Access and Use of ICT among Tutors in Public Teachers Training Colleges: A Case of Moshi Rural District Tanzania

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Abstract

This study examined access and use of Information and Communication Technologies (ICTs) in public teacher colleges (TCs) in Moshi Rural District, Tanzania. Mixed methods approach was employed using sequential explanatory design. A total sample of 96 respondents in categories of 90 tutors, 3 ICT system administrators and three heads of ICT department were used. To collect the requisite data, questionnaires and interview protocols were used. The study findings revealed that the main areas of ICT application in teaching and learning process in TCs included the following: used as search engines to find educational resources that support teaching, download resources useful for teaching in subject area, create teaching aids like visual graphics, charts as well as drawings, carry out power point presentations, use of scanner or digital camera to import graphics, photos together with text for presentation and use of computer to prepare scheme of work as well as lesson plan. Based on findings from this study, it is concluded that despite the fact that there are government and other stakeholders' in continuing to make effective use of ICT in education like to train tutors in TCs on use of ICT in teaching and learning accompanied with provision of ICT facilities, there is still minimal access and application of ICT in teaching and instruction activities in all visited TCs. Although all visited TCs already have ICT facilities and use ICT, TCs' application of ICT is limited to basic applications like administration, teaching of computer literacy and Internet skills. It is recommended that the MoEST should post teachers skilled in ICTs to each college so as to impart ICT skills to tutors and administrative staff members.

Keywords: *Accessibility, ICT, Teachers' College, Tutor.*

1.0 Introduction

Today's 21st Century era and also, the age of information and technology (IT), every aspect of life is related to science and technology. Huge flow of information is emerging in all fields throughout the world. Currently, IT is popularly used in education field for making teaching and learning process successful as well as interesting for students and teachers (Dellit, 2001; Hare, 2007; Evoh, 2009). Moreover, IT has the potential for increasing efficiency and effectiveness of management and administration of Teachers Colleges [(TCs) Khirwadkar, 2007; Issa, 2008]. Indeed, IT has more impact on administrative services such as admissions, registration, fee payment and purchasing than on fundamentals of classroom teaching and learning in TCs (Resta, 2002; Momanyi *et al*., 2006). It is observed that IT issues have quickly moved from being special for preparing individuals to become IT specialists into an issue and an important aspect in teachers' preparation so as to fit in their daily teaching activities (Baylor & Donn. 2002; Empirica, 2006). It is evident that most countries in the world have integrated Information and Communication Technology (ICT) in their education system, in general and particularly in teachers' colleges (UNESCO, 2003).

Tanzania, like other Sub-Saharan African countries, recognizes the potential for ICT access and use in offering available options in promoting as well as improving provision of quality education in all aspects and TCs, in particular. To achieve this, Tanzanian government, through the Ministry of Education and Vocational Training [then MoEVT, currently, the Ministry Education, Science and Technology (MoEST)] decided to formulate a specific policy to guide integration of ICT in basic education (MoEVT, 2007). Promulgation of the ICT policy for Basic Education in 2007, created the national framework for integrating ICT in Basic Education (pre-primary, primary, secondary and teacher education) as well as non-formal education and adult education. According to the policy document (URT, 2007: 2), the framework provides for a variety of technologies including radio, television, video, telephone (both fixed line and mobile), computer and network hardware together with software as well as equipment and services associated with the technologies such as electronic mail, text messaging and radio broadcasts. In brief, the Policy (URT, 2007: 4) objectives include:

> "… activities, approaches and standards in the educational uses of ICTs; Ensure that there exists equitable access to ICT resources by students,

teachers and administrators in all regions and types of educational institutions and offices; Ensure proper management and maintenance of ICT resources; Facilitate the development and use of ICT as a pedagogical tool; Promote development of local content for basic education and others; Encourage partnership; and Facilitate use of ICT resources in schools, colleges, and libraries."

Integration of ICT in basic education subsector, according to the policy document (URT, 2007: 2), is expected to yield the following outcomes:

"Improve access and equity to, and quality and relevance of basic education; Increase the number and quality of teachers, through improved pre-service and in-service training and better provision of teaching and learning materials; Enhance the acquisition and use of knowledge and skills for all learners, including those with special needs; Improve the efficiency and effectiveness of the management and administration of education, at all levels; and Broaden the basis of education financing, while optimizing the use of education resources, through partnerships and stakeholder participation.

According to the policy (URT, 2007), priority levels (though implemented in phases) include teacher education, secondary schools and primary schools among others. Moreover, in the policy document, policy statements revolve around infrastructure and technical issues; curriculum and content; training and capacity building; planning, procurement and administration; management, support and sustainability; and monitoring and evaluation (URT, 2007). The ICT policy for Basic Education and National ICT Policy of 2003 are not only aimed at accommodating training in ICT but also in enhancing ICT-enabled teaching and learning in TCs. In addition, ICT is taught as a subject in TCs and it is integrated as a pedagogical tool for teaching and learning in other subject areas (URT, 2007). The objective of Teachers' Colleges (TCs) in Tanzania, is to prepare teachers for primary and secondary schools (URT, 1995).

According to the education system of Tanzania, TCs are education institutions that are at the third education level, that is, tertiary education level. In Tanzania, TCs are classified into Diploma TCs offering diploma in secondary education and Grade 'A' TCs offering Certificate in primary education (URT, 2007). On the other hand, ICT use in teaching and learning in Tanzania's TCs has been introduced (URT, 2007). A study by Hare (2007) showed

that the Ministry of Education with support from the Swedish International Development Cooperation Agency (SIDA) initiated a program for introducing ICT in TCs in 2005. The program aimed at improving the quality of TCs by using ICT to both pre-service and in-service teachers (URT, 2007). Through such collaboration of Ministry of Education and Vocation Training (MoEVT) and the Swedish International Development Agency (SIDA), all 34 public TCs were equipped with thin client solutions and VSAT connectivity (*ibid*.). Moreover, tutors were trained in computer literacy, while tutor technicians received training in technical maintenance support and networking essentials (*ibid*.). It is now over fourteen years since introduction of ICT project in TCs in Tanzania. However, the status of access and use of ICTs in TCs remains unknown. Hence, this study intended to assess the status of accessibility and use of ICTs for policy implementation.

1.1 Objectives of the study

The main objective of this study was to examine access and use of ICT among TC tutors in selected teachers' colleges in Moshi Rural District, Tanzania. Specifically, the study sought to; explore the availability and accessibility of ICT facilities, examine how often tutors use ICT in their teaching and learning process and purpose of ICT use among tutors.

2.0 Research Methodology

In this study, mixed methods approach was employed to examine access and use of ICT among tutors in public TCs. Holloway and Wheeler (2010) declare that a mixed methods design provides better understanding of a research problem than solely using either quantitative or qualitative methods. With this consideration, sequential explanatory type of research design was employed. In sequential explanatory design, different forms of data are collected in sequence at different phases in a study (Komba &Tromp, 2006). Therefore, the researchers collected and analyzed quantitative data followed with qualitative data collection as well as data analysis. Recall, this study was carried out in Moshi Rural District where three TCs under study were located. The district was deliberately preferred because there were three public teacher colleges in the district. This is a condition unique to needs for research since there was no other district in the country with three public teacher colleges. All other districts have only one or two such colleges. The sample size for this study involved a total of 96 respondents from the three

selected teachers' colleges. The sample was obtained by using purposive sampling procedure and stratified simple random sampling procedure.

The sample size of key categories included three heads of ICT departments, three ICT system administrators and 90 subject tutors. Each college provided one head of ICT department, one ICT system administrator and 30 tutors. Creswell (2009) points out that, "to study a whole population so as to arrive at generalizations would be impracticable, if not impossible and scientifically and technically not necessary." Furthermore, Creswell (2009) argues that a study, which involves a small could be successfully conducted with a minimum of 30 participants. Therefore, the researcher involved 96 respondents to collect research information. This study employed two data collection methods, namely, questionnaire and interview.

Data analysis was performed using triangulation strategies. Both qualitative and quantitative data analysis strategies were employed. Data collection and data analysis were performed simultaneously. In the field, recorded interviews were transcribed verbatim into Kiswahili and later on, translated into English. Then, the transcribed information from heads of ICT departments and ICT system administrators was analyzed following Miles and Huberman's (1994) model of qualitative data analysis. The model involves data reduction, data display and finally, conclusion drawing as well as verification (*ibid*.). Thereafter, the collected quantitative data through questionnaires were analysed by using Statistical Package for Social Sciences (SPSS) version 20. Data were classified and analysed through descriptive statistics. Data were then summarized and presented in tables of frequencies and percentages.

3.0 Findings and Discussion

3.1 Availability and accessibility of ICT facilities

Availability and accessibility of ICT facilities to instructors were measured using a 4-point Likert-scale. Instructors were asked to indicate their agreement levels to various statements they were given regarding availability and accessibility of ICT facilities in their respective TCs. Table 1 presents summary of research findings.

Table 1: Availability and accessibility of ICT facilities in selected public TCs (tutors, n=90).

ICT Facilities	Not known		Not available		Available but not accessible		Available and accessible	
	F	%	F	%	F	%	F	%
Computer hardware and software	01	1.0	0	0	20	20.8	75	78.1
Computer laboratories	2	2.1	2	2.0	30	31.3	62	64.6
Network connections in computer laboratories	3	3.1	8	8.3	32	33.3	53	55.2
Internet connections in computer laboratories	10	10.4	2	2.0	26	27.1	58	60.4
Internet connection out of the computer laboratories, e.g. in the classrooms.	5	5.2	79	82.3	10	10.4	2	2.1
Overhead projector(s)	16	16.7	13	13.5	64	66.7	3	3.1
Educational software for teaching and learning	38	39.6	20	20.8	30	31.3	8	8.3
Video and audio tapes	71	74.0	8	8.3	17	17.7	0	00.0
CDs and DVDs ROMs	36	37.6	27	28.1	20	20.8	13	13.5
Television set for teaching and learning	0	0.0	0	0	22	22.9	74	77.1
Photocopier machine(s)	52	54.2	25	26	14	14.6	5	5.2
Scanner(s)	2	2.1	10	10.4	68	70.8	16	16.7
Printer(s)	35	36.5	5	5.2	42	43.8	14	14.6
Whiteboard(s) for use with overhead projector	5	5.2	61	63.5	28	29.2	2	2.1
Digital camera(s)	35	36.5	17	17.7	64	66.7	4	4.2
ICTs textbooks	0	0.0	16	16.7	9	9.4	71	74.0

Table 1 shows that majority (78.1%) and 74(77.1%) of tutors said that computer hardware and software including television sets for teaching and learning activities were available and accessible, respectively. Moreover, 71(74%) and 62(64.2%) of tutors said that ICT's textbooks and computer laboratories were available as well tutors as accessible (Table 1). Surprisingly, analysis showed that 64(66.7%), 42(43.8%), 68(70.8%) and 64(66.7%) of tutors said overhead projector, scanners and digital cameras were available but were not accessible (Table 1). It implies that tutors do not have access to some ICT facilities although they were available in their respective TCs. Interview findings corroborate with questionnaire findings, as one of the interviewed ICT system administrators said,

Frankly speaking in this college, we have few only one projector and 5 working computers ... Other computers are not working properly … Hence, few available computers are mainly for administrative purposes … We don't give them to every tutor. To overcome this, most tutors use their own computers, projector and even printers" (Interview with ICT system administrator, April, 2018).

It implies that visited TCs had shortage of computers, printers and projects. To overcome such challenges, tutors opt to use their own computers, printers and projector to teach. This study finding corroborates with Nihuka (2011) and Kozma (2000) who found out that large numbers of lecturers and students in developing countries, Tanzania, in particular, had limited access to ICT facilities.

3.2 Use of ICT facilities by tutors for effective teaching process

Through questionnaire, tutors were asked to give their views on how often they used ICT facilities in teaching and learning in their respective TCS. Table 2 provides summary of research findings.

Table 2: Tutors' responses on use of ICT Tools in Teaching and Learning (Tutors, n=90)

	ICT's materials	S. A		A		S. D		D	
		F	%	F	%	F	%	F	%
1	I create teaching aid like visual graphics, charts and drawings	37	41.1	29	32.2	13	14.4	11	12.2
2	use of scanner or digital camera to import graphics, photos and text for presentation	5	55	10	11.1	32	35.5	43	47.7
3	I use PowerPoint in presenting my lesson	17	18.8	10	11.1	42	46.6	21	23.3
4	I search teaching materials by using search engine such as Google	22	24.4	56	62.2	9	10	3	3.3
5	I communicate information with my students via emails	11	12.2	10	11.1	43	47.7	26	28.8
6	I use computer to prepare scheme of work and lesson plan and use of excel	7	7	11	12.2	35	38.8	41	45.5
7	I use television programmes to teach	2	2.2	10	11.1	16	17.7	62	68.8
8	I use data projector to display the content of my presentations to students	4	4.4	20	22.2	42	46.6	24	26.6
9	I use printer and photocopier to have copy of my teaching notes and other teaching and learning related documents	45	50	14	15.5	46	51.1	25	27.7

Key: SA=Strongly Agree, A=Agree, SD=Strongly Disagree, D=Disagree

Table 2 shows that a considerable number of tutors 22(24.4%) strongly agreed and 56(62.2%) agreed with the notion that, "I search teaching materials by using search engine such as Google." Moreover, 45(50%) tutors strongly agreed and agreed with the notion that "I use printer and photocopier to have copy of my teaching notes and other teaching and learning related documents". Also, results from this study revealed that 37(41.1%) tutors strongly agreed and 29(32.2%) agreed with the notion that, "They create teaching aid like visual graphics, charts and drawing." Further analysis showed that a considerable number of tutors [62(68.8%), 48(53.3%) and 42(46.6%)] strongly disagreed and disagreed with the notion that they used television programmes, educational software and create visual display of data/and information to teach, respectively (Table 2). This implies that at least each respondent pointed one or more than one use of ICT in teaching and learning process in TCs. However, the main areas of ICT application in teaching and learning process in TCs included the following: used as a search engines to find educational resources that support teaching, downloading resources useful for teaching in subject area, creating teaching aids like visual graphics, charts and drawings, carrying out power point presentations, use of scanner or digital camera to import graphics, photos and text for presentation as well as use computer to prepare scheme of work and lesson plan.

However, during interviews, it was found out that some tutors did not have sufficient ICT competence. In due regard, the head of ICT department noted that,

Majority of tutors have low level of ICT competencies. As a result, only few tutors can use ICT facilities such as computer to create teaching aids like graphics. As you know sir, using computer to design and create teaching aids need some drawing skills. Most of tutors only have elementary computer skills. They don't have advanced skills" (Interviews with a systems administrator, April, 2018).

The quoted assertion denotes that lack of adequate computer skills was a major hurdle that hindered TCs' tutors in using ICT facilities to prepare curriculum or teaching/learning materials. On underlying importance of ICT skills among teachers, Hare (2007) said that in order to use ICT in preparing teaching and learning materials, instructors must first understand and be comfortable with the technologies. This is also one of the objectives of

Tanzania ICT Policy for Basic Education (Tanzania MoEVT, 2007), which states that every tutor should know how to use technology, pedagogy and subject area content effectively in daily classroom teaching. Arguably, TCs' tutors should attain and maintain an assured degree of technological competence to make instructional strategies highly effective (*ibid.*). This was supported by Albirini (2006) who stated that ICTs' competence comprises not only of ICT knowledge, but also skills and experience essential to put them into use. ICT competency allows tutors to turn into the most efficient individuals in dealing with daily tasks such as to keep records; to do research in their specific as well as main domains; and to prepare presentations (Priscilla *et al.*, 2008).

3.3 Purposes for tutors' use of internet

Generally, results presented in Table 3 show that in general, tutors agreed that, to a large extent, they accessed the internet for different purposes as Table 3 summarizes the information.

Table 3: Purpose of using internet (Tutors, n=90).

	Purposes of using Internet	Almost always		Sometime		Every once in a while,		Rarely	
		F	%	F	%	F	%	F	%
1	To gather educational and academic information	38	42.2	52	57.2	0	0	0	0
2	For leisure and entertainment purposes	5	5.6	13	14.4	12	13.3	50	55.6
3	Communicate with friends/ Social network	16	17.8	41	45.6	14	15.6	19	21.1
4	For reading news	28	31.1	52	57.8	2	2.2	8	8.9
5	Sending and receiving students' assignments	11	12.1	6	6.7	28	31.1	45	50.0
6	For shopping/E – commerce	1	1.1	3	3.3	16	17.8	70	77.8
7	Sending and receiving mails	5	5.6	30	33.3	23	25.6	32	35.6

Key: SA=Strongly Agree, A=Agree, SD=Strongly Disagree, D=Disagree

Table 3 shows that all (100%) respondents who took part in the study were using Internet services to gather educational and academic information from various sources. It is also shown that 57(63.3%) of tutors used internet to communicate with friends and 80(88%) tutors informed that they used internet for receiving news from various sources. However, few respondents indicated that they accessed the internet in some applications such as for shopping/electronic commerce/business (e-commerce/business); sending as well as receiving electronic mails (e-mails); for doing web-based research; and for games, sports, leisure as well as entertainment. These findings imply that the extent of internet use by tutors was found to be extensive when they used the internet to gather educational and academic information from various sources, when they communicated with friends/social networks and for reading news. Also, such results lead to suggest that tutors at Moshi Rural District colleges recognized significance of using the internet as an important resource in teaching and learning. Therefore, using internet resource is important because it assists tutors as well as students to solve the problem of limited books and other teaching aids in TCs. The study findings further showed that a small number of respondents used internet games, sports, leisure and entertainment, for conducting web–based research, for shopping, e- commerce/business and for sending as well as receiving emails.

Moreover, from the researchers' observations, it was revealed that most tutors in the sampled teachers' colleges used their smart phones and laptops to access Internet. This was because access to Internet services in the computer laboratories at the public teachers' colleges was limited due to insufficient number of computers and slow Internet speed in the available computer laboratories.

4.0 Conclusion and Recommendations

Despite efforts by government and other stakeholders in continuing to make effective use of ICT in education entities like to train tutors in the TCs on use of ICT in teaching and learning accompanied with provision of ICT facilities, there is still minimal access as well as application of ICT in teaching and instruction activities in all visited TCs. Although all visited TCs already have ICT facilities and use ICT, TCs' application of ICT is limited to basic applications such as administration and teaching of computer literacy as well as Internet skills. In most cases, ICT was not used as a medium of instructions to enhance curriculum delivery. Thus, it is recommended that the

classroom is now changing its look from the traditional one - from one way to two-way communication. Now college tutors as well as student teachers participate in classroom discussion. So, tutors should prepare to cope up with different technologies for using them in the classroom so as to make teaching and learning interesting. There is need for effective implementation of certain student centric methodologies such as project-based learning, which put the student teachers in the role of active researches whereby technology becomes an appropriate tool. Moreover, ICT has enabled better and swifter communication and presentation of ideas highly effective in a relevant way. It is an effective tool for information acquiring and thus, student teachers are encouraged to look for information from multiple sources and they are now more informed than before. So, for this reason, ICT is greatly necessary for Teacher Education. Hence, tutors should be in a position to integrate technology into teaching and learning. In due regard, professional development of tutors should be given importance. Otherwise, tutors may not be ready to utilize their knowledge to effectively design teaching/ learning processes, project work, and assignments. Also, in order to ensure that ICTs are widely applied in teaching and learning process in TCs, the study recommends to the government to ensure that ICT policy statements are translated into reality. An ICT policy implementation commission should be created. Such commission should be funded and given the power to provide ICT facilities in colleges and monitor their use. There should be efforts by MoEST to post teachers who are skilled in ICTs to each college so as to impart ICT skills to tutors and administrative staff members.

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