THE UTILISATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN COLLEGES OF EDUCATION OF NORTHERN PROVINCE, ZAMBIA.

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[1]Moses Ng'andwe Musonda, [2]Dr. William Phiri
[1,2]School of Education,
Information and Communications University
Email: [1]cheatah27@gmail.com, [2]william77734@yahoo.com

Abstract:

The study sought to evaluate the utilisation of Information and Communication Technologies (ICTs) in Zambian colleges of teacher education. The study was conducted at Kasama College of Education, Northern College and ST Mary's College of Education. All the three colleges of teacher education offer diploma programmes for trainee teachers in early childhood education, Primary education and Junior Secondary. The research design employed in this study was a survey. The study target population was 1050 comprising college administrators, senior lecturers and student teachers. The study sample was 100 distributed as follows: three college administrators, 27 senior lecturers and 70 student teachers. Data was collected using questionnaires and interview schedules.

The study sought to determine the extent to which teacher training colleges use ICTs in institutional management and administration; to ascertain extent to which ICTs were utilised as tools for delivering the subject matter to pre-service teachers in colleges of education; and to establish the factors affecting effective utilisation of ICT in colleges of teacher education.

The findings of the study revealed that senior lecturer's ICT devices were rarely used in the process of delivering the subject matter to the trainee teachers in the classroom. The study revealed that a number of factors affected the effective utilisation of ICTs by the students in learning process: inadequate number of ICT devices such as computers, erratic provision of internet, and limited space in the student's computer lab. The lecturers reported that they did not effectively utilise ICT devices in the teaching process due to shortage of equipment such projectors, inadequate knowledge and skills on how to use ICT devices for teaching, overreliance on traditional approaches to lecturing and unreliable internet supply.

Based on the findings recommendations emerged: the college administration should organize training programmes for lecturers on how to use various ICT devices in teaching and learning, the colleges should prioritize the procurement of computers and other ICTs devices in order to reduce the student-computer ratio and increase the usage of ICTs in teaching by the lecturers, the colleges should build more and bigger computer labs both for students and lecturers.

Keywords: Information and Communication Technologies, Revised curriculum, Teacher Education Colleges, Student teachers,

1. INTRODUCTION
1.1 Background

In the contemporary world, educational systems worldwide are under ever-increasing pressure to use the latest Information and Communication technologies (ICTs) in management of student affairs such as registration and assessment; in management of institutional finances and staff affairs; and in transmitting knowledge and skills to students in the 21st century.

On a daily basis computer technocrat are coming up new technologies that can be utilized in schools and colleges of education. This rapid increase in technological innovations in the education sector coupled with an increasing demand among educationists for teachers to employ humanistic approaches to teaching and learning, have led to a shift from traditional teacher centered to leaner centric methods of teaching. The concepts teaching and learning have tremendously evolved and assumed new meanings and new modes of delivery. Modern educators are required to be competent users of technologies in delivering instructions to the learners.

In response to this pedagogical change and in an effort to revise and tailor the school curriculum to the changing educational needs, the Zambian Ministry in charge of Education introduced the revised curriculum in which computer studies was introduced in 2013. It was seen that Zambia had ragged behind in the incorporation of ICT in the education sector. Therefore, country wide, there were calls from various stakeholders to align the school curriculum to the economic and social needs and ensure that the products of the school system are adequately prepared to live in a world of accelerating technological change. It should also be stated that the revised Zambian curriculum competence-based meaning that recipients should embody the necessary knowledge, skills and attitudes after being exposed to the content. One of the skills that should be imparted to the students is being able to use digital tools. As a consequence of this, teachers' ability to provide learning opportunities in digital competences for their pupils has received a great deal more attention. Thus, teacher education colleges are expected to expose student teachers to ICT education so that they can gain the necessary competencies that would enable them use ICT in teaching when they finally deployed in schools.

One important ICT tool that student teachers should experience is electronic learning. Carliner (2004) defines the term e-learning as the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance. It is the application of advanced information systems and technologies to transmit learning through cable or wireless internet technologies to the students. This type of learning has received a lot of support from international agencies and many stakeholders because of its outstanding benefits. One of them is that it offers flexible learning environments to the learners, which enables them to interact with learning materials, their instructors and other learners from various locations and often at various times using network technologies.

As it has been noted various policies have been put in place to foster the integration of ICT in teaching and learning at various levels of general education. However, there have not been sufficient studies in Africa and Zambia to be specific to evaluate how colleges of

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education utilize ICTs. Bekele (2004) argues that there exists an enormous knowledge gap in as far as ICT application in the instructional process is concerned. Lack of literature backed by empirical evidence from research on this area in Zambia is a clear confirmation of this knowledge gap. It is for this reason that this study sought to evaluate how ICTs were utilized in colleges of teacher education. The study was conducted at Kasama College of Education, Northern College of Education and ST Mary's College of Education. All the three colleges of teacher education offer diploma programs for trainee teachers in early childhood education, primary education and Junior secondary.

1.2 Statement of the problem

Educational research has revealed that ICTs play a very pivotal role in information creation, dissemination and management. It has also been found that ICT promotes student-centered approaches to learning by enabling the students to control their own pace of learning. At a global level, a good number of educational software packages have been developed that can improve the student's interaction with fellow students and lecturers without having any physical contact. It is these benefits that have made the Zambian government to incorporate ICT education in teacher education curriculum. It is envisaged that the introduction of ICT education in colleges of education would help to improve the teaching pedagogy and management of student affairs. In spite of the increased awareness the outstanding benefits of effective ICT utilisation in colleges of education and government's commitment towards the full integration of ICT in teaching and learning programmes, the levels of ICT utilisation in colleges of education for teaching and learning

are frequently low. It is in this regard that this study seeks to investigate factors affecting the utilisation of ICTs in colleges of teacher education.

1.3 Objectives of the project

1. To determine the extent to which teacher training colleges use ICTs in institutional management and administration.
2. To ascertain extent to which ICTs are utilised as tools for delivering the subject matter to pre-service teachers in colleges of education.
3. To establish the factors affecting effective utilisation of ICT in colleges of teacher education.

2.   LITERATURE REVIEW

2.1 Extent to which ICT is utilised in institutional management and administration

The role of ICT in management and administration of public institutions cannot be overemphasized. ICT plays a vital role in supporting powerful, efficient management and administration in education sector. Maki (2008) states that ICT has become useful in the management of tertiary educational institutions and its use range from student administration to various human, material and financial resources administration. Krishnaveni and Meenakumari (2010) have identified about six reasons why of ICT is a convenient and significant tool in the administration and management of tertiary educational institutions. Firstly, ICT technology can process huge records quickly, thoroughly and faultlessly; secondly, technology can generate consistent and dependable records; and thirdly, records and data produced are searchable and quickly retrievable. The other reasons are that digital records save space, a premium cost to

institutions; technology saves human resources for data entry and servicing student admission and registration. With advanced scanning technology, completed application forms can be read into the databases in a matter of seconds. Other software like Learning Management Systems (LMS) e.g., the open source Moodle allow students to register for courses directly online, pay online and get course information online; and technology can expand the geographical boundary for student intake and facilitate cross-border higher education.

2.2 Extent of utilisation of ICTs in colleges of education as tools for delivering the subject matter to pre-service teachers

Tomte, Hovdhaugen and Solum (2009) have reported the findings of a survey that was conducted in Norway at three higher education institutions which included Oslo, Sor Tronderlag and Vestfold University Colleges. The study's respondents included 87 student teachers, 82 teacher trainers and 29 teacher mentors. The survey sought to establish the extent to which technology was used in teacher training institutions and the ways in which student teachers were prepared to integrate technology into their teaching. The findings of the survey showed that teacher trainers did not complain about access to ICT equipment. The common ICT equipment that were reported to be readily available in the three university colleges included computers and projector systems. However, the contemporary ICT devices such as videoconferencing, digital photo and video cameras, interactive whiteboards and audio equipment were scarce (Tomte, Hovdhaugen and Solum, 2009). It was discovered that even the student teachers were mainly prepared on how to use the traditional devices in teaching

and this represented the primitive understanding of teacher trainers of how ICT can be used in education.

Another study was conducted in Tanzania by Anderson, Nfuka, Sumra, Uimonen and Pain (2014) that sort to evaluate the usage ICT in Teacher Training Colleges. The project was implemented from 2005 to 2008 by the Ministry of Education and Vocational Training (MoEVT) sponsored by the Swedish embassy. The project aimed at improving the quality of education in Teacher Training Colleges and schools by incorporating ICT in teacher education so that student-teachers become ICT literate and able to use ICT in their teaching upon completing their programme. Thus, at the beginning of the project, colleges were provided with training, up-to-date equipment and internet connection. After project implementation, an evaluation was conducted to find out what had been achieved. The findings of the evaluation revealed that lecturers were still not fully using ICT for teaching. The study also showed that only 44% of the teachers were using ICT in teaching against the set target of 80%. It was further discovered that 62% of the lecturers from the 12 teacher training colleges used internet for sharing knowledge.

Another study was conducted in Nigeria by Gabba, Singh, Yusuf and Zeiden (2013) to explore the preparedness of colleges of education for ICT integration. The findings of the study revealed Nigerian colleges of education were not readily prepared for effective usage of ICT in pedagogical practices. It was discovered that many Nigerian colleges lagged behind in as far as the utilisation of digital technologies in their pedagogical practices was concerned. The poor state of ICT usage in Nigerian teacher

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education colleges was attributed to a number of factors which included but not limited lack of ICT facilities, low level of ICT literacy and experience among the academic staff.

Opati (2013) conducted a study at Makerere University College of education and external studies in Uganda, which aimed at investigating the extent to which ICT was used in teaching and learning at this institution. The study utilized qualitative case study research design to find out how ICT was used by student teachers and lecturers of a single university faculty. The findings of the study revealed that the university used an ICT learning management system that helped students to monitor their academic progress, register for courses and access marks.

The lecturers interviewed indicated that they used ICT for preparing and organizing lectures (Opati, 2013). Lecturers mainly used a computer to type lecture notes which they later on availed to students in order to alleviate the problem of wasting time through dictating notes to students in class. Furthermore, it was reported that students used a computer to type their assignments and they attested to the fact that typed assignments earned them more marks than handwritten ones.

2.3 Factors affecting the utilisation ICTs in teacher education colleges

Goktas, Yildirim and Yildirim (2009) conducted an investigation of the main barriers and possible enablers for integrating ICTs in Turkey's pre-service teacher education programs. The researchers utilized both quantitative and qualitative methods of data collection and analysis. The findings revealed that teacher educators attributed poor or lack of integration of ICTs in pre-service education programs to lack of in-service training, lack of

suitable software and materials and lack of hardware. The study showed that most schools of teacher education (STE) had limited ICT resources and infrastructures. Thus, it was suggested that STEs needed to invest huge amounts of money for the procurement of new hardware and software.

Anderson, Nfuka, Sumra, Uimonen and Pain (2014) state that one factor responsible for low utilisation of ICT in teaching and student preparation to use ICT in teaching was caused by a number of factors which include but not limited to insufficient number of computers at teacher colleges and unreliable internet connections. It was found that the student-computer ratio stood at 20 students to 1computer and that this needed attention in order for students to effectively gain knowledge and skills on how to use various ICT tools in teaching.

Gabba, Singh, Yusuf and Zeiden (2013) indicated that lack of ICT equipment, low internet connectivity and computers and inadequacies in the use of educational software had become barriers to effective training of prospective teachers in colleges. It was revealed that corruption among government officials had resulted in erratic supply of funds to colleges of education thereby affecting the procurement and installation of the much-needed ICT facilities. As result, teacher educators were not able to integrate ICT as instructional tools in their pre-service teacher training programmes.

Furthermore, Mirzajani, Mahmud, Ayub and Luan (2015) reviewed a number of studies on obstacles that prevent the use of ICT in pre-service teachers' educational courses. From the various studies reviewed, a number of factors that affect the utilisation of ICT in

teacher education programmes were identified which include but not limited to lack of enough training, lack of suitable technological resources such as hardware and software, lack of knowledge and skills, lack of ICT leadership support and lack of self-efficacy.

2.4 Summary of findings and Establishment of the gap and Personal critique summary

Opati (2013) conducted a study on how ICT was integrated in teaching and learning at this institution. The study used a case study research design. The findings revealed that the University had ICT learning management system that helped students to monitor their academic progress, register for courses and access marks.

However, the researcher did not do much as the study was confined to a single university and therefore the results cannot be over-generalized.

Gabba et al (2013) researched on the preparedness of Nigerian colleges of education for ICT integration. The results of the study showed that the colleges of education were readily prepared for effective usage of ICT in pedagogical practices. However, Gabba et al (2013) did not look at how ready colleges were to integrate ICT in institutional management and administration.

3. METHODOLOGY/RESEARCH DESIGN
3.1 Project Design / Approach
The study aims at evaluating the utilisation of ICT in colleges of teacher education in Zambia. To achieve this, the researcher will employ a mixed approach of qualitative and quantitative methods of data collection, analysis and reporting. A cross-section survey research design will be used in this study. A

cross-sectional survey is a type of research design that involves the collection of data from a specified population at a single point in time.

The researcher has adopted a cross-sectional survey design because its ability to offer the researcher an opportunity to assess relations between variables and differences between subgroups in a population (Glasow, 2005). A cross-sectional survey also allowed the researcher to obtain information from a large sample of the population. It is also well suited to gathering demographic data that describe the composition of the sample (McIntyre, 1999, p. 74). Additionally, a cross-sectional survey was suitable for this study because it is inclusive in the types and number of variables that can be studied, requires minimal investment to develop and administer, and is relatively easy for making generalizations.

3.2 Sampling technique/procedure
In this study, the researcher utilised a simple random sampling technique to select the respondents. A simple random sampling can be defined as a form of probability sampling where the elements or respondents drawn from the population have a known, unbiased and non-zero chance of being selected. Simple random sampling will give the researcher confidence that the selected sample is representative of the larger population from which it will be drawn.

To select the sample, the researcher will first construct a sampling frame consisting of the names of all student teachers and lecturers from the three colleges of education. A sampling frame refers to a list or procedure used to identify all the elements of the target population scientifically.

After the sampling frame is constructed, the researcher will use excel to generate random

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numbers by using the following formula: =RANDBETWEEN (0,50). The random numbers generated will then be used to pick participants with the corresponding numbers.

3.3 Target populations and Sample size

The study population was drawn from three colleges of teacher education in Northern Province of Zambia, namely Kasama College of education Northern College and ST Mary's College of Education. The total target population was 1050 consisting of student teachers, senior lecturers and administrators.

The total study sample was 100 distributed as follows: 70 student participants, 27 teacher educators and 3 administrators.

Table 1 below shows a summary of participants drawn from each college.

Participants	Kasama College of Education	Northern College	ST Mary's College
Administrators	1	1	1
Teacher Educators	15	5	7
Student teachers	50	10	10
Sub-total	66	16	18
Grand total			**100**

3.4 Instruments of data collection

In this stud, structured questionnaires were utilised to collect data from both student teachers and lecturers. The questionnaires consisted of both open and closed ended questions. Open-ended questions gave the participants chance to respond using their own words. On the other hand, closed-ended questions require that the respondents select an answer from a set of choices offered explicitly by the researcher (McIntyre, 1999, p. 75).

3.5 Data analysis techniques

The collected Data was processed using Rhemaforms which allowed the researcher to extract data in an excel file. This method was used because it is not time consuming and it is very effective. Thereafter, the data in the excel file will be run in a statistical package called STATA and be analyzed to produce quantitative study findings.

Qualitative data obtained from open ended questions in the questionnaires will be analysed using thematic analysis. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organizes and describes the data set in great detail. However, it also often goes further than this, and interprets various aspects of the research topic.

Under this method of data analysis, the researcher will first code the data. The term coding refers to the process of creating categories in relation to data or the grouping together of different instances of datum under an umbrella term that can enable them to be regarded as of the same type.

3.6 Ethical Considerations

In order to protect the respondents right to autonomy, the respondents were allowed chance to give an informed consent before participating in the study. Armiger (1997) defines the term informed consent as the act a person giving consent to participate in a research knowingly, voluntarily and intelligently, and in a clear and manifest way. In order to abide by this ethic, the study was introduced and its purpose explained to the

respondents. The researcher also clearly explained the procedure that would be followed in the research.

The researcher also upheld the confidentiality of the respondents. The issue of confidentiality and anonymity was upheld as a way of protecting the rights of beneficence, respect for the dignity and fidelity of the participants.

Additionally, the privacy of the respondents was also be respected. Privacy in this context refers is the freedom of research participants to determine the time, extent, and general circumstances under which private information will be shared with or withheld from others. In this regard, the researcher would not divulge any private information to anyone including personal beliefs, attitudes and opinions is shared with others, without the consent of the respondent.

4.0 RESULTS / RESEARCH FINDINGS

The study was conducted in three colleges of education of Northern Province namely, Kasama College of Education, Northern College and ST Mary's college of education. The data collected from the field was analysed and presented in accordance with the themes corresponding to each research question. The research questions have been answered by using the information gathered from respondents through questionnaires.

The findings were presented following the thematic areas: Response rates, demographic information of the study participants, extent to which ICTs utilized in colleges of teacher education in Zambia, factors are affecting effective utilisation of ICT in colleges of teacher education and possible enablers for effective utilisation of ICTs in pre-service teacher education programs in Zambian colleges.

4.2 ICT usage in management and administration of teacher education colleges

In determining the extent to which ICTs were employed in the management and administration of colleges of education, the lecturers and administrators were asked whether they used ICTs in management.

Table 1

Statement	Response	
	Yes	No
Use ICT for internal communication with staff	100%	0%
Availability of student's communication platform e.g. for announcements, check results e.t.c	17%	83%
Has a digital database (for HR record management, accounts and keeping students' records)	0%	100%
Functional website	13%	87%

Source: Field data, 2017

Figure 1: Use of ICT for Record keeping method
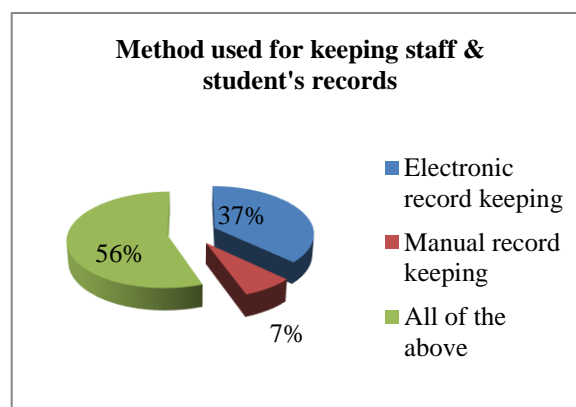
Source: Field data

Figure 1 shows the percent distribution of responses teacher educators and administrators on whether ICT was used to store records of staff and students. From the figure, we can see that the majority of the respondents, representing 93% reported that ICT was used for record keeping.
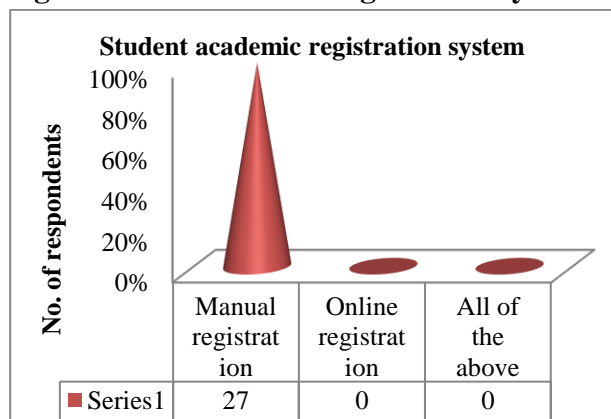
Figure 2: Use of Online registration system

Figure 2 above shows the teacher educator's responses on whether the colleges of education had online systems for student registration. The figure indicates that all the teacher educators (100%) said that the colleges did not have online registration systems.

4.3 Use of ICT for teaching and learning in teacher education colleges

Figure 3: How often lecturers incorporate ICT in classroom teaching
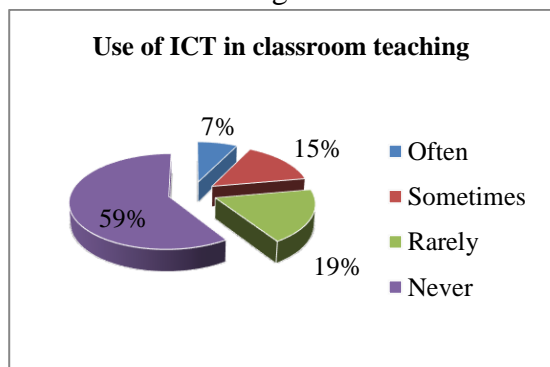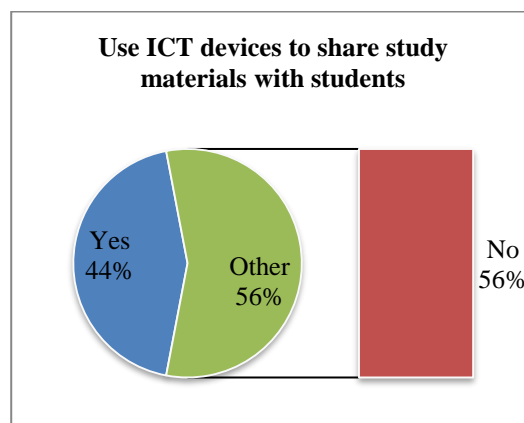

Figure 3 displays the percent distribution of how frequently ICT was incorporated by the lecturers in colleges of education in their classroom teaching. From the figure we can see that the majority of the teacher educators

i.e. 59% revealed that they did not use ICT in teaching.

Figure 4: Use ICT devices to share study materials with student teachers

Source: Field data

4.4 Factors affecting the effective utilisation of ICT in colleges of education

In trying to find out the factors affecting effective utilisation of ICTs in colleges of education, all the participants were asked to indicate whether the institution had access to various ICT devices, applications and other relevant ICT facilities. Table 2 below shows the responses of participants on factors impeding ICT usage in colleges of education.

Statement	Response	
	Yes	No
Does the institution have adequate computers for students and lecturers?	8%	92%
Does the institution have computer labs for students/lecturers	100%	0%
Is internet accessible	65%	35%
Do lecturers have adequate skills and competencies to effectively integrate ICT in teaching and learning?	19%	81%
Does the college have adequate number of projectors?	17%	83%

Source: Field data, 2017

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It is clear from the findings presented in the table above that the majority of the teacher educators representing 92% and 83% indicated that they did not utilise ICT in their teaching due to inadequate number of computers and projectors respectively.

When asked whether the lecturers had adequate knowledge, skills and competencies to enable them to effectively incorporate ICT in their teaching, 81% reported that they were not competent users of ICT.

5.0 DISCUSSION OF FINDINGS

This study has found that ICT is not very much utilised in teaching and learning in teacher training colleges.

This is supported by previous study by Anderson, Nfuka, Sumra, Uimonen and Pain (2014) who found that lecturers in colleges of education were still not fully using ICT for teaching. This study also showed that only 44% of the teacher educators were using ICT in teaching against the set target of 80%.

According to the findings of this study, the major factor affecting the utilisation of ICTs in teaching is lack of ICT equipment. Other factors lack technical skills and unstable internet connectivity and inadequate space in the computer lab (for students).

Finding is consistent with Dogra and Thakur (2013) who found that many teacher education institutions could not effectively utilise ICTs in teaching and learning processes due to lack of adequate ICT tools.

6. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the findings of the study which sought to ascertain the extent to which ICT was utilised in teaching and institutional management in colleges of education, the following have emerged:

There is low utilisation of ICT in colleges of education both for institutional management and teaching and learning.

The utilisation of ICT is limited due to the following factors:

- Lack of ICT equipment e.g. computers & projectors
- Unstable internet connectivity
- Lack of knowledge and skill on how to use ICT for teaching and learning purposes.

Recommendations

On the basis of the findings above, the following recommendations are made:

1. Colleges of education should invest reasonable amounts of money into the procurement of adequate ICT equipment such as projectors, laptops, tablets e.t.c.

2. Colleges of education should conduct CPD programs for lecturers in ICT and how to integrate it in teaching and learning so that prospective teachers are adequately empowered with skills and knowledge to enable them incorporate ICT in their future teaching.

3. Colleges of education should set aside funds for development of a college website and database.

4. Colleges of education should construct bigger computer laboratory rooms both for students and members of staff.

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