

Challenges for Teaching and Learning Information and Communication Technology Courses in Higher Learning Institutions in Tanzania: A Review

Joel D.Rumanyika^{1*} Robert Mashenene Galan²

1. College of Business Education (CBE)-Dodoma Campus, Department of ICT and Mathematics

P.O Box 2077 Dodoma, Tanzania

Mobile Phone: +255 (0) 714043423/769853114; Email: rummjoe@gmail.com

2. College of Business Education (CBE)-Dodoma Campus, Department of Marketing

P.O Box 2077 Dodoma, Tanzania

Mobile Phone: +255 (0) 755 48 31 10/654 660 909; Email: gmashenene@yahoo.com

*Corresponding author Email: rummjoe@gmail.com

Abstract

Teaching and learning ICT courses in higher learning institutions (HLIs) in Tanzania is facing various challenges. This study, examined challenges facing teaching and learning of ICT courses in HLIs in Tanzania. Variables including limited access of ICT hardware and software, weak government policies, poor ICT infrastructure, lack of competent ICT staff, poor institutions' coordination and curriculum variation, high cost imposed on ICT tools, little government funding, reluctance to use ICT tools in teaching and learning, lack of practical training, limited capacity of ICT hardware and software were studied using quantitative approach. Thirteen (13) current papers (2010-2014) related to the study were reviewed to extract the challenges which appear most frequently. Percentages and frequencies of ten (10) studied variables were computed and presented using a table and bar graph. The findings show that limited access of ICT hardware and software, poor ICT infrastructure, lack of competent ICT staff, little government funding, lack of practical training and poor institutions' coordination are significant challenges hindering teaching and learning of ICT courses in HLIs in Tanzania. The study recommends that, policy makers should sharply concentrate with first priority to tackle the most critical challenges instead of dealing with a multitude of challenges, an approach which may not be fruitful for quick improvement given limited resources facing the nation.

Key words: Challenges, ICT, Higher Learning Institutions, Learning and Teaching

1. Introduction

Information and Communication Technology (ICT) has opened a new visage to globalization in education (Aguale, 2014). In higher education ICTs are being used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc (Mondal and Mete, 2012). Worldwide, the field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research (Yusuf, 2005). For example, Neeru (2009) in Indian universities and colleges indicated that, transformation of higher education in the country in terms of access, equity and quality is due to the usage of ICT in education.

The past few years witnessed a host of activities aimed at injecting ICT in Tanzania's education sector (Hare, 2007). For example in the year 2003 the government formulated a national ICT policy which recognizes that ICT can enhance education opportunities and advocates for the introduction of an e-education system (URT, 2003). Other development in ICT include, a recent level of SEACOM marine cable which has increased internet speed up to 155 Mbps as well as reducing telecommunication costs by 95% (Swarts and Wachira, 2010). Also, the country's migration from analogue television broadcast system to digital on 31st December 2012 in addition to the arrival and installation of the national fiber backbone are expected to greatly benefit universities and other educational institutions, providing high speed internet connections for research and education.

Based on these situations, many institutions have procured various ICT technologies such as Learning Management Systems (LMS), video conferencing and multimedia facilities to complement face-to-face and distance learning (Mtebe and Raisamo, 2014). All universities have computer centers available to the student population and many have high bandwidth connections through satellite (VSAT). In recent years, the Tanzania Education Network (TERNET) was created to provide an electronic network that will connect all Higher Education Institutions (HEIs) in the country as well as research facilities (Swarts and Wachira, 2010). Recently, the government has also exempted all ICT equipment imported in the country from value added tax in order to make them affordable to the majority of Tanzanians (Sife *et al.*, 2007). The previous study conducted by Munguatosha *et al.* (2011) reveal that, 80.2% of HLIs in Tanzania were using various Learning Management Systems (LMSs), 78% used Moodle, and 2.5% Blackboard. In addition to LMSs, Lwoga (2012) found other institutions were using audiotapes, CDROMs, videotapes, video conferencing and other related technologies.

Despite the improvement in ICT and related technologies in Tanzania, still the existing literatures explain a number of challenges hampering the process of teaching and learning ICT courses in HLIs. For example, Lwoga (2012) identifies the following challenges: cost of acquiring, managing and maintaining ICT infrastructure and high cost of bandwidth and inadequate of competent technical staff. Also a study of Mtega *et al.* (2012) identified that 80% of the teaching staff did not have any Web 2.0 training although Web 2.0 tools are known to facilitate teaching and learning processes. Others challenges include, lack of incentives to retain ICT experts, dynamic ICT curriculum, lack of awareness and poor attitude towards learning ICT, unreliable power supply, lack of internet connectivity, low budget, lack of capacity to implement existing policies and strategies, reluctant of some ICT instructors, costs of software and hardware, lack of central coordination and strategy, limited coverage of mobile phone networks and inadequate planning (Lwoga, 2012; Yonazi, 2012; Nihuka and Voogt, 2011; Swarts and Wachira, 2010; URT, 2003). Following this scenario, such multiple challenges identified could be difficult to address them at a time given the fact the government of Tanzania suffers from limited budgets and as the result, such challenges have tended to persevere. This study aims at examining the critical challenges hindering the teaching and learning process of ICT courses in HLIs and then to suggest solutions that will help the government to prioritize the available resources in order to be focused when addressing these challenges for strong implementation of ICT education in Tanzania.

2. Literature Review

2.1 Theoretical Perspective

This review viewed the challenges for teaching and learning ICT in higher learning institutions as a paradigm of innovation adoption and therefore it invokes Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh *et al.* (2003) developed UTAUT as a comprehensive synthesis of prior technology acceptance research. UTAUT has four key constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) that influence behavioral intention to use a technology.

In this model *performance expectancy* is defined as the degree to which using a technology will provide benefits to consumers in performing certain activities; *effort expectancy* is the degree of ease associated with consumers' use of technology; *social influence* is the extent to which consumers perceive that it is important to use a particular technology; and *facilitating conditions* refer to consumers' perceptions of the resources and support available to perform a behavior (Brown and Venkatesh 2005; Venkatesh *et al.* 2003). The relevancy of UTAUT to this study is based on the fact that ICT and the related technologies will be used in teaching and learning process provided that there is greater performance expectancy, ease of use, social influence and availability of resources.

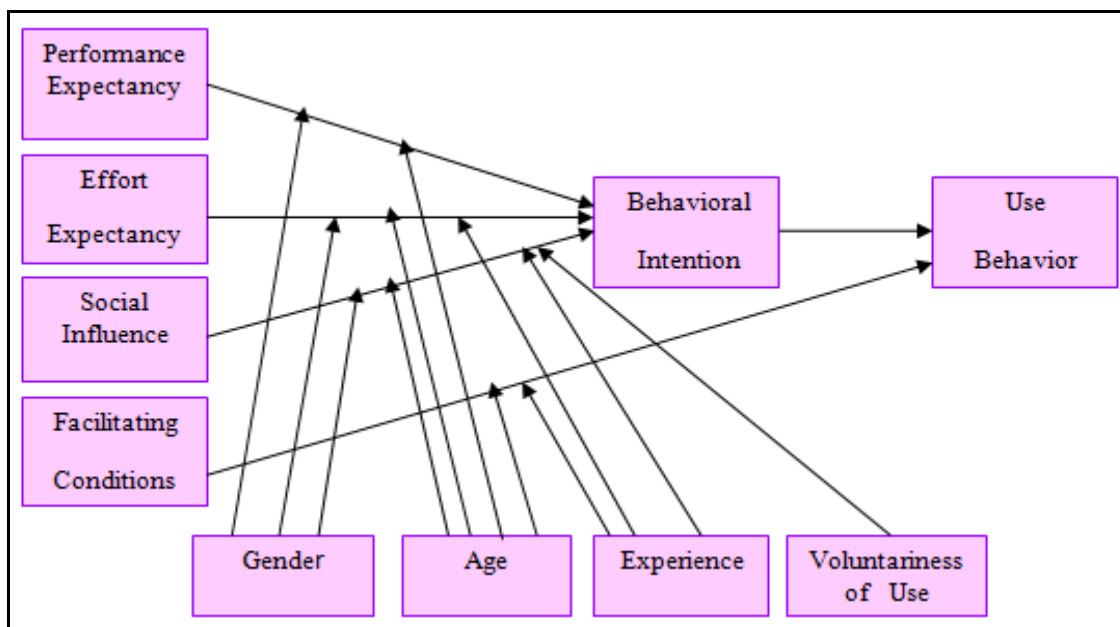


Figure 1: The UTAUT Model (Source: Venkatesh et al., 2003, p.447)

2.2 Empirical Literature Review

2.2.1 Challenges of Teaching and Learning ICT courses in HLIs in Tanzania

Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning (Mondal and Mete, 2012). Worldwide, the challenges for teaching ICT are noted to be barriers which hinder the learning and teaching processes of ICT related subject in HLIs. A study of Aguele (2012) in Nigeria indicates that the implementation of ICT in Nigerian universities is confronted by a number of problems including lack of enough fund (73.5%), lack adequate technical expertise (76.5%) and lack of enough bandwidth (69%).

Khan *et al.* (2012) study in Bangladesh reveals that the main barriers to the introduction of ICT into education in developing countries is lack of resources within educational institutions, lack of computers (both hardware and software), lack of sufficient computer experience for both students and instructors and other ICT-supported tools in the classrooms. Furthermore, UNESCO (2009) points out four common mistakes which happen when introducing ICTs into teaching; installing learning technology without reviewing students' needs and content availability, imposing technological systems from the top down without involving faculty and students, using inappropriate content from other regions of the world without customizing it appropriately, and producing low quality content that has poor instructional design and is not adapted to the technology in use.

In Tanzania, studies of Kajuna (2009) and Ndume (2008) reveal the major challenges faced in technology instruction in HLIs to include: insufficient of technical and academic staff with appropriate skills of technology use, unsupportive mindset, poor electricity connectivity and reliability, poor telecommunication network, expensive cost of internet access, low internet speed, lack of content that meet user's expectation, and traditional culture of education and learning styles. Also a study conducted by Nyandara (2012) the usage of ICT tools for learning was noted to have discrepancy between Tanzania and China whereby, the access to videotapes by students scored 40% in Tanzania compared with 88% CCDE-China and 18.2% for instructors in Tanzania compared with 66% of instructors at CCDE-China. In another case, DVDs/CDs are accessed by majority of CCDE students and instructors (about 90% and above) compared with only 60% of students and 54.5% instructors from Tanzania. Videoconferencing is less accessed by Tanzania students (10%) and instructors (13.6%) compared with students (81%) and instructors (77%) from CCDE.

2.2. The Selected studies from Tanzania Addressing the Challenges for Teaching and Learning ICT courses in HLIs.

In order to examine the challenges facing teaching and learning ICT in HLIs in Tanzania, the previous studies were reviewed and from which independent variables were selected and measured as shown in the **Table 1.0**.

Table 1.0: Selected Previous Studies in Tanzania and Major Findings

Author(s) and Title	Major Findings
Mtebe, J. S., and Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. <i>The International Review of Research in Open and Distance Learning</i> .	i) Lack of access to computers and the Internet, ii) low Internet bandwidth, iii) absence of clear policies, iv) lack of skills to create or use open educational resources, v) unreliable power supply
Tedla, B. A. (2012). Understanding the Importance, Impacts and Barriers of ICT on Teaching and Learning in East African Countries.	i) Unrealistic ICT policies, ii) poor ICT infrastructure, ii) lack of competent teachers iii) curriculum changes, iv) lack of proper network, v) low budget for funding ICT researches, vi) irregular electricity, vii) technological illiteracy and viii) lack of ICT pedagogical skills.
Mtega, W. P., Bernard, R., Msungu, A. C., and Sanare, R. (2012). Using mobile phones for teaching and learning purposes in higher learning institutions: The case of Sokoine University of Agriculture in Tanzania	i) Poor network infrastructure, ii) lack of ICT practical training, iii) high internet service tariffs, iv) limited capacity of ICT hardware and software.
Lwoga, E. (2012). Making learning and Web 2.0 technologies work for higher learning institutions in Africa.	i) Poor ICT infrastructure, ii) limited access to computing technologies, iii) high cost of internet connection, iv) low internet bandwidth, v) language and content issues, vi) cost of educational technologies, vii) poor ICT policies, viii) poor attitudes towards e-learning, ix) lack of local expertise in ICT curriculum development, x) high number of students which does not match with the required ICT facilities, xi) poor computers maintenance, xii) reluctance to use ICT for teaching purposes, xiii) low payments to ICT experts, xiv) little government funding, xv) low quality and variation of ICT curriculum and pedagogical methods of teaching ICT.
Nkembo, K. S., Koloseni, D., and Shimba, F. J. (2011). ICT and the Education Sector in Tanzania: Effectiveness of Introducing and Applying ICT in Higher Learning Institutions in Tanzania: The Case of Ardhi University.	i) Limited ICT infrastructure, ii) inadequate ICT personnel, iii) inadequate training provided to staff, iv) insufficient budget for ICT infrastructure, v) lack of coordination of ICT education activities, vi) limited information sharing, vii) limited skills for integration of ICT in education, viii) variation of ICT curriculum.
Yonazi, J. (2010). Exploring Facilitators and Challenges Facing ICT4D in Tanzania.	i) Inadequate ICT infrastructure, ii) lack of electricity, iii) low broadband connections, iii) lack of leadership and organizational inertia, iv) weak government ICT policy, v) lack of quality ICT content.
Bakari, J., Mbwette, T. S., and Salaam, D. E. (2010). Implementing e-learning in higher open and distance learning institutions in developing countries: The experience of the Open University of Tanzania.	i) Low digital bandwidth, ii) lack of expertise in e-learning, iii) poor e-learning infrastructure, iv) low incentive packages for retaining skilled personnel, v) poor power supply, vi) lack of internet connectivity, vii) little staff and students skills in use of ICT equipment, viii) high cost imposed on ICT technologies e.g. internet connection, ix) large number of students as compared to available human resources.

<p>Mtebe, J. S., and Raisamo, R. (2014). Challenges and instructors' intention to adopt and use open educational resources in higher education in Tanzania.</p>	<p>i) Inadequate ICT infrastructure, ii) limited number of computers, iii) unreliable internet services and low bandwidth, iv) poor readiness and willingness to learn ICT, v) fear of authenticity of internet, v) ICT curriculum variation.</p>
<p>Mtebe, J. S. (2013). Exploring the Potential of Clouds to Facilitate the Adoption of Blended Learning in Tanzania.</p>	<p>i) Bandwidth is insufficient, ii) lack of stable ICT policies, iii) lack of computing experts.</p>
<p>Nyandara, Z. I. (2012). Challenges and opportunities of technology based Instruction in open and distance learning: A comparative study of Tanzania and China.</p>	<p>i)Limited number of computers and internet access points, ii) unsuitable computers in terms of their capacity and speed, ii) insufficient technical support and experience to use some of the computer applications, iii) power breakdown, iv) instructors' reluctance to shift to new technology, v) shortage of qualified technical staff, vi) slow internet connection, vii) high internet connection costs, viii) differences in pedagogical skills to use technology in instruction, ix) inadequate funds for staff development and ICT infrastructure development.</p>
<p>Nihuka, K. A., and Voogt, J. (2012). Collaborative e-learning course design: Impacts on instructors in the Open University of Tanzania.</p>	<p>i) Power cuts and unreliability, ii) Narrow bandwidth, iii) limited number of computers.</p>
<p>Swarts, P., and Wachira, E. (2010). Tanzania: ICT in education situational analysis.</p>	<p>i) Insufficient financial resources, ii) lack of skilled manpower to implement ICT curriculum, iii) management skill in the integration of ICT, iv) lack of electricity in the rural areas, v) lack of enough hardware and software, vi) inadequate experience in sharing, collaboration and partnership in ICT implementation, vii) poor ICT infrastructure.</p>
<p>Sanga, C., Magesa, M., Chingonikaya, E., and Kayunze, K. (2013). Can e-learning promote participation of female students in STEM disciplines in higher learning institutions of Tanzania.</p>	<p>i) Lack of funds to purchase computers or pay Internet from the Internet café ii) Time limit to look for Internet café from university, iii) slow Internet connection, iv) few Internet access points for wireless Internet connection, v) lack of adequate computers in students' computer laboratories, vi) some websites require subscription fee to access journals, vii) poor strategies to manage computer labs as a result some computers were not running most of the time, viii) unreliable power supply as computer require stable electricity, ix) poor knowledge on Internet search.</p>

Source: Literature Review (2015)

3. Research Methodology

3.1 Methodology

This paper uses a quantitative approach in which descriptive analysis was adopted. An intensive literature review was conducted in order to extract the most frequent identified challenges for teaching and learning of ICT courses in HLIs in Tanzania. Researchers first reviewed various studies worldwide in order to identify the challenges facing teaching and learning of ICT courses in the world. In order to make the study more focused, variables of the study were extracted from thirteen (13) selected literatures from a Tanzanian environment in order to identify the most critical challenges for teaching and learning ICT courses in HLIs in Tanzania. The selection of these literatures was based on their relevance to the topic under study and up to date in which the literature was restricted within five (5) current years (2010-2014). A sample size of 13 literatures was viewed adequate for statistical analysis since Rumanyika and Mashene (2014) and Mohammed *et al.* (2013) used a sample of 12 literatures to draw up the conclusions. From the literature, ten (10) challenges were identified and analyzed descriptively and presented in tabular form in which frequencies and percentages were computed.

These variables include; (i) limited access of ICT hardware and software, (ii) weak government policies, (iii) poor ICT infrastructure, (iv) lack of competent ICT teaching staff, (v) poor institutions' coordination and curriculum variation, (vi) high cost imposed on ICT tools, (vii) little government funding, (viii) reluctance to use ICT tools in teaching and learning, (ix) lack of practical training and (x) limited capacity of ICT hardware and software. In this study, the decision to choose the critical challenges was restricted only to challenges with scores at least 50% (Mashenene and Rumanyika, 2014; Rumanyika and Mashenene, 2014; Mohammed *et al.*, 2013).

3.2 Conceptual Framework

Based on the literature review, a number of challenges affecting teaching and learning ICT courses in Tanzania were identified. The dependent variable in this study is teaching and learning ICT courses in HLIs in Tanzania. It is anticipated in this study that dependent variable is affected by independent variables which are: limited access of ICT hardware and software, weak government policies, poor ICT infrastructure, lack of competent ICT staff, poor institutions' coordination and curriculum variation, high cost imposed on ICT tools, little government funding, reluctant to use ICT tools in teaching and learning, lack of practical training, limited capacity of ICT hardware and software. The arrows extending from independent variables to dependent variable show the relationship between these variables.

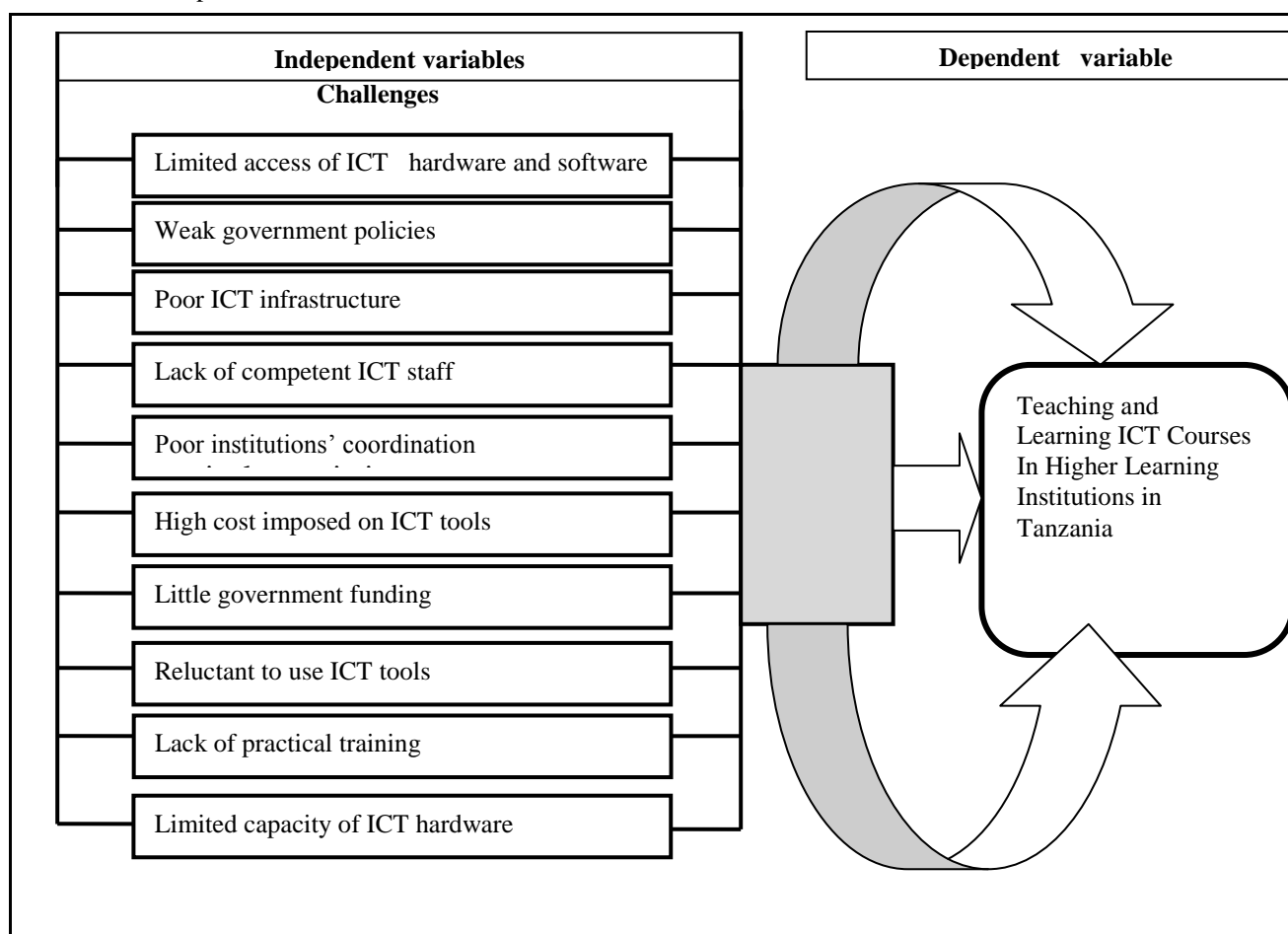


Figure 2: Conceptual Framework

Source: Literature review

3.3 Hypotheses

Bases on the literature reviewed, challenges for teaching and learning ICT courses in HLIs in Tanzania can be hypothesized as follows:

H₁. There is a negative relationship between limited access of ICT hardware and software and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₂. There is a negative relationship between weak government policies and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₃: There is a negative relationship between poor ICT infrastructure and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₄: There is a negative relationship between lack of competent ICT staff and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₅: There is a negative relationship between poor institutions' coordination and curriculum variation and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₆: There is a negative relationship between high costs imposed on ICT tools and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₇: There is a negative relationship between little government funding and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₈: There is a negative relationship between reluctant to use ICT tools in teaching and learning and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₉: There is a negative relationship between lack of ICT practical training and teaching and learning ICT courses in higher learning institutions in Tanzania.

H₁₀: There is a negative relationship between limited capacity of ICT hardware and software and learning and teaching and learning ICT courses in higher learning institutions in Tanzania.

4. Findings and Discussion

Based on the comprehensive literature review carried out, the most extracted challenges for teaching and learning ICT in HLIs in Tanzania are presented in as presented in **Table 2.0**. The sign (√) shows the variables which have been found to be the critical challenge as per this study.

Table 2.0: Challenges for Teaching and Learning ICT in HLIs in Tanzania

Researcher/Article	Variables									
	[1] LAIHS	[2] WGP	[3] PII	[4] LCIS	[5] PCCV	[6] HCIT	[7] LGF	[8] RUTLI	[9] LPT	[10] LCIHS
Mtebe, J. S., and Raisamo, R. (2014)	√	√	√	√					√	
Tedla, B. A. (2012)		√	√	√	√		√		√	
Mtega, W. P., Bernard, R., Msungu, A. C., and Sanare, R. (2012)			√			√			√	√
Lwoga, E. (2012).	√	√	√	√	√	√	√	√		√
Nkembo, K. S., Koloseni, D., and Shimba, F. J. (2011)			√	√	√		√		√	
Yonazi, J. (2012)	√	√	√		√					
Bakari, J., Mbwette, T. S., and Salaam, D. E. (2010).	√		√	√		√	√	√	√	
Mtebe, J. S., and Raisamo, R. (2014)	√		√		√			√		
Mtebe, J. S. (2013)		√	√	√	√					
Nyandara, Z. I. (2012).	√		√	√			√	√	√	√
Nihuka, K. A., and Voogt, J. (2012)			√							
Swarts, P., and Wachira, E. (2010)	√		√	√	√		√		√	
Sanga, C., Magesa, M., Chingonikaya, E., and Kayunze, K. (2013)	√	√	√			√	√			

Key: [1] LAIHS = Limited access of ICT hardware and software, [2] WGP = Weak government policies, [3] PII = Poor ICT infrastructure, [4] LCIS = Lack of competent ICT staff, [5] PCCV = Poor institutions' coordination and curriculum variation, [6] HCIT = High cost imposed on ICT tools, [7] LGT = Little government funding, [8] RUTLI = Reluctance to use ICT tools in Teaching and Learning, [9] LPT = Lack of practical training, [10] LCIHS = Limited capacity of ICT hardware and software.

From **Table 2.0**, the most frequently extracted variables are presented in **Table 3.0** to show the frequencies and percentages of variables studied.

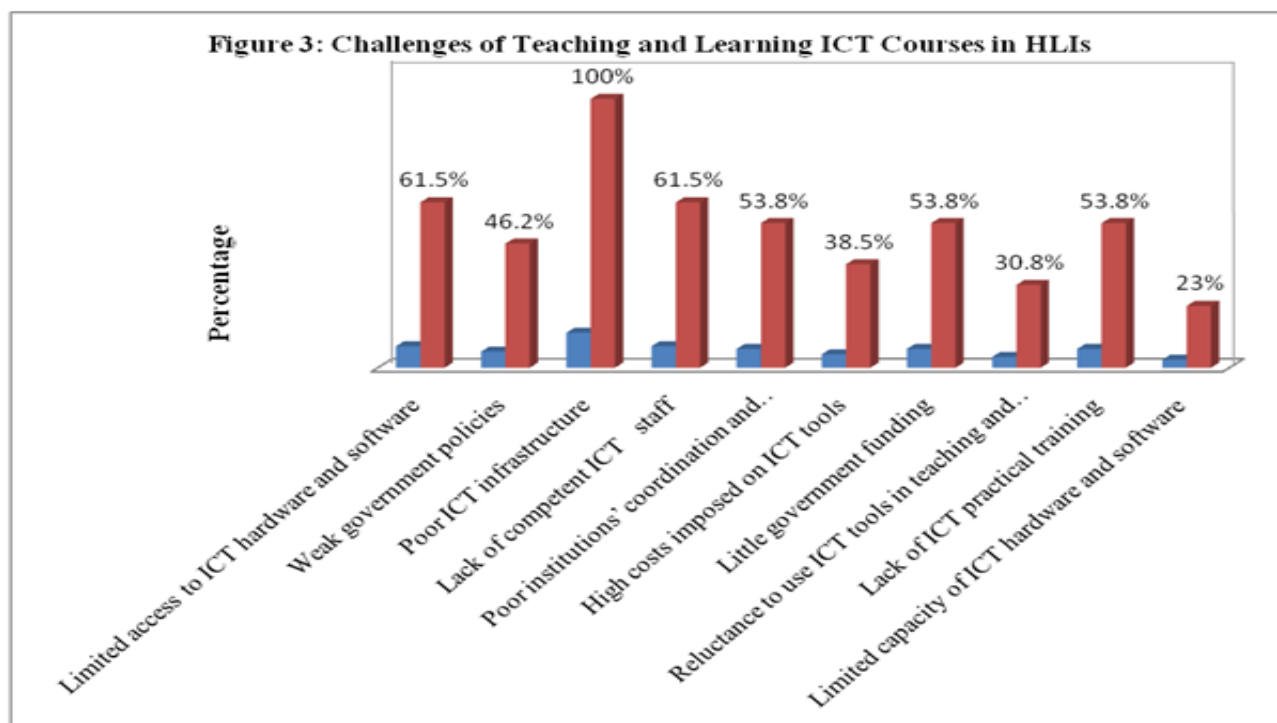
Table 3.0: Frequencies and Percentages of the Challenges for Teaching and Learning ICT in HLIs in Tanzania

Variables	Frequency	Percent
Limited access to ICT hardware and software	8	61.5 ^{^^^}
Weak government policies	6	46.2
Poor ICT infrastructure	13	100 ^{^^^}
Lack of competent ICT staff	8	61.5 ^{^^^}
Poor institutions' coordination and curriculum variation/dynamics	7	53.8 ^{^^^}
High costs imposed on ICT tools	5	38.5
Little government funding	7	53.8 ^{^^^}
Reluctance to use ICT tools in teaching and learning ICT	4	30.8
Lack of practical training	7	53.8 ^{^^^}
Limited capacity of ICT hardware and software	3	23.0

Source: Compiled from Literature Review, 2014

Key: ^{^^^} =Critical challenges

Figure 2: Frequencies Showing Challenges for Teaching and Learning ICT Courses in HLIs in Tanzania



The results (**Table 3.0** and **Figure 3**) indicate that poor ICT infrastructure (100.0%), limited access to ICT hardware and software (61.5%), lack of competent ICT teaching staff (61.5%), poor institutions' coordination and curriculum variation (53.8%), little government funding (53.8%) and lack of ICT practical training (53.8%) are critical challenges facing teaching and learning of ICT courses in Tanzania.

In this perspective, it can be argued that, poor ICT infrastructure such as low Internet bandwidth, low broadband connection and inadequate electricity supply tend to construct the barriers for effective teaching and learning ICT courses. Low internet bandwidth eventually tends to frustrate the downlink and uplink services when both instructors and students are trying to access the academic materials from the respective websites. The ITU report (2013) shows that, up to May 2014, the Tanzania communication network stretched over 7,560 km across the country, connecting 34 regional headquarters with only 6.1 million users, which is equal to 13.1% of the population. These findings are supported by those in URT (2014) which shows that 24 % of the Mainland Tanzanian population is connected with electricity services of which 7% is in rural areas. This indicates that the demand for electricity is on average growing between 10% and 15% per annum. Such growth is too small to suffice the national demand for power. Accordingly, these findings are consistent with those of Rhema and Miliszewska (2010) in Libya which reveal that HLIs have available computers in laboratories but, the lack of adequate network facilities places serious restrictions on Internet access which makes teaching and learning ICT difficult. Similarly, these findings are consistent with those in Rumanyika and Mashenene (2014) which indicate that poor telecommunication infrastructure is significant impediment of E-commerce adoption in Tanzania. Similarly, these findings are in are in harmony with UTAUT in one of its component which suggests that in order for the technology to perform well there should be good facilitating conditions. In this view of UTAUT, teaching and learning ICT courses in HLIs need good facilitating conditions (good ICT infrastructure).

Regarding limited access of ICT hardware and software, the findings reveals that there are no adequate ICT hardware and software to support effective teaching and learning ICT courses in Tanzania. These findings are similar to those of Aguele (2007) in Nigeria which reveals that, the difficulty to implementation ICT teaching and learning in due to constraints such as: insufficient fund to implement ICT effectively, inadequate technical experts to handle ICT activities (both installation and technical support), little procurement of sufficient bandwidth for VSATs and inadequate software for teaching and learning. Furthermore, these findings are supported by those of Materu *et al.*, (2010) study which reveals the main obstacles for ICT development in Tanzania are limited access and unavailability of hardware and software, incomplete telecommunication infrastructure, poor electricity supply, lack of technical expertise, low-bandwidth, low ICT literacy among the general public and low purchasing power . Accordingly, these findings are supported with UTAUT in one of its constructs which addresses that, for the ICT technologies to be useful there should be minimum effort to access and use it. In this situation of the study, in order for teaching and learning ICT courses in HLIs to be enhanced there should be ease of access of ICT hardware and software.

In the case of lack of competent ICT teaching staff, the implication of these findings suggest that there is poor instructors-students ratio in HLIs in Tanzania, something which is a stumbling block for effective teaching and learning ICT courses. These findings are in harmony with those Rhema and Miliszewska (2010) in Libya which reveal that lack of competent ICT teaching staff is among the critical challenges in teaching and learning ICT. Also, these findings are similar to those of Wee and Zaitun (2006) in Malaysia which reveals that lack of ICT technical staff (52.8%) is among the critical challenge facing teaching and learning ICT. Similarly, these findings are consistent with those in Rumanyika and Mashenene (2014) which indicate that lack of ICT experts is among the critical impediments of E-commerce adoption in Tanzania.

Regarding poor institutions' coordination and curriculum variation, the findings suggest that poor coordination and curriculum variation exist among HLIs in Tanzania. As the result, each institution posses its own curriculum, something posses difficult situation to produce graduates with similar learned contents. These findings are in harmony with those in Rhema and Miliszewska (2010) in Libya which reveal that poor institutions' coordination and ICT curriculum dynamics are challenges for teaching and learning ICT.

In the case of little government funding, the findings suggest that difficulties arise in teaching and learning ICT due to financial constraint. These findings are supported by those in Rhema and Miliszewska (2010) in Libya which reveal that little government funding is among challenges facing teaching and learning of ICT. Accordingly, these findings are in harmony with those Wee and Zaitun (2006) in Malaysia which reveals that failure of management to provide incentive to lecturers to integrate ICT in teaching (78.1%) is the critical challenge facing teaching and learning ICT. Similarly, these findings are consistent with those in Rhema and

Miliszewska (2010) study in Libya which indicates that little government funding poses a challenge in teaching and learning ICT.

Regarding lack of ICT practical training, these findings suggest that teaching and learning ICT in Tanzania is confronted with lack of ICT practical training which exposes students to learn by doing. These findings are supported by those in Wee and Zaitun (2006) study which finds out that lack of ICT practical training in Malaysia is a critical challenge facing teaching and learning of ICT. Similarly, these findings are in harmony with those in Rhema and Miliszewska (2010) study in Libya which indicates that lack of practical training to students and instructors is among the most critical constraints facing teaching and learning of ICT. Accordingly, Twinomujuni (2012) indicates that lack of practical training to students and instructors is among the most critical constraints facing teaching and learning of ICT in Uganda.

5. Conclusion and Recommendations

This paper examined on challenges which hamper the teaching and learning ICT courses in higher learning institutions in Tanzania was to examine the Tanzania. It has been observed that, poor ICT infrastructure (100.0%), limited access of ICT hardware and software (61.5%), lack of competent ICT staff (61.5%), poor institutions' coordination in teaching and learning and curriculum variations (53.8%), little government funding (53.8%) and lack of practical training (53.8%) are the most critical challenges. Therefore, for effective implementation of ICT education in higher learning institutions the government should first and quickly act upon solving the challenges of ICT infrastructure by taking a serious measures on improving internet bandwidth through connecting the urban and rural areas to wired or wireless networks. In the same line, shortage of electricity supply should be addressed urgently as of now most of urban and rural areas are not connected to the national electrical grid, since up to May, 2014 only 6.1 million households in Tanzania which is equal to 13.1% had been connected to a national grid (URT, 2014).

To overcome a challenge of limited access of ICT hardware and software, the government of Tanzania should increase the budget for purchasing ICT teaching assisting equipment such as; computers, projectors, DVDs/CDs, printer, scanner, digital camera, modems, cables, video conferencing assisting tools etc. This should go in hand with institutions of higher learning be encouraged to employ several ICT experts with different training methods. These could help in training instructors and students ranging from face-to-face workshops, online self study programs. Similarly, lecturers and students should be enabled to physical touch with ICT equipment in order to increase computing skills and expertise before they can make use of them for either teaching or learning. Considerable knowledge and skills have to be developed among the end users so that they are able to use ICT services and systems such Web 2.0, Internet Explorer, Moodle LMS, Blackboard, Sakai, video conferencing, multimedia, cloud computing and other forms of Blended Learning (BL).

To address the problem of poor institutions' coordination and ICT curriculum variations, the Ministry of Education and Vocational Training (MoEVT) should harmonize the situation by incorporating all the higher learning institutions undergoing the same programs into ICT courses curriculum development and evaluation. For example, institutions in collaboration with The Tanzania Institute of Education (TIE) and National Council for Technical Education (NACTE) can help in designing ICT curriculum which is can accommodate institutional requirements.

The general recommendation for this study is that, in order to implement well the teaching and learning of ICT courses in higher learning institutions in Tanzania, the government has no option to cope timely with accrued and technological changes. Effective implementation of ICT in education requires commitment from the government, administrators, instructors, students and all other stakeholders. The responsible authorities should be aware of the importance of technology in developing students' learning and should strive to overcome the barriers which prevent the use of technology in classroom settings, so that students can benefit effectively from ICT. This could be successfully by reviewing the existing ICT policy (2003) whereby serious emphasis should be directed on ICT education for higher learning institutions in order to create awareness, positive attitude and motivation towards teaching and learning ICT as well as providing suitable environment for both instructors and learners.

6. References

- Aguele, L. I. (2007). Information and communication technology in universities in Nigeria: Challenges for teaching and learning. Retrieved on January, 4th, 2015.
- Bakari, J., Mbwette, T. S., and Salaam, D. E. (2010). Implementing e-learning in higher open and distance learning institutions in developing countries: the experience of the Open University of Tanzania. In *Fifth International Conference of Learning International Networks Consortium (LINC)*, Massachusetts Institute of Technology.
- Brown, S. A., and Venkatesh, V. (2005). Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life Cycle, *MIS Quarterly* (29:4), pp. 399-426.
- Hare, H. (2007). Survey of ICT and Education in Africa: Tanzania Country Report.
- ITU (2013). Percentage of Individuals using the Internet 2000-2012: International Telecommunications Union (Geneva), June 2013, retrieved 4th January June 2015
- Kajuna, L. W. (2009). *Implementation of Technology Integration in Higher Education: A Case Study of the* (Doctoral dissertation, Ohio University)
- Khan, M., Hossain, S., Hasan, M., and Clement, C. K. (2012). Barriers to the Introduction of ICT into Education in Developing Countries: The Example of Bangladesh. *Online Submission*, 5(2), 61-80.
- Lwoga, E. (2012). Making learning and Web 2.0 technologies work for higher learning institutions in Africa. *Campus-Wide Information Systems*, 29(2), 90-107.
- Mashenene, R. G., and Rumanyika, J. (2014). Business Constraints and Potential Growth of Small and Medium Enterprises in Tanzania: A Review. *European Journal of Business and Management*, 6 (32), 72-79.
- Materu-Behitsa, M., and Bitrina, D. D. (2010). Towards Evidence-based ICT Policy and Regulation. *Volume Two, Policy Paper*, 11.
- Mohammed, J.A., Almsafir, M.K. and Alnaser, A.S.M. (2013). The Factors That Affect E-commerce Adoption in Small and Medium Enterprises: A Review. *Australian Journal of Basic and Applied Sciences*, 7(10): 400-412, 2013.
- Mondal, A., and Mete, J. (2012). ICT in Higher Education: Opportunities and Challenges. *Institutions*, 21(60), 4.
- Mtebe, J.S. (2013). Exploring the Potential of Clouds to Facilitate the Adoption of Blended Learning in Tanzania. *International Journal of Education and Research*, 1(8), 1-16.
- Mtebe, J. S., and Raisamo, R. (2014). Challenges and instructors' intention to adopt and use open educational resources in higher education in Tanzania. *The International Review of Research in Open and Distance Learning*, 15(1).
- Mtebe, J. S., and Twaakyondo, H. M. (2012). Developing and using animations and simulations to teach computer science courses: The case of University of Dar Es Salaam. In *2012 International Conference on E-Learning and E-Technologies in Education (ICEEE)* (pp. 240–246).
- Mtega, W. P., Bernard, R., Msungu, A. C., and Sanare, R. (2012). Using mobile phones for teaching and learning purposes in higher learning institutions: The case of Sokoine University of Agriculture in Tanzania. In *Proceedings and report of the 15th UbuntuNet alliance Annual Conference*.
- Munguatosha, G. M., Muyinda, P. B., and Lubega, J. T. (2011). A social networked learning adoption model for higher education institutions in developing countries. *On the Horizon*, 19 (4), 307-320.
- Ndume, V., Tilya, F.N. and Twaakyondo, H. (2008). Challenges of adaptive e-learning at higher learning institutions: A case study in Tanzania. *International Journal of Computing and ICT Research* 2(1), pp 47-59).
- Neeru, S. (2009). ICT in Indian Universities and Colleges: Opportunities and Challenges. *Management and Change*, 13(2), 231-244.
- Nihuka, K. A., and Voogt, J. (2012). Collaborative e-learning course design: Impacts on instructors in the Open University of Tanzania. *Australasian Journal of Educational Technology*, 28(2), 232-248.
- Nkembo, K. S., Koloseni, D., and Shimba, F. J. (2011). ICT and the Education Sector in Tanzania: Effectiveness of Introducing and Applying ICT in Higher Learning Institutions in Tanzania: The Case of Ardhi University.

- Nyandara, Z. I. (2012). Challenges and opportunities of technology based instruction in open and distance learning: A comparative study of Tanzania and China. In *5th UbuntuNet Alliance annual conference* (pp. 130–145).
- Rhema, A., & Miliszewska, I. (2010). Towards e-learning in higher education in Libya. *Issues in Informing Science and Information Technology*, 7(1), 423-437.
- Rumanyika, J.D. and Mashenene, R.G (2014). Impediments of E-commerce Adoption among Small and Medium Enterprises in Tanzania: A Review. *International Journal of Information Technology and Business Management for Publication*, (32 (1).
- Sanga, C., Magesa, M., Chingonikaya, E., and Kayunze, K. (2013). Can e-learning promote participation of female students in STEM disciplines in higher learning institutions of Tanzania? *International Journal of Education and Development using ICT*, 9(3).
- Sife, A. S., Lwoga, E. T., and Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 3(2), 57–67.
- Swarts, P., and Wachira, M. E. (2010). Tanzania: ICT in education Situational Analysis; Global e-Schools and Communities Initiative. pp 20-33.
- Tedla, B. A. (2012). Understanding the Importance, Impacts and Barriers of ICT on Teaching and Learning in East African Countries. *International Journal for e-Learning Security (IJeLS)*, 2(3-4), 199-207.
- Twinomujuni, J. A., NO, R., and KAMPALA, U. (2011). *Problems in ICT implementation in selected institutions of higher learning in Kabale District* (Doctoral dissertation, Makerere University).
- URT (2014). *Electricity Supply Industry Reform Strategy and Roadmap 2014-2015*, Dar es Salaam, Tanzania.
- URT (2003). *National Information and Communication Technology Policy*, Dar-es-Salaam, Tanzania.
- Wee, M. C., & Zaitun, A. B. (2006). Obstacles Towards the Use of ICT Tools in Teaching and Learning of Information Systems in Malaysian Universities. *Int. Arab J. Inf. Technol.*, 3(3), 203-209
- Yonazi, J.J. (2012). Exploring Facilitators and Challenges Facing ICT4D in Tanzania.
- Yusuf, M.O. (2005). Information and communication education: Analyzing the Nigerian national policy for information technology. *International Education Journal* Vol. 6 No. (3), Pp; 316-321)

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

