

Access and use of internet in teaching and learning at two selected teachers' colleges in Tanzania

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ABSTRACT

Recently, the application of Information and Communication Technologies (ICTs) is inevitable especially in improving education system. It is on the basis of this reality that this paper investigated access and use of Internet in teaching and learning in teachers' colleges (TCs), basing on two selected colleges in Tanzania. The results indicate that the majority (83.2%) of respondents used the Internet for academic purposes, 61.3% used it for searching news and 50% for communication, slightly more than a half (52%) of the respondents were using Internet for games and entertainments while only (43%) used it for social network. However, the frequency of using internet for academic purposes is not convincing as only 12.5% of the respondents used it daily. There is also limited access to internet and ICT facilities in these teachers' colleges in Tanzania. It is therefore, concluded that the parent ministry in co-operation with college principals should improve Internet access and use in TCs by ensuring that there is good access to ICT facilities that offers internet services, tutors are well trained on ICTs basics and information literacy, and that the ratio of tutors and student-teachers to computers and other ICTs available in their colleges is improved.

Keywords: *ICT; Internet; teaching and learning; teachers colleges; Tanzania.*

INTRODUCTION

Information and Communication Technologies (ICTs) refer to all technologies used to communicate, create, manage, access, gather, and distribute information. These include computer hardware and software, the Internet, telephone, television, radio, and audio-visual equipment (UNESCO, 2009). The term Information and Communication Technology (ICT) is also defined as forms of technology that are used for communication purposes of transmitting, storing, creating, sharing or exchanging information (United Republic of Tanzania (URT), 2007). It includes a vast technology range, from simple such as the radio and telephone to complex such as computer, network hardware and software as well as the associated equipment and services (URT, 2007).

It is evident that, if ICTs used appropriately to support teaching and learning in schools and colleges it can be an effective tool particularly in improving quality of content and pedagogy (Anderson, 2008). For example, many academic institutions are now using videos, interactive television, and computer programmes in the teaching and learning processes. The Internet has turned into a wide and resourceful source of information for learners and trainers around the world (Makoye, 2003). One of the most important contributions of ICTs in education is- Easy Access to Learning. With the help of ICTs, students can now browse through e-books, sample examination and past papers. Students can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world (UI- Amin, 2010).

Several studies throughout the world have indicated the importance of the availability of ICT infrastructures and resources in the integration of ICTs in instructions (Bingimlas 2009; Ottesen, 2006). However, the availability of adequate ICT infrastructures and resources, while necessary,

is not in itself a sufficient condition for effective use of ICT in education (Ten Brummelhuis and Kuiper, 2008). However high the quality of such ICT resources might be within an institution, this may still not necessarily guarantee accessibility to ICT resources for both teachers and students (Balanskat *et al.*, 2006). On the other hand, poor organisation of ICT resources, inaccessibility of internal school network outside the institution may limit teachers and students' from accessing and using ICTs. Also in some occasions, teachers have to book for the ICT classroom well in advance to allow him or her secure a slot in using the classroom due to limited resources (Afamasanga, 2009).

Studies in most developing countries show that lack of ICT infrastructures and or inadequacy of ICT resources are a major obstacle to ICT integration in education, making the student- computer ratio being very high. For example, a study by Kilale, (2011) at Mpuguso and Sumbawanga Teachers Colleges in Tanzania, revealed that the computers to student-teachers ratio is 1: 40 at MpugusoTC and 1:23 at Sumbawanga TC. Such limited resources within institutions are a great impediment to the uptake of ICT in education. Moreover in many African countries, the lack of qualified teachers with adequate ICT skills is a major obstacle. This problem is further worsened by growing poverty and lack of funding for their training (Hennessy *et al.*, 2010).

Sida-MoEVT Project

It was in this regard, the then Tanzanian Ministry of Education and Vocational Training (MoEVT) in a joint venture with the Swedish International Development Agency (SIDA) emphasized on ICT development and deployment in teacher education colleges (TCs) starting in 2005. The main goal of this initiative was to improve the quality of pre-service and in-service teacher education by using ICTs. All 34 public TCs were equipped with computers and Very Small Aperture-Terminal (VSAT) connectivity, tutors were trained in computer literacy, and tutor technicians received advanced technical training on computer maintenance and networking essentials (Swarts and Wachira, 2010).

The number of computers that were purchased and installed was reported to be higher than the originally planned due to the shift to thin client terminals with lower prices than was the case with planned desktop computers. Also two colleges, Dakawa and Shinyanga were later added to the list of beneficiaries (Andersson *et al.*, 2014).

MoEVT developed an ICT Policy for Basic Education in 2007 in order to guide ICT integration in education in Tanzania. In the context of Tanzania, basic education includes pre-primary, primary, secondary, teachers colleges as well as non-formal and adult education. This ICT policy is being implemented in phases with the first phase involving teacher education followed by secondary and primary education. The integration of ICT in teacher education aims at enabling teachers to integrate ICT in classrooms to achieve educational objectives; facilitate the use of ICT resources in schools as well as facilitate the development and use of ICTs as a pedagogical tool in the teaching and learning process (URT, 2007).

Various efforts have been made to promote ICT integration in teacher education, one of which is Sida-MoEVT project. This project ensured the availability of ICTs in all government TCs (Swarts and Wachira, 2010). According to URT (2007), the ICT project was implemented by a team from the Department of Teacher Education of the MoEVT. In colleges, principals and tutors worked together with volunteers from The United States of America (USA) to conduct various ICT activities. Therefore, it is clear that such ICT initiative in Tanzania education is highly dependent on foreign agencies.

Despite the fact that several initiatives have been carried out in the country to improve ICTs and Internet infrastructures in teacher colleges, however, it remains unclear as to how and to what

extent these ICTs and particularly the Internet services are used for academic purposes in these colleges. Some research studies elsewhere (Drent and Meelissen, 2007; Gülbahar, 2005) have shown that teacher educators are using various ICTs such as computers, LCD projectors, word processing and presentation software. In Tanzania, studies on the use of ICTs for academic purposes in teachers colleges are scarce. This study, therefore, focused on the use of internet by tutors and students in teacher training colleges in order to, first establish the extent of access and use for academic purposes, and secondly identify the challenges encountered; and, lastly to suggest remedies for increasing the use of ICTs in Teachers colleges in Tanzania.

OBJECTIVES OF THE STUDY

Generally, the study aims to assess the extent and purpose of Internet use among student-teachers and tutors in Tanzania's teachers' colleges using the two selected colleges. Specifically the study intends to; first establish the extent of access and use for academic purposes, and secondly identify the challenges encountered; and, lastly to suggest remedies for increasing the use of ICTs in Teachers colleges in Tanzania.

LITERATURE REVIEW

ICT Development and its Application in Teachers' colleges

One of the main objectives of the Ministry of Education and Vocational Training (MoEVT) is to expand the provision of both formal and non-formal education and training by involving the private sector; promote and strengthen formal, non-formal and distance learning education programmes; and optimise the utilisation of the existing education and training facilities and resources (URT, 2007). It is in this regard that the MoEVT in a joint venture with the Swedish International Development Agency (SIDA) is prioritising ICT development and deployment in teacher education colleges and whose implementation started in 2005. The main goal of the project is improving the quality of pre-service and in-service teacher education through the use of ICT.

Internet Use by Teachers and Students

In India, Panda and Sahu (2003) conducted a study of internet usage in the engineering colleges of Orissa. The study findings revealed that 50 percent of the engineering colleges used dial-up connection, with the majority of colleges using the Internet to provide on-line demonstrations.

Also, a study conducted by Jagboro (2003) among postgraduate students at Obafemi Awolowo University, Nigeria found that the use of research materials on the Internet was ranked fourth (17.3%). However, the use of the Internet for searching for research materials was ranked second (53.4%) and the use of the Internet for e-mail purposes was ranked first (69.9%). The study recommended that the use of the Internet for academic research would significantly improve through the provision of more access points at the departmental and faculty levels.

In Africa despite the relatively high availability of ICT facilities in colleges there is still minimal usage of the Internet. As Tsolo (2006) argues, the optimal utilisation of computer equipments in institutions of higher learning remains an argument among scholars and computer experts. Also Jagboro (2003) observes that the introduction of computers in education has not revolutionised education and that a great deal of computer equipment which are worth millions and purchased by educational institutions remains unused or underutilised, making such equipment become obsolete. This implies that utilisation of computer equipment for learning in institutions in Africa is either not optimal or failing, which results in wasteful or fruitless expenditure.

The Role of Internet Use in Teaching and learning

The emergence of the Internet in education has a tremendous impact in teaching and learning. Properly used information from the Internet represents added value to education. Given limited government's financial and human resources, necessitate high use of online resources to replace expensive printed educational resources (Pelgrum,2001). UNESCO (2003) pointed out that information retrieval, individualised learning, group learning, and collaborative activities would greatly be enhanced in education through the use of the Internet. ICTs and Internet use provide new ways of communication that simplify social interaction among people and learning, as people can communicate and learn from one another from a distant place, country and continent through various social networking platforms (Khosravi, 2016). Moreover, effective use of the Internet in teaching and learning can bring changes that would lead to not only pedagogical improvement but also save time and space.

METHODOLOGY

This study was conducted in two government-owned teachers' colleges in Mainland Tanzania, the colleges named Changu and Chako TCs for the case of this study . These colleges were selected purposefully because they both were the beneficiaries of the ICT project introduced in 2005. Thus, they have relatively well-established ICT infrastructures. The researcher used mixed research approach following both qualitative and quantitative techniques. The study used a sample of 99 subjects from two selected teachers' colleges.

The sample sizes of the key categories involved one college principal (as the other principal was not available), two ICT system administrators, sixteen tutors and 80 student-teachers. College principal and ICT system administrators were selected purposefully, whereas tutors and student-teachers, from each college were obtained using stratified and simple random sampling techniques. The attendance list of first and second year student-teachers was used as a sampling frame from which the sample was selected. Pieces of paper with 'Yes' and 'No' responses were distributed to the students. Twenty 'Yes' papers were for first year students and twenty 'Yes' papers were for second year students, the same applied for the 'No' response papers. The student-teachers were thus stratified according to their year of study so that 20 student-teachers were picked from each stratum to generate 40 respondents from each TTC. Those who picked 'No' papers were excluded from the sample. Moreover, tutors attendance list was also used to randomly select the tutors and observation checklist was used to assess availability of ICT facilities in the colleges.

Data from both tutors and student-teachers were collected using self-administered structured questionnaire. Data from both College principal and ICT coordinators were collected using semi-structured interview guide. Quantitative data were analysed using Statistical Package for Social Science (version 16.0) and qualitative data were analysed by using content analysis. A constant comparison analysis was applied where by words were systematically reduced to codes inductively, and then themes were developed from the codes.

RESULTS AND DISCUSSION

Internet Access Points

The study findings indicate that two-thirds (65.6%) of the respondents accessed the internet at their colleges followed by those who were accessing internet using cellular phones (26%),only

4% accessed internet through internet cafes. Nearly 15% of the respondents did not use the Internet at all (Table 1).

Table 1: Internet Access Points

Point of Internet Access	Number of Respondents	Percentage
At the college	63	65.6
At home	9	9.3
Internet cafes	4	4.1
Cell phones	25	26
Category not using Internet	14	14.6

N=96

These findings show that most respondents relied on their college computer labs to access internet. The reason was that most of the respondents live on or near the college campus. All student-teachers were accommodated at college dormitories and most of the tutors lived in the college staff quarters. Moreover, both colleges are located in rural settings with either no or limited access to Internet cafe nearby. Also, it was observed that most of the students who accessed the Internet through cell phones were from Changu TC as Chako student-teachers were prohibited from using cell phones by their college regulations.

Level of Internet use

To determine their level of internet use, the respondents were asked to state whether or not they were using the Internet, The results indicated that majority of the respondents; (100%) tutors and (82.5%) students indicated to have been using the Internet, whereas (17.5%) of student-teachers respondents did not (Table 2).

Table 2: Respondents' level of Internet use

Variable	Tutors (N=16)		Student-teachers (N=80)	
	Frequency	Percentage	Frequency	Percentage
Who used the Internet	16	100	66	82.5
Who did not use the Internet	0	0	14	17.5
Total	16	100	80	100

The findings in Table 2 show that both tutors and student-teacher respondents use the Internet for various purposes. Similar findings are reported by Andersson, *et al.* (2014) who showed that 62% of tutors are using the internet in sharing knowledge. This implies that training of tutors and their students on academic use of ICTs and particularly internet can tremendously enhance ICT integration in education. High percentage of use of Internet by tutors may be attributed to the fact that most of tutors are graduate from universities where the use of ICT and internet in particular is relatively high.

Reasons for not using the Internet

Those respondents who said they do not use the internet gave the following reasons for their response: two-third (64.3%) indicated lack of access to a computer with Internet connection,

slightly over a half of them (57.1 %) indicated shortage of time and almost three-quarters (71%) indicated lack of knowledge and skills of using computer and Internet (Table 3).

Table 3: Reasons for not using the Internet

Reason	Frequency	Percent
Lack of computers with Internet connection	9	64.3
Shortage of time	8	57.1
Lack of knowledge of the Internet usage.	10	71
Costs involved.	5	36

N=14 Source: Field data (2013)

Lack of knowledge on using the internet particularly to facilitate teaching and learning is a common problem facing many students and teachers in Africa (Hennessy *et al.*, 2010). Moreover, a study by Anderson, *et al* (2014) linked lack of basic or enough ICT Skills among tutors to poor or low usage of the Internet among students and teachers in Africa.

Frequency of Accessing the Internet

When asked to state how often they accessed the Internet, nearly half (47.8%) of the respondents indicate a frequency of once to three times a week. Only 10% of the respondents were using the internet daily (Table 4).

Table 4: Frequency of Accessing the Internet

Variable	Frequency	Percent
Daily	10	10.4
Once to three times a week	46	47.9
Twice a month	11	11.4
Once a month	6	6.2
Once a year	9	9.3
Category not using Internet	14	14.6
Total	96	100.0

N=96

These findings suggest that in general the respondents accessed the Internet rather less frequently. Thus, it can be argued that the Internet is not yet regarded as one of the most important resources in learning and teaching in TCs in Tanzania. These results are in line with Kilale (2011) observations that teachers still depend on chalk, blackboard and books despite the opportunity arising from the emergence of ICT. Hence, this indicates lack of awareness among tutors and student-teachers on the essence of Internet in teaching and learning. This is a major challenge to the uptake of ICT integration in TCs.

Availability of ICT facilities

The respondents were also asked to indicate availability of various ICT facilities for teaching and learning in their colleges. The findings in Table 5 below show that less than a quarter (23.8%) of the respondents reported that there were adequate computers in their college. Nearly all (97.5%) respondents reported that their computers were connected to the internet. Furthermore, more

than two-thirds (67%) of the respondents reported to have education software for teaching and learning and three-quarters (75%) reported to have LCD projectors.

Table 5: Availability of ICT facilities

Statements	Frequency	%
There are adequate computers in my college	19	23.8
My college has education software for teaching and learning	54	67.5
Our computers are connected to the Internet.	78	97
There are television sets that we use for teaching and learning	3	3.8
We have enough printers	10	12.5
We have LCD projectors in our college	60	75
Presence of virtual library	2	2.5

N=96 Source: Field data (2013)

The findings show that computers were very few and insufficient to meet the needs of the students in the two colleges. Observations made by the researcher revealed that ICT facilities were not fixed in the classrooms. These findings confirm the earlier findings by Mswanyama (2004) who reported lack of computers and other ICT facilities in the Tanzanian teachers' colleges as a major factor that affect integration of ICT in teaching and learning. On the other hand, although many respondents indicated that their colleges had education software for teaching, the researchers' observation and interviews indicate that none of the two colleges have education software for teaching and learning. The Implication is that most of respondents did not understand what is meant by education software, largely due to the poor background in ICT. Lack of education software in education institution is also noted by Unwin (2004) who observes that, most of the computers in teacher educational institutions in Africa do not have educational software. Educational software if appropriately used with internet improves academic performance of students in schools through access to quality content and save time (Bulman and fairlie, 2016). On this ground, it is important for teachers' colleges to have education software and use it to enhance teaching and learning. Some examples of educational software used to facilitate teaching and learning include "moodle" and "blackboard".

Tutors' Training in the Use of Internet

Tutor respondents were also asked to indicate whether they had benefited from any training in Internet use. The findings indicate that seven (44%) attended some training and nine (56%) had never attended any training as illustrated in Figure 1.

The findings show that the majority of tutors did not attend any formal training on Internet Use. Lack of training in Internet use is one of the major factors that hinder effective Internet use hence contributing to the underutilisation of the Internet and related resources despite access to and availability of the facilities. Similarly, lack of training and skills in internet searching strategies is also noted by Tarimo and Kavishe (2017), who argued that majority of internet users from secondary schools lacked appropriate searching skills to access information from the Internet. The study is also supported by Yidana (2007) who found that most of the teacher-educators in two Ghanaian universities lacked knowledge and skills on ICT integration and internet use in particular in teaching and learning. In a study that involved 132 teacher educators, the results show that only 12.9 percent (n=17) had knowledge and skills on ICT integration in education. Moreover, lack of training is also reported by Bashir et al (2012) found a small number of university students from Punjab had formal training on internet use. Lack of training and skills on

internet searching strategies among tutors hinders the quality of the content they teach which in the long run affects the entire education system in Tanzania as its output (students) is teachers of primary and secondary schools.

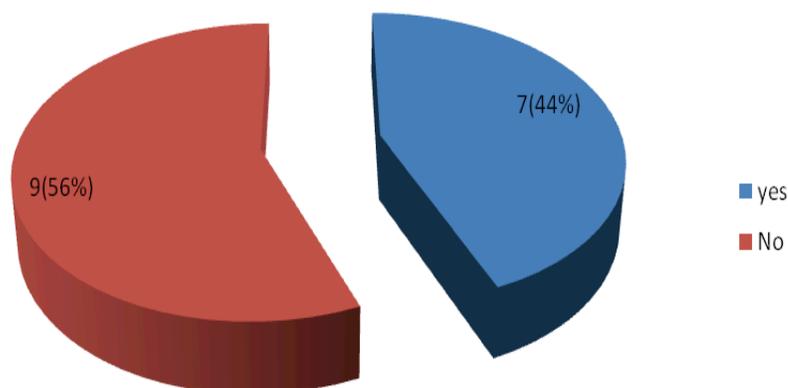


Figure 1: Tutors' training in Use of Internet

Purpose of using Internet

Respondents were also asked to indicate the reasons for using the Internet. The findings are shown in Table 6.

Table 6: Respondents' Purpose of Internet Use

PURPOSE	FREQUENCY									
	every day		2-6 days a week		once a week		once a month		Rarely	
	F	%	F	%	F	%	F	%	F	%
Communication	8	8.3	10	10.4	9	9.4	9	9.4	12	12.5
Games	4	4.2	11	11.4	12	12.5	8	8.3	15	15.6
Education and Academic	12	12.5	28	29.1	22	22.8	3	3.1	15	15.6
Social Network	2	2.08	8	8.3	4	4.2	8	8.3	19	19.8
News	13	13.5	16	16.6	15	15.6	5	5.2	10	10.4

N=96 Source: Field data 2013

The results indicate that the majority (83.2%) of respondents used the Internet for academic purposes, 61.3% used it for searching news and 50% for communication, slightly more than a half (52%) of the respondents were using internet for games and entertainments while only (43%) used it for social network. A Similar purpose of internet usage was reported by various researchers such as Bashir (2016); Sife (2013) revealing that academic/research projects, communication and news as the popular purposes of using internet. However, the frequency of using internet for academic purposes is not convincing as only 12.5% of the respondents used it daily and 29.1% used internet between two to six days a week. This is supported by Andersson *et al.* (2014), who reported that only 44% of tutors use ICT for teaching and learning while the expectation of the Sida-MoEVT project was 80%. Therefore, it can be concluded that ICTs and the Internet in particular are not yet regarded as key tools for teaching and learning in Teachers colleges, and thus there is a lot to be done to improve usage of Internet in Tanzania education system.

Problems encountered in using the Internet

Respondents were also asked to indicate whether they faced any difficulties in using the Internet. The findings presented in Table 7 show that the major problems encountered with the use of internet include slow internet speed (79%), erratic power supply (77%), inadequate number of computers (77%), lack of skills for Internet use (66%), barriers related to timetabling (60.3) and difficulties in finding relevant information (49%).

Table 7: Problems encountered in using the Internet

Variable	N=96	
	Frequency	Percentage
Slow Internet speed	76	79.1
Inadequate computers	74	77
Time table barrier	58	60.3
Difficulties in finding relevant information	47	49
Erratic power supply	74	77
Lack of Skills on Internet usage	64	66.6

Source: Field data (2013)

Slow Internet speed seems to be a common problem in public TCs in Tanzania as they all receive Internet connection from the same source. It was established through interviews that all public TCs in Tanzania were connected via VSAT, which generally experiences poor connectivity. As one respondent commented:

"...Internet speed is always very slow especially from 6.00 pm to around 09.00 pm, hence this makes it difficult for us to download enough material for teaching."

The slow Internet speed might be attributed to having small bandwidth that slows down Internet access particularly during peak hours. The shortage of computers and other ICT facilities in general has been a common problem in several education institutions in Africa. The situation is even worse in Tanzania where ICT facilities are limited not only in primary and secondary schools but also in TCs. It was projected that the 1:10 computer user ratio would be attained for ICT application in education upon completion of the project in 2008 (URT, 2007). However, the situation on the ground particularly in colleges of education has not changed as the actual ratio is alarming. For example in Changu, computer-to-student ratio was found to be 1:26 whereas in

Chako the ratio was 1:18. This shows that there were very fewer computers than the number of student-teachers enrolled in the colleges. This challenge, it appears, cannot be solved by the colleges without concerted support and political will from the parent ministry.

The student-teacher's time table is fixed and rather inflexible with very limited free time. In Chako, for example, the researcher observed that there was only one ICT period and double free periods per week. After classroom hours, student-teachers had to do some extra-curricular activities. Indeed, for the development of ICT in TCs and internet use in particular, timetables should be set in such a way that both tutors and student-teachers get enough time to use ICT facilities for teaching and learning purposes.

For internet technology to be used effectively in education, relevant searching skills are a necessity. In this case, tutors were required to be equipped with information literacy skills to be able to benefit from the Internet and to teach their students accordingly. As Mapunda (2004) observes, when technology appears difficult to use and when the majority of potential users lack requisite skills, its application remains low, as users shy away from using the technology they are not familiar with. As a result, they tend to lose interest in using it. This finding is in line with the finding of a study by Unwin (2004) indicating that skills and training are variables that influence Internet use.

Frequent power cuts were identified as a problem facing not only Tanzania but also other African countries; this has tremendous effect on educational institutions, more particularly in TCs. Recently, frequent power cuts due to load shedding have wreaked havoc on different socio-economic activities in the country, including hitting hard educational institutions without recourse to standby power. Generally, TANESCO has been unable to serve the growing demand for this utility. In this regard, Makamba (2011) observes:

"There were no power cuts in Tanzania. In those days, very few people were connected to the national electricity grid, and had reliable power supply most of the time. Today, those connected to the grid do not get power much of the time. The simple answer is: we did not invest in power generation, transmission and distribution systems to keep up with increasing demand. This is the crux of the matter".

Similarly, Tarimo and Kavishe (2017) points out that lack of electricity and frequent power outages as factors hindering the effective use of Internet in schools. To address this problem, TCs should establish alternative power sources, such as purchasing standby generators, instead of waiting for assistance from the government.

CONCLUSION AND RECOMMENDATIONS

It is now apparent that ICTs can offer great opportunity for teacher colleges in developing countries to improve teaching and learning processes in both aspects of content and pedagogy. It was on this respect that the then Ministry of Education and Vocational Training (MoEVT) in a joint venture with the Swedish International Development Agency (SIDA) decided to prioritize on ICT development and deployment in teacher education colleges (TCs). The project partially succeeded in increasing the number of thin client computers in teachers colleges, as well as offering special ICT training to some tutors who were prepared to be trainers to their fellow tutors and students in their respective colleges. Moreover, all 34 teachers colleges had internet connectivity via VSAT.

However, there are still a number of obstacles such as inadequate computers, lack of ICT literacy skills and unreliable internet connectivity. As a result, , when it comes to effective use of ICTs in

teaching and learning, particularly Internet, both tutors and students were missing out on the many resources available on the Internet and that could benefit them academically. Therefore, considering the purpose and frequency of Internet use among tutors and student-teachers, it can be concluded that the Internet is not yet regarded as one of the foremost resource in enhancing the learning and teaching activities in Tanzania's TCs, as student-teachers still use traditional methods of note-taking and note-making and also remain largely dependent on tutors notes, handouts and printed materials. The tutors, on the other hand, also use traditional ways of teaching and the parent ministry does not seem to work hard on this since Sida-MoEVT project ended. Hence, there is a serious need to raise the awareness to all stakeholders at the Ministry and the TCs as well as tutors and student-teachers to enhance the use of the Internet for academic purposes.

More computers with Internet connectivity should be provided to increase the level of access to ICTs among tutors and student-teachers. Tutors and student teachers should be equipped with both internet basics and information literacy skills. Maintenance of computers should also be done more regularly to ensure that the available computers are always in good condition. Furthermore, Internet cables should be instituted in the classrooms to encourage Internet use among tutors during instructions. Also, standby generators and Uninterrupted Power supply (UPSs) should be made available for the computer labs in TCs to cater the need for reliable power supply.

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