

Institutional Characteristics

By institutional characteristics, Bekalu, Elen, Petegem, Bekele and Goeman, (2021) referred to the challenges that are not directly attributed to individual ICT users but are imbedded within the institutional systems and yet they influence ICT integration. The commonly cited institutional challenges include ICT vision, ICT plan, professional development initiatives, and technical support.

Institutional ICT Vision

The institution's ICT vision relates to the aspirations regarding the place of ICT in instructional practices (Zhu, 2015). Institutional ICT vision is paramount in determining ICT use in

any institution (Goeman, 2008; Zhu, 2015) for it is from the institutional vision that a general framework for the strategic and operational planning relating to allocation of the institution's scarce resources can be drawn (Salik & Zhiyong, 2014). Previous research evidence shows that the absence of ICT vision is one of the crucial challenges inhibiting teachers' ICT integration in their instructional practices (Barakabitze et al., 2019; Raphael & Mtebe, 2016; Rana & Rana, 2020).

Institutional ICT Plan

The ICT plan is a document prepared by the institution that specifies the overall philosophy and goals of ICT integration in the institution and includes other details about the technical and infrastructural specifications with strategies how the program will be implemented, monitored and evaluated (Vanderlinde, Braak & Dexter, 2012). The absence of such a clear ICT plan in an institution is definitely one of the challenges to ICT integration by the teachers (Baylor & Ritchie, 2002).

Professional Development Initiatives

Professional development initiatives focusing on both technology and pedagogy, which are crucial for enhancing the teachers' ICT competences, may include face to face trainings, online tutorials, workshops and seminars (Goeman, 2008; Kopcha, 2012; Teo, Huang, Hoi (2018; Al-Busaidi & Al-Shihi, 2012). The absence of a sound professional development initiative in an institution leaves the teachers vulnerable to skill gaps and may breed fears among the teachers to engage with the available technologies (Inamorato dos Santos et al., 2019).

Technical support

Technical support refers to expertise support extended to teachers by skilled and specialized personnel in the application of technology for classroom instruction (Moses, Bakar, Mahmud & Wong, 2012). Technical support may cover a number of services including providing helpdesks and online support services (Teo, 2010) such as access, operation and troubleshooting of hardware, software and network resources (Dexter, Anderson & Ronnkvist, 2002). It is common for teachers while working with technology and most especially when the technology is new, to face some technical challenges which are beyond their capability

(Mouakket & Bettayeb, 2015). Under such circumstances, the presence of real time technical support is crucial to fix the technical challenges (Aldheleai, Baki, Tasir, & Alrahmi, 2019) and this will enhance the teacher's readiness to adopt the ICT (Rizana, Hediyanto., Ramadhan & Kurniawati, 2020). Where technical support may be lacking, teachers may lack the confidence to integrate ICT for fear of risking failure and losing the confidence of the learners (Buabeng-Andoh, 2012). Whereas the presence of technical support is so crucial to boost the teacher's confidence for ICT integration in an instructional setting (Martins & Baptista Nunes, 2016), study findings have always reported that the lack of technical support is one of the key challenges facing teachers (Ali, Uppal & Gulliver, 2018; Bervell & Umar, 2017; Kaliisa & Picard, 2017; Wingo, Ivankova & Moss, 2017).

Infrastructure

Infrastructure is the second category of challenges that inhibit the teachers from ICT integration in their instructional practices. ICT infrastructure encompasses ICT hardware and software, internet connectivity and electricity or simply power supply. Previous studies have reported lack of ICT infrastructure to be among the major challenges encountered by teachers in their zeal to integrate ICT in teaching and learning (Ali, Uppal, & Gulliver, 2018) and a worse infrastructural challenge reported in developing countries Barakabitzte, Lazaro, Ainea et al. (2019). Improper ICT infrastructure may result in frustration and discouragement among teachers when internet or electricity is intermittent or the computers are obsolete and too slow (Asuman & Clement, 2018; Barakabitzte et al., 2019; Bridget, 2016).

Individual characteristics

The third category of challenges is those that relate to the teacher's attributes. Factors considered among the teacher's individual characteristics include attitude, competence, time constraints and limited ICT training.

Attitude: Attitude refers to the teachers' liking or disliking to use ICT in education. When teachers have a positive attitude towards ICT, they will tend to integrate it in their teaching whereas when the attitudes are negative, they will be hesitant to integrate it (Ali, Uppal & Gulliver, 2018; Goeman, 2008; Kaliisa & Picard,

2017; Rohayani, Kurniabudi, & Sharipuddin, 2015). Becta (2004) claims that one key means of influencing teachers' attitudes towards integration of ICT in their instructional practices is to convince them of how these technologies will benefit both their instructional processes and their students.

ICT Competence: ICT competence is one of the key influences of the teachers' ICT integration in classroom teaching and learning (Bervell & Umar, 2017; Rohayani, Kurniabudi, & Sharipuddin, 2015). ICT competence relates to the teachers' knowledge and skills in integrating ICT in the instructional process (Vanderlinde, Aesaert & van Braak (2014). It is understandable that ICTs are a recent innovation in the education systems of many countries and therefore many teachers still have no or little skill and experience in working with technologies which may justify the limited ICT competence. The teachers' competence will remain a prominent challenge to the integration of ICT in education systems the world over until it is adequately addressed (Barakabitzte et al., 2019).

Time Constraints: Previous studies have reported lack of time as a key challenge to the integration of ICT in instructional practices of teachers (Al- Alwani, 2005; Becta, 2004; Beggs, 2000; Schoepp, 2005; Sicilia, 2005). Teachers need time to search internet information, prepare lessons, correct students' work, explore and practice with ICT, deal with technical challenges and attend training in form of workshops, seminars and online courses (Becta, 2004). Therefore, there is need to reduce the workload of teachers to allow ample time for them to engage with technology.

Limited ICT Training: Among the challenges most commonly cited in literature is limited and inappropriate ICT training (Albirini, 2006; Balanskat, Blamire & Kefala, 2006; Beggs, 2000; Özden, 2007; Schoepp, 2005; Sicilia, 2005; Toprakci, 2006; Ghavifekr & Wan Athirah, 2015). Beggs (2000) cited limited training as one of the top three challenges hindering teachers from integrating ICT in their instructional practices. Teachers need some initial training to develop relevant skills, knowledge and attitudes for the effective integration of ICT to support their instructional practices. However, as observed by Becta (2004), the issue of ICT training is a complex one as it involves the provision of

pedagogical training for the teachers rather than just training them on basic ICT skills.

Research Methodology

The study was qualitative involving the use of focus group discussions with 10 college lecturers from each of the four National Teachers' Colleges; interview with 4 Principals, one from each college and observation of 4 lessons where ICT was integrated. Snowball purposive sampling strategy was employed to draw the 10 focus group discussion participants from each college while there was no sampling of the Principals because each college had only one Principal. Volunteer sampling strategy was used to get participants for the lessons to be observed.

Validity and Reliability

The validity and reliability of the instruments were ensured through conducting a pilot study with lecturers from a neutral college and later adjusting the instrument items that were found to have been ambiguous and vague. Secondly, through seeking guidance and approval from the research supervisors during the process of instruments' development. Thirdly, through data triangulation, involving the use of data from multiple sources: focus group discussion, interview and observation.

Data Analysis Plan

The data generated being qualitative, thematic analysis was applied following the four stages as described by Punch (2015): involving translating and transcribing, identification of themes, data coding and conceptualization. Data collected through different instruments were integrated at the interpretational stage.

Ethical Considerations

The participants were assured of anonymity of their identities, voluntariness in participation, restriction of information provided to the study purpose only and were requested to sign consent forms.

Results and Discussion

The core research question that informed this study was: What are the perceived challenges to the integration of ICT in the instructional practices of the lecturers among the National Teachers' Colleges in Uganda?

In the researchers' discourse with the participants through focus group discussions,

interview and observation of sample lessons, the following challenges were revealed:

Attitudinal Challenges

It was apparent that some of the challenges encountered by the college lecturers were attitudinal. Some lecturers openly expressed reservations to the integration of ICT in their instructional practices. An example of such negative attitude is illustrated by one of the lecturers as follows:

When we allow our students to get into the computer room to search for materials that are relevant to their subjects, they become excited. But you will find some of them watching pornographic pictures and others chatting with their friends in facebook instead. Funny enough, many students are using the internet at the college to spread rumors 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 view expressed above was supported by many lecturers who believed that ICT distracts students from concentrating on their studies. This view is in consonance with findings of previous studies on barriers to ICT integration that reported negative attitudes of teachers as key challenge to the integration (Ali, Uppal & Gulliver, 2018; Goeman, 2008; Kaliisa & Picard, 2019; Rohayani, Kurniabudi, & Sharipuddin, 2015). It is as a result of such negative attitude towards ICT that to date the possession of mobile phones by students is banned in Primary and secondary schools in Uganda.

ICT Competence

Competence can be defined as "an excellent capability in undertaking a given task" (Amimo, 2021 p.4). In this study, competence comprises the knowledge, skills, attitudes and experiences that will enable teachers to teach using technology for optimum learning to take place. ICT competence was yet another challenge that the lecturers expressed as one of the reasons they did not attempt to integrate ICT in their teaching. Many of them observed that during their own secondary school education and teacher training, they did not get a chance to interact with computers. They wondered how all

of a sudden, they would be asked to use computers in their lesson delivery as expressed by one of the respondents:

In my opinion, ICT can be used as a pedagogical tool to enhance learning in the classroom but it is not used at our college. We have enough computers, LCD projectors and smart board but most of us don't use them since we don't have sufficient knowledge about them. Last year, there was some training at the college in which most of us participated but it focused on equipping basic ICT skills instead of pedagogical competence. Some of us are even afraid to use projectors in the classroom because we are not able to prepare digital presentations and for fear of failure and being embarrassed before the students who are more technologically savvy than us.

In line with the lecturers' views on competence, Knezek and Christensen (2002) stated that teachers' competence with computer technology is a key factor of effective use of ICT in teaching. So, the lecturers who did not have ICT competence could not integrate the ICT tools in their teaching even when some tools were available in the colleges. Some other studies such as of Chu (2000); Vanderlinde, Van Braak and Hermans (2009); Venezky (2004); Divaharan and Ping (2010) also agreed that effective use of computers is reliant on the teachers' ICT skills as well as their intentions towards ICT use. It is therefore, imperative that the lecturers' professional development has to concentrate on both ICT skills training and appropriate ICT integration strategies in the curriculum.

Time Constraints

The lecturers expressed time constraints as one of the challenges hampering the integration of ICT in their instructional practices. Many lecturers pointed out to the fact that college programs are congested with so many activities, leave alone the teaching duties. For instance, one of the lecturers said:

I cannot find time due to heavy workload and intensive teaching program in the college"
Another lecturer reported, *"There is an exam at the end of the year that students need to be ready for. Much as I could integrate*

technology in my teaching, I must complete the curriculum in readiness for the exams.

According to Dang (2011), conducting a lesson using ICT is time consuming because as the rule of thumb, one hour of ICT- enhanced lesson would require about 3 to 4 hours of preparation because the teachers will need additional time to set up and test. For this reason, the lecturers faced problems either in preparing the lessons or in conducting the lessons within the limited time. So, the lecturers felt that integrating ICT in their teaching practices slowed down syllabus content coverage that would eventually interfere with performance in the examinations. Moreover, Kozma, McGhee, Quellmalz & Zalles, (2004) claimed that the biggest barriers to the use of computers by teachers were the lack of time available in classes and in their own schedules for planning.

Limited ICT Training

Most lecturers reported they lacked the skill to use the ICT in their instructional practices because they missed the opportunity to be trained in computer applications during their initial teacher training and since then some of them have had limited opportunity to attend in-service training on ICT integration in teaching. The illustration below is an example:

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?

Relatedly, during an interview with a Principal of one of the colleges, he made the following remark:

We thank the Ministry of Education and Sports and our Development Partners for the training our lecturers have benefitted from so far. However, the lecturers require extensive, on-going exposure to ICTs to be able to evaluate and select the most appropriate resources. 'One-off training' is not sufficient, the Ministry needs to invest in and implement long term ongoing training and continuous professional development in

order for the lecturers to keep up with rapidly evolving digital technologies.

Most of the participants in the focus group discussions stated that they have never taken formal training on ICT application in teaching and learning. This implies that the lecturers require ICT training both at preservice and in-service levels. Some of the lecturers who had attended some in-service training complained that the trainings they received were not tailored to their curriculum nor to their subject, instead, it was of general ICT skills. Lack of training is therefore pointed out as a major hinderance to the integration of ICT in teaching (Albirini, 2006; Balanskat, Blamire & Kefala, 2006; Pelgrum 2001; Schoepp, 2005). Further, OFSTED (2011) reported that lack of training in ICT for teachers is the main reason for insufficient integration of ICT in learning. The lack of training in ICT is not unique to only Ugandan teachers. Amimo (2021) reported a similar scenario in Kenya where as a result of the COVID-19 pandemic, schools were abruptly closed and teachers from “mortar and brick” classrooms were suddenly required to conduct online classes which neither their initial teacher training nor in-service programs had prepared them for.

ICT Infrastructure

Although credible effort has been made to equip the colleges with both hardware and software, including internet connectivity, the college lecturers still complained of their inadequacy compared to the number of users. In one of the colleges, a lecturer expressed his disappointment thus:

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 the equipment, how would we share them? Even projectors, there are only two against over fifty of us who would need to use them.

Another lecturer in yet another college observed:

Many of us enjoy using computers and other digital tools in our 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 competing with students in the computer lab to get computers when there is internet connectivity; these days with the little computer training many of us have received, even to secure a projector for a lesson has become a scramble, even worse, some lecturers secure the projectors well in advance of their lessons and keep until when the lesson is due, disadvantaging their colleagues whose lessons come before.

The findings of this study therefore, revealed the inadequacy of ICT equipment in the colleges, thus, affecting the successful integration of ICT in teaching. This finding was supported the finding by Azim Premji Foundation (2008), Thirumurthy and Sundaram (2003), infoDev (2010) and Thakur (2014) which claimed that inadequate accessibility to ICT equipment was one of the main factors which hampered ICT integration in teaching. It was also observed that when the lecturers wanted to integrate ICT in their lessons, they took the students to specific shared ICT labs which were equipped with ICT facilities. During the discussions, some lecturers responded that they used ICT if the computer lab was accessible and free.

So, accessibility and availability of ICT equipment in the ICT labs facilitated the lecturers' integration of ICT in teaching. Al-Alwani (2005), Toprakci (2006) Albirini (2006) supporting this view pointed out that teachers generally complained about the challenge of accessing ICT resources to the extent that in some schools it required prior booking of the ICT resources. Because of the inadequate access to the ICT resources in the colleges, the lecturers as well as the students were not getting adequate opportunity to constantly use the ICT resources whenever they required.

Observation of lessons where ICT was integrated in the teaching and learning process in all the four study colleges revealed that whereas the lecturers used PowerPoint presentations, the students were passively listening and copying notes from the slides into their notebooks. The lessons appeared to be the traditional teacher-centered methods in which the PowerPoint slides substituted the chalkboard. Figure one illustrates how the ICT was integrated in the congested classroom:



Figure 1: Integration of ICT in a Congested Classroom

According to Dexter, Seashore and Anderson (2013), integration of ICT in the teaching and learning process requires both the teacher and the learners to be actively engaged with the ICT devices, browsing the web and searching content online. Therefore, in a situation where only the lecturer has access to a projector and projects pre-prepared lesson notes to students, while students are simply listening and writing down some notes, as in the scenario depicted in figure one, falls short of the purpose of ICT integration in teaching and learning.

Technical Support

The lecturers in all the colleges acknowledged that each of the colleges had at least one technical personnel employed by the Governing Councils to provide technical support to the lecturers while teaching using ICT. However, they observed that one person was not adequate compared to the number of users and they also recommended extending his/roles to include teaching. The illustration below supports this finding:

There is only one ICT technician who always looks overwhelmed by the number of students who flock the ICT lab. He is always busy with students and when you are a teacher and you try to consult him for help, he sometimes embarrasses you before the students saying that as a teacher you ought to know what to do. But

even then, the lab technician only provides technical services to students like trouble shooting, how to open email accounts and help with forgotten email passwords, fixing internet connectivity; he has little knowledge and skill of how to integrate the ICT in teaching and learning.

According to Korte and Hüsing (2007), ICT technical support in schools helps teachers to use ICT in teaching without losing time fixing software and hardware problems. The Becta (2004) report stated “if there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns” (p. 16). Gomes (2005) further argued that ICT integration in teaching needs a technician who can provide technical support in real time during a lesson and if one is unavailable, the lack of technical support can be an obstacle to ICT integration in teaching and learning practices. It is therefore, imperative that if lecturers are to integrate ICT in their teaching practices with confidence, then technical personnel must be recruited in sufficient number to provide due technical assistance when required.

ICT Vision and Plans

The researchers found that all the four sampled colleges lacked ICT vision and plan. In some of the colleges, the participants in the focus group

discussions said the ICT visions and plans were either in the process of being developed or existed in draft form and were not yet operational. But even when the investigators demanded to see the draft forms of the ICT vision and plan documents, they seemed to be nonexistent. One participant in a focus group discussion said:

In our college, the Head of departments participated in formulating the college ICT vision and policy about two years ago. The draft vision and policy were supposed to be presented to the staff for consideration before it would be presented to the Governing Council for approval. Since then, I don't know what has happened to the draft vision and policy, for they have never been presented to the staff, nor to the Governing Council. If the head of ICT department was in this discussion, he would perhaps explain what happened to the draft vision and policy.

According to Bangkok (2014) ICT vision is important to effective ICT integration. Previous research evidence shows that the absence of ICT vision is one of the crucial challenges inhibiting teachers' ICT integration in their instructional practices (Barakabitze et al., 2019; Raphael & Mtebe, 2016; Rana & Rana, 2020), for it is from the institutional vision that a general framework for the strategic and operational planning relating to allocation of the institution's scarce resources can be drawn (Salik & Zhiyong, 2014). The formulation and institutionalization of a vision will stimulate and empower the lecturers to work towards achieving the stated aims and objectives of the vision, pave the way for career growth for the lecturers and set a level of excellence that all relevant parties within the institution will strive to achieve.

Conclusions and Recommendations

The following conclusions and recommendations are hereby made from the findings:

Conclusions

Successful integration of ICT in the teaching and learning process depends on various factors. The result of this study revealed that there are many interrelated challenges that impede the lecturers in the National Teachers' Colleges from successfully integrating ICT in their teaching and

learning practices. Among the prominent challenges were:

1. Attitudinal barriers: Some lecturers expressed reservations about the actual value of ICT in the teaching and learning process apart from just distracting the attention of the students.
2. Inadequate ICT competence: Many lecturers acknowledged their inadequate knowledge and skills in ICT because they lacked such experience during their own teacher training.
3. Time constraints: The lecturers observed a congestion of activities within their work schedules and expressed fears that ICT mediated lessons require much time which may not be available given their examination-oriented teaching.
4. Limited ICT training. It was revealed that many lecturers lacked pre-service training on ICT applications for classroom instruction and even after joining the service, some of the in-service training they have had have not addressed their subject needs but rather been of a general nature focusing on basic ICT skills.
5. Infrastructure accessibility: There was generally inadequate accessibility to ICT infrastructure in the colleges leading to limited accessibility to the ICT resources. The issue of a shared ICT lab for all classes was a major concern for the lecturers. Internet was reported to be intermittent and slow when available, which disabled the lecturers from using innovative and web-based learning techniques. ICT was used to support traditional teaching practices.
6. Technical support: It was revealed that the colleges had some technical personnel to play supportive role to the lecturers and students when using ICT for study purposes. The major concern of the lecturers was that one technical personnel was not adequate to handle the increasing enrollments of the colleges. There was tendency of getting overwhelmed by the number of students and lecturers requiring service at the same time,
7. ICT vision and plans: It was clearly reported that the colleges did not have operational ICT vision and plans. The claims that some ICT visions and plans

were in draft form in some colleges could not be verified because they were not availed.

Recommendations

In light of the findings of this study, the researchers recommend the following:

1. Provision of regular professional development trainings to the college lecturers to retool those without any initial training on ICT integration and keep up-to-date the skills of those with already some basic skills and experience. The training provided should focus not only on basic skills in ICT but also pedagogical use of ICT in teaching and learning. A system of peer coaching and mentoring across levels of teacher education in Uganda could also tremendously improve the ICT skills of the novice lecturers. There is need for benchmarking with successful teacher education programs outside the country. Resources need to be channeled towards these directions. Regular training for the lecturers will serve multiple purposes: It will address the negative attitude of some of the lecturers, raise the competence levels of the ICT novice lecturers and provide in-service training for all the lecturers.
2. To allow more time for the lecturers to engage with ICT for instructional purposes, their workloads need to be reduced. Reducing the workloads for the lecturers means recruiting more lecturers who could offload some responsibilities from the already overstretched.
3. More ICT infrastructure in the form of hardware and software should be provided to the colleges and they should be regularly updated to minimize reliance on obsolete technology which may frustrate both the students and lecturers. Furthermore, to alleviate reliance on college infrastructure which may always be inadequate because of the expanding enrollment of the colleges, students should be encouraged to bring their own devices such as laptops, tablets, or simply smart phones. Lecturers need to be provided with laptops and broadband internet connection packages at affordable payments and instalment conditions to allow the lecturers have the

opportunity to use technology beyond the college. Furthermore, there is need to provide fast and reliable internet in the colleges. College management needs to explore possibilities of sourcing interested development partners to help subsidize the cost of internet connectivity.

4. While the employment of technical personnel in the colleges to provide technical support to the ICT users is appreciable, there is need to allocate more resources to employ more technical personnel.
5. The colleges need to be supported to develop ICT vision and plans using credible consultants and involving all relevant stakeholders in the college – management staff, lecturers, parents' representatives, etc. The college management needs to be supported to allocate adequate resources towards the implementation of the vision and plan.

References

- Al-Alwani, A. (2005). Barriers to Integrating Information Technology in Saudi Arabia Science Education: Doctoral dissertation, the University of Kansas, <http://gradworks.umi.com/31/85/3185124.html>.
- Albirini, A. (2006) Teachers' attitudes towards ICT. The case of Syrian EFL. *Computers and Education*, 47(4) 373-398
- Al-Busaidi, K. A., & Al-Shihi, H. (2012). Key factors to instructors' satisfaction of learning management systems in blended learning. *Journal of Computing in Higher Education*, 24(1), 18–39.
- Aldheleai, Y. M., Baki, R., Tasir, Z., & Alrahmi, W. (2019). What hinders the use of ICT among academic staff at Yemen's public universities? *International Journal of Humanities and Innovation*, 2(1), 7–12.166
- Ali, S., Uppal, M. A., & Gulliver, S. R. (2018). A conceptual framework highlighting e-learning implementation barriers. *Information Technology and People*, 31(1), 156–180.
- Amimo, C. A. (2021). From the Classroom into Virtual Learning Environments: Essential Knowledge, Competences, Skills and

- Pedagogical Strategies for the 21st Century Teacher Education in Kenya. Retrieved from: https://www.intechopen.com/c_hapters/75908.
- Asuman, B., & Clement, C. K. (2018). Integration of web-based learning into higher education institutions in Uganda: Teachers' perspectives. *International Journal of Web-Based Learning and Teaching Technologies*, 13(3), 33–50.
- AzimPremji Founation(2008) The Social Context of Elementary Education in Rural India Report.Bangalore India: Azim Premji Foundation. Retrieved from <http://w.w.w.azimPremjiFounation.org/>.
- Balanskat, A., Blamire, R., & Kefala, S. (2006). A review of studies of ICT impact on schools in Europe: European Schoolnet.
- Bangkok, U. (2014). Integrating ICTs into Education. Retrieved May 12, 2018, from ICT in Education:<http://www.unescobkk.org/index.php?id=1793>
- Barakabitze, A. A (2014) "The context of education initiatives, importance and inhibitors of ICTs towards improving teaching and learning in Tanzania: a critical literature review," *Journal of Information & Knowledge Management*, 4, (10), 83–97.
- Barakabitze, A. A., Kitindi, E. J., Sanga, C., G. Kibirige, G., & N. Makwinya, N. (2015) "Exploring students' skills and attitudes on effective use of ICTs: case study of selected Tanzanian public secondary schools," *Universal Journal of Educational Research*, 3(6) 407–425.
- Barakabitze, A. A., Lazaro, A. W., Ainea, N., Mkwizu, M. H., Maziku, H., Matofali, A. X., & Sanga, C. (2019). Transforming African education Systems in Science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International*. <https://doi.org/10.1155/2019/6946809>.
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education*, 39(4), 395–414.
- Becta (2004). *Primary schools - ICT and standards*. Retrieved June 13, 2020, from <http://www.becta.org.uk>
- Beggs, T. A. (2000). Influences and barriers to the adoption of instructional technology: Paper presented at the Proceedings of the Mid-South Instructional Technology Conference, Murfreesboro.
- Bekalu, F., Elen, J., Petegem, W. V., Bekele, A. & Goeman, K. (2021) Determinants of instructors' educational ICT use in Ethiopian higher education, *Journal of Education and Information Technologies*, 34(15), 273 – 286.
- Bervell, B., & Umar, I. N. (2017). A decade of LMS acceptance and adoption research in sub-Sahara African higher education: A systematic review of models, methodologies, milestones and main challenges. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(11), 7269–7286.
- Birhanu, M. A. (2015) "Integrating ICT into teaching-learning practices: promise, challenges and future directions of higher educational institutes," *Universal Journal of Educational Research*, 3, (3) 170–189.
- Bridget, E. U. (2016). Enhancing the utilization of information communication technology (ICT) among home economics lecturers in south eastern Nigeria. *Education and Practice*, 7(9), 34–39.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 136–155.
- Chai, C. S., Koh, J. L., & Tsai, C. C. (2010). "Facilitating pre-service teachers' development of technological, pedagogical, and content knowledge (TPACK)," *Educational Technology and Society*, 13(4), 63–73.

- Chu, K. M. (2000) *The new meaning of educational change*. New York and London: Teachers College Press.
- Dang, X.T. (2011). Factors Influencing Teachers' Use of ICT in Language Teaching: A Case Study of Hanoi University Vietnam, International Conference "ICT for Language Learning."
- Dexter, S. L., Anderson, R. E., & Ronnkvist, A. M. (2002). Quality technology support: What is it? Who has it? And what difference does it make? *Journal of Educational Computing Research*, 26(3), 265–285.
- Dexter, S. L., Seashore, K. R., & Anderson, R. E. (2013). Contributions of professional community to exemplary use of ICT. *Journal of Computer Assisted Learning*, 18(4), 489-497.
- Divaharan, S. & Ping, L. C. (2010). Secondary School Socio- Cultural Context influencing ICT integration: A case study approach. *Australian Journal of Education Technology*, 26(6), 741-763.
- Fu, S. (2013) "ICT in education: a critical literature review and its implications," *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 9(1),112–122, 2013.
- Ghavifekr, S., Afshari, M., & Amla, S. (2012). Management strategies for E-Learning system as the core component of systemic change: A qualitative analysis. *Life Science Journal*, 9(3), 2190-2196.
- Ghavifekr, S., & Wan Athirah, W. R. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1(2), 175-191.
- Goeman, K. (2008). From Bricks and Mortar to Virtual Universities: The Implementation of E-Learning in Flemish Universities (Unpublished doctoral dissertation). Vrije University.
- Gomes, C. (2005). Integration of ICT in science teaching: A study performed in Azores, Portugal. Recent Research Developments in Learning Technologies. *International Journal of Education and Development using Information and Communication Technology*, 13(3), 87–93.
- Inamorato dos Santos, A., Gausas, S., Mackeviciute, R., Jotautyte, A., & Martinaitis, Z. (2019). Innovating professional development in higher education: Case studies. Publications Office of the European Union. <https://doi.org/10.2760/712385>.
- InfoDev (2010) ICT in school education (Primary and Secondary). Retrieved from <http://w.w.w.infodev.org/en/document/1016.pdf>.
- Joel, M. & Mussa, M. K. (2015) "Deployment and adoption strategy of cloud computing for blended learning in higher education institutions in sub-Saharan Africa," in *Educational Technology Integration and Active Learning*, pp. 395–408, IGI Global, Hershey, PA, USA, 2015.
- Kafyulilo, A. C. (2015) "Challenges and opportunities for e-learning in education: a case study," in *Educational Technology Integration and Active Learning*, pp. 317–328, IGI Global, Hershey, PA, USA.
- Kaliisa, R., & Picard, M. (2017). A systematic review on mobile learning in higher education: The African perspective. *The Turkish Online Journal of Educational Technology*, 16(1), 1–18.
- Kisanjara, S., Tossy, T., Sife, A., & Msanjila, S. (2017) "An integrated model for measuring the impacts of e-learning on students' achievement in developing countries," *International Journal of Education and Development using Information and Communication Technology*, 13(3), 109–127.
- Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, 59(4), 1109–1121.
- Korte, W. B., & Hüsing, T. (2017). Benchmarking access and use of ICT in European schools: Results from Head Teacher and A Classroom Teacher Surveys in 27 European countries. *eLearning Papers*, 2(1), 1-6.

- Kozma, R., McGhee, R., Quellmalz, E., and Zalles, D. 2004. Closing the digital divide: Evaluation of the World Links program. *International Journal of Educational Development*, Vol. 24, No. 4, pp. 361–381.
- Knezek, G., & Christensen, R. (2002). Impact of new information technologies on teachers and students. *Education and Information Technologies*, 7(4), 369–376.
- Lidia, W., Mark, S., Thomas, C. & Thomas, H (2018) The impact of ICT and game-based learning on content and language integrated learning,” in Proceedings of International Conference ICT for Language Learning, 4th Edition, pp. 1–7, Florence Italy.
- Martins, J. T., & Baptista Nunes, M. (2016). Academics’ e-learning adoption in higher education institutions: A matter of trust. *The Learning Organization*, 23(5), 299–331. <https://doi.org/10.1108/TLO-05-2015-0034>.
- Maurice, A., Charles, B. C. & Ofori-Darko, J. (2014) “Perceptions in the use of information and communication technology (ICT) among distance learning students in the university of education,” *International Journal of Business and Management*, 2(7)185–195.
- Moses, P., Bakar, K. A., Mahmud, R., & Wong, S. L. (2012). ICT infrastructure, technical and administrative support as correlates of teachers’ laptop use. *Procedia - Social and Behavioral Sciences*, 59, 709–714.
- Mouakket, S., & Bettayeb, A. M. (2015). Investigating the factors influencing continuance usage intention of learning management systems by university instructors. *International Journal of Web Information Systems*, 11(4), 491–509.
- Mukelabai, A. C. (2011) "Third-year students’ perceptions of the use of ICT at a teacher training college in Namibia,” Thesis Dissertation, M.Phil in Higher Education, Stellenbosch University, Stellenbosch, South Africa.
- Mwalongo, A. (2010) “Teachers’ knowledge, beliefs and pedagogical practices in integrating ICTs in different curriculum areas in secondary schools: a case study of Pakistan,” *Journal of Educational Research*, 13(1) 69.
- Mwalongo, A. (2011) “Teachers’ perceptions about ICT for teaching, professional development, administration and personal use,” *International Journal of Education and Development using Information and Communication Technology (IJEDICT)* vol. 7(3), 36–49.
- OFSTED (2011) ICT in schools: An evaluation of ICT in schools in England, 2008-2011; London office for standards in education.
- Osborne, J., & Hennessey, S. (2003). Literature review in science education and the role of ICT: Promise, problems and future directions. London: Future lab. <http://hal.archives-ouvertes.fr/docs/00/19/04/41/PDF/osborne-j-2003-r6.pdf>.
- Özden, M. (2007). Problems with science and technology education in Turkey. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(2), 157-161.
- Passey, D., T. Laferrière, M. Y-A. Ahmad, M. Bhowmik, D. Gross, J. Price, P. Resta & Shonfeld, M. (2016). “Educational Digital Technologies in Developing Countries Challenge Third Party Providers.” *Educational Technology & Society* 19 (3): 121–133. [Google Scholar].
- Pelgrum, W. J. (2001) Obstacles to the integration of ICT in education: Results from a worldwide educational assessment, *Computers and Education* 37(2) 163-178.
- Puentedura, R. R. (2018) “SAMR and TPACK: introduction to advanced practice,” http://hippasus.com/resources/sweden2010/samr_tpck_introtoadvancedpractice.pdf.
- Punch, K. F. (2015). *Introduction to social research: Quantitative and qualitative approaches* (2nd ed.). Thousand Oaks, CA: Sage Publication Ltd.
- Rana, K., & Rana, K. (2020). ICT integration in teaching and learning activities in higher education: A case study of Nepal's teacher education. *Malaysian Online*

- Journal of Educational Technology*, 8(1), 36–47.
- Raphael, C., & Mtebe, J. S. (2016). Instructor support services: An inevitable critical success factor in blended learning in higher education in Tanzania. *International Journal of Education and Development using Information and Communication Technology*, 12(2), 123–138.170
- Rizana, A. F., Hediyanto, U. Y. K. S., Ramadhan, F., & Kurniawati, A. (2020). E-learning success determinants in higher education: A systematic literature review from users' perspective. In *IOP Conference Series: Materials Science and Engineering* (p. 032012). IOP Publishing. <https://doi.org/10.1088/1757-899X/830/3/032012170>.
- Rohayani, A. H. H., Kurniabudi, & Sharipuddin (2015). A literature review: Readiness factors to measuring e-learning readiness in higher education. *Procedia Computer Science*, 59, 230–234.
- Salik, M., & Zhiyong, Z. (2014). Information and communication technologies: A look at policy in higher education for sustainable development. *Journal of Educational Policy and Entrepreneurial Research*, 1(2), 144–150.
- Schoepp, K. (2005). Barriers to technology integration in a technology-rich environment. *Learning and Teaching in Higher Education: Gulf Perspectives*, 2(1), 1-24.
- Sicilia, C. (2005). The Challenges and Benefits to Teachers' Practices in Constructivist Learning Environments Supported by Technology. Unpublished Masters thesis, McGill University, Montreal.
- Singhavi, C., & Basargekar, P. (2019). "Barriers Perceived by Teachers for Use of Information and Communication Technology (ICT) in the Classroom in Maharashtra, India." *International Journal of Education and Development Using Information and Communication Technology* (IJEDICT) 15 (2): 62–78. [Google Scholar]
- Teo, T. (2010). Examining the influence of subjective norm and facilitating conditions on the intention to use technology among pre-service teachers: A structural equation modeling of an extended technology acceptance model. *Asia Pacific Education Review*, 11, 253–262.
- Teo, T., Huang, F., & Hoi, C. K. W. (2018). Explicating the influences that explain intention to use technology among English teachers in China. *Interactive Learning Environments*, 26(4), 460–475.
- Thakur, N. (2014) A study on awareness of trained teachers in relation to ICT. *International Journal of Research and Methods in Education* 4(1) 6-11.
- Thirumurthy, Y & Sundaram, N. (2003) Computers for young children in India: Childhood Education; *Annual Theme* 79(5) 307-313.
- Toprakci, E. (2006). Obstacles at integration of schools into information and communication technologies by taking into consideration the opinions of the teachers and principals of primary and secondary schools in Turkey. *Journal of Instructional Science and Technology(e-JIST)*, 9(1), 1-16.
- Uganda Vision, 2040. A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years" Uganda National Planning Authority.
- Uganda Communications Commission (2014) Integrating ICT in Uganda: Status Report. Uganda National Development Plan, 2010/2011-2014/2015.
- UNESCO (2018) Leveraging Information and Communication Technology to Achieve Education 2030: Report of the International Forum on ICT and Education 2030, <http://unesdoc.unesco.org/images/0025/002595/259587e.pdf>.
- Vanderlinde, R., Van Braak, J., & Dexter, S. (2012). ICT policy planning in a context of curriculum reform: Disentanglement of ICT policy domains and artifacts.

- Computers and Education*, 58(4), 1339–1350.
- Vanderlinde, R., Aesaert, K. & van Braak, J. (2014). Institutionalised ICT use in primary education: a multilevel analysis. *Computers & Education*, 72, 1–10.
- Vanderlinde, R., van Braak, J. & Hermans, R. (2009). Educational technology on a turning point: curriculum implementation in Flanders and challenges for schools. *ETR&D Educational Technology Research and Development*, 57, 573–584.
- Venezky, R. (2004). Technology in the classroom: steps toward a new vision in education. *Communication and Information*, 4, 3–21.
- Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017). Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning*, 21(1), 15–35.
- Xavier, M., Tina, K., Matti, T., & Inocente, M., (2018) "From teacher-oriented to student-centred learning: developing an ICT-supported learning approach at the Eduardo Mondlane university, Mozambique," *Turkish Online Journal of Educational Technology*, 17(2), 112–122.
- Zhu, C. (2015). Organizational culture and technology-enhanced innovation in higher education. *Technology, Pedagogy and Education*, 24(1), 65–79.