University of Dar es Salaam Library Journal
Vol. 13, No 2 (2018), pp-49-64
ISSN: 0856-1818

USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) IN LEARNING BY UNDERGRADUATE STUDENTS AT THE UNIVERSITY OF DAR ES SALAAM LIBRARY IN TANZANIA

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ABSTRACT

This study was carried out in January, 2019 at the University of Dar es Salaam in Tanzania. The low level of application of ICTs in learning processes at some of the academic institutions in Tanzania was a major stimulant for this study. The principal objective was to determine the extent to which ICTs are used for learning by undergraduate students at the University of Dar es Salaam Library. A mixed research approach was employed to collect both qualitative and quantitative data from 96 respondents. Whereas qualitative data was collected through using key informant interviews and Focus Groups Discussions qualitative data and analysed using content analysis, quantitative data was collected using questionnaire with both open and closed ended questions which was administered to respondents in face to face interviews and data collected was analyzed using SPSS version 20. The findings revealed that available ICT facilities for learning include internet, audio devices, networked computers, You Tube (audio/visual materials) and mobile phones. The level of utilization of ICT resources is high for majority of the respondents admitted they use ICT resources in learning a large extent. Also, it was revealed that students' low level of search skills is a major challenge in using ICTs effectively in learning. Based on the study findings, it is concluded that computers are the major ICT facilities available at UDSM Library. The incompetence of undergraduate students in accessing information constrains effective use and application of ICT in learning. It is recommended that the University of Dar es Salaam Library should continue to train students and teaching staff in information literacy skills, increase bandwidth, and avail students with laptops, printers and data analysis programs. Also, The University of Dar es Salaam should deliberately incorporate ICTs in learning processes to ensure effective use of ICTS.

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ISSN: 0856-1818

Introduction

The main impact of ICTs in education can be seen in improving the capabilities of young generation for greater and more comprehensive learning, enhancing educational quality and improving teaching skills (Hicks and Graber, 2010). Experience shows that ICTs in Tanzanian universities have been accommodated in teaching and learning despite of challenges such as unimproved infrastructure, security and privacy related obstacles. On this, the University of Dar es Salaam was not left behind.

The UDSM library has two sister library buildings following the construction of a new library in 2018 under China's support. Its sitting capacity is bout two thousand users. Like other academic libraries in Tanzania, this library has a major role to play in ensuring its parent organization meets its objectives which revolve around teaching, research and consultancy and service provision to the community at large. These also include rendering information services to users, teach information studies programme and train users in information literacy skills. Unlike in the past, the library has invested a lot in ICTs and electronic resources for last few years. As a result, the UDSM Library has been able to procure more than Two Hundred and Fifty computers and other electronic devices to support learning. It is worth mentioning that during the past three years, the Library subscribed to full text electronic journals with the most current information which is available online at a cost of about $210,000.00. Thus, the Library has been struggling to ensure availability of reliable and up-to-date ICT infrastructure and e-resources to enhance research, teaching, learning as well as for smooth running of university operations. It was of paramount importance to conduct this study to ascertain whether users of these resources felt that they were adequate and utilization of the ICTs to support learning was satisfactory. This is an intangible benefit which could signal clue on value for money. Therefore, this among other things posed a rationale for revealing the application of Information and Communication Technologies in Learning at the University of Dar es Salaam Library.

Statement of the Research Problem

Information and Communication Technologies (ICTs) have considerable significance for learning and teaching process as they enhance the way students learn and communicate (Limnious and Smith, 2010). Some universities in Tanzania including The University of Dar es Salaam have equipped their libraries with ICTs to ensure that there are full-time internet and other related ICT-based services. Studies by Dulle (2008) and Lwoga et al., (2007) have revealed that ICTs are useful in the information dissemination related processes in all sorts of social and economic sectors. On the other hand, there have been attempts by the government of Tanzania and other stakeholders in promoting effective use of ICTs in higher education, such as training tutors and students on effective and efficient use of ICT in learning and teaching along with provision of ICT facilities. Although the UDSM Library has a considerable number of ICTs, less remains to be known on the extent of application of ICTs in learning by the undergraduate

students at the University of Dar es Salaam Library, in Tanzania. The question is, what is the situation of ICTs use at this Library? Therefore, this study was structured to reveal the extent to which undergraduate students apply ICTs for learning with a view to enhancing their application for academic excellence. The general objective of this study was to determine the extent to which available ICTs at the UDSM Library are used in learning. The following research questions guided this study: Are ICT facilities available at the UDSM Library adequate?; to what extent do students use ICTs available at the UDSM Library in learning?; What are the constraints and strategies that need to be in place in order to improve use of ICTs in learning.

Literature Review

ICTs are applied when one uses tools such as interactive media, on-line resources, and interactive contents, sharing resources, collaborative learning through social media, role-playing and group problem-solving activities. Experience shows use of ICT for learning mostly includes preparation of notes, learning resources and preparing for examinations. The paramount constraints or barriers usually pointed out include lack of time, lack of knowledge/competence, lack of training, inadequate facilities, age, fear and lack of confidence, lack of support and poor infrastructure such as networks and unstable power supply. These constraints may be grouped into psycho-sociological factors related directly to the educators' use of technology (Katunzi-Mollel, 2013). Educators' knowledge and willingness to adopt ICT, for instance, is often associated with age and teaching experience. Educators' approach to pedagogy may influence integration of ICT into the teaching and learning processes. If an educator believes in traditional methods of teaching, he/she is not be likely to change his/her pedagogy to embrace ICT in teaching and learning. Educators who hold constructivist principles are more likely to view learners as active participants in the learning process and, therefore, readily integrate ICT in their learning practices.

Constraints on effective use of ICTs

The constraints may arise as a result of institutional incapacity to organise both materials and non-materials to facilitate the integration of ICT in the curriculum or teaching processes other limiting factors are time and available facilities or lack of infrastructure required to support usage of ICTs in teaching which include physical space, furniture, electricity and internet connectivity (Chigona et al., 2010; Nihuka, 2012). Chigona et al., (2010) study focused on technological based constraints (availability, usability and accessibility) and individuals factors covering skills and time spent in accessing and using ICT facilities and institutional factors in relation to motivation and support available for application of ICT in learning processes. Generally, ICT constraints that users face in many sub-Sahara countries include inadequate initial training particularly in information literacy which is not given much attention (Katundu, 2002), insufficient motivation, absence of technical services support, insufficient facilities, poor connectivity (Agaba et. al., (2004) and (Joel and Mungwabi, 2015) limited time,

unreliable power supply, inadequate bandwidth, school administration that does not embrace ICT usage and lack of administrative support (Nihuka, 2010; Lubuva, 2012 and Katunzi-Mollel, 2013). Training users for the ICT skills is the task of the librarians themselves. On the whole, successful adoption of any innovation or technology calls for a positive attitude towards changes or the new technology and having sound skills related to the innovation, availability and accessibility of a support infrastructure and facilities. Similarly, practitioners need adequate time, support and motivation to effect effectively the desired changes. Finally, studies such as Wachira and Swarts (2010), Mwalongo (2011) and Lubuva (2012) also observed that there was a lot of setbacks such as insufficient power and number of computers; limited broadband; and inadequate training that limit use of ICTs in teaching and learning in Tanzania.

Strategies for Adoption of ICT in learning

Tanzania's initiative towards ICT integration in educational institutions are in line with the Education and Training Policy (1995) which clearly stipulates the use of technology in teaching and learning as a means for fostering quality education for students. This was meant to equip tutors and students with skills to enable them to integrate ICT in teaching and learning in anticipation that it would foster more productive learning (UNESCO, 2009) and (Goktas et al., 2009).

Review of related literature indicates that the level of education of an individual is important in decision making as it enables one to choose better options and strategies which are useful in utilizing ICTs infrastructures in the learning and teaching practices (Maro, 1995) and (Kamwenda, 1999). Sex also plays an important role in the adoption and adaptation of innovation (Njana, 2008). Other studies such as Ockiya (2000) and Adhikari *et al*. (2003) place more attention on both male and female. Thus, it was important to include these variables in the analysis of characteristics of the study population.

Studies such Wolf (2001), Asemi and Riyahiniya (2007) indicate that the most prevalent ICT-based resources include e-journals and online databases. Users of these resources may expose reasons as to why they use them, extent of use and their satisfaction with the available ICTs (Voorbij and Ongering, 2006). These studies enabled researchers to identify ICT facilities and tools in use by the users hence their incorporation in the questionnaire. Furthermore, studies such as Msagati, 2014; Lwoga *et al*., (2007) and Manda (2005) dealt with the use of e-resources in the context of Tanzania but did not focus on ICT use at the UDM Library. Hence, the need for this study. Okiki and Asiru (2011) concur that use of ICT resources has posed new challenges in both libraries and their parent institutions. Globally, studies such as Tiefel (2004), Waldman (2003), Dadzie (2005) Majid and and Okello-Obura (2010) also investigated use of electronic resources in varying degrees. These studies have greatly helped to shape methodological approach to this study.

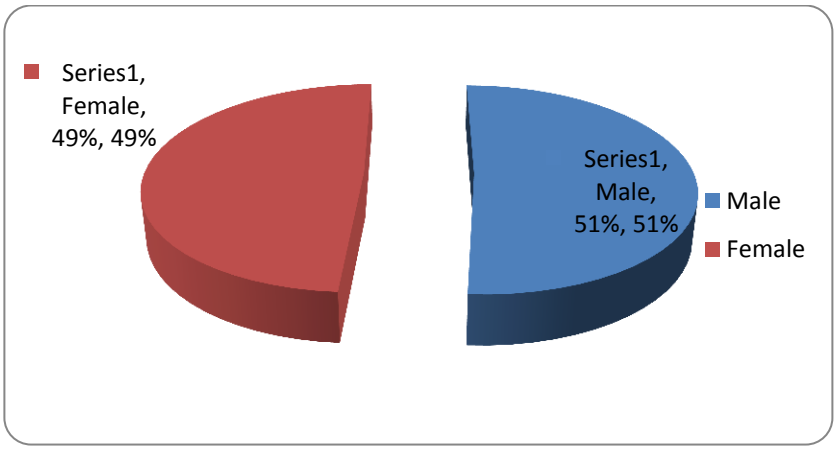
Methodology

This study employed a mixed research approach since both qualitative and quantitative data were collected. Survey method was used in which the questionnaires, interviews and observations were used to collect data. A Survey was deemed suitable for this study in that it allows application of multiple methods of data collection to gather information. It also allows the collection of data from different groups in a given time (Ndunguru, 2006). The population of study include undergraduate students. The sample size was 96 respondents selected from the aforementioned population. These were expected to provide researcher with in-depth information because they are information rich and would also provide theoretical insights into the study (Saunders *et al.*, 2009). Purposive sampling was used to select First, Second and Third year students who are habitual users of the UDSM Library and because they are considered to be familiar with ICT facilities available at the research area.

PRESENTATION AND DISCUSSION OF THE RESEARCH FINDINGS

Results of this study are presented in figures, descriptions and frequency tables. The findings are presented in line with the research objectives.

Socio-demographic characteristics of the Respondents



Source: Field data, 2018

Figure 1: The characteristics of respondents by sex (N=96)

Figure One shows that almost half 49(51%) of the respondents were male and 47(49%) female. This purely happened by chance. Njana (2008) noted usefulness of sex towards adaptation of any kind of innovative initiatives including the adoption of ICT in the learning and teaching practices in higher learning. Ockiya (2000) and Adhikari *et al.* (2003), also observed that the presence of both sex male and female suggests a

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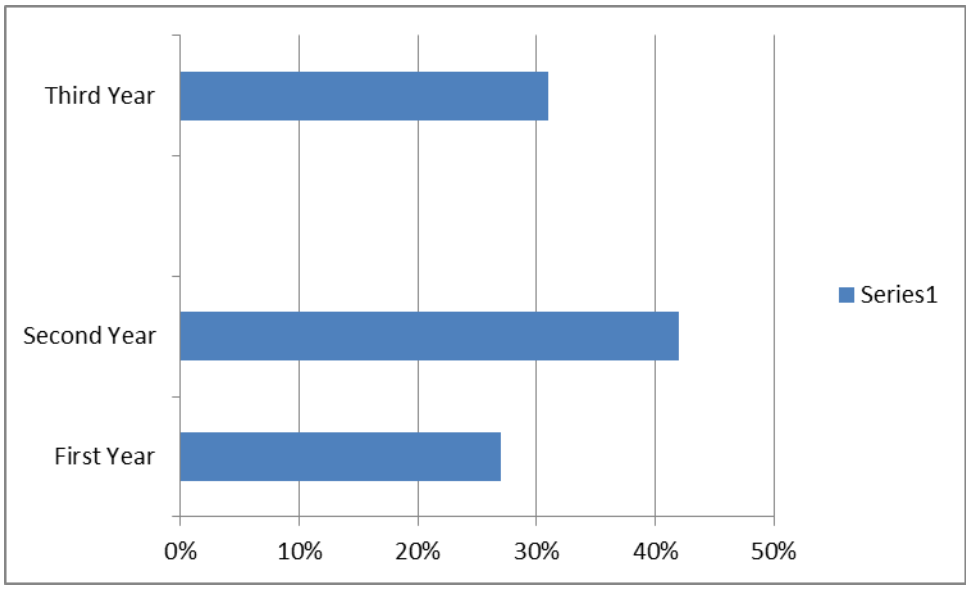
supportive condition for sustainable adaptation of various innovative practices including the adoption of ICT uses initiatives in the learning and teaching at the study area.

Age-wise, all 96(100%) of the respondents who participated in this study were between 18 and 25 years. It could not be established whether this finding indicate that mature entrants are no longer admitted at the University of Dar es Salaam or it was a mere coincidence. The fact that all respondents were aged between 18 and 25 years reflects availability of the young generation in innovative sectors including learning and teaching activities. Youngsters can easily adopt and utilize ICTs in the learning and teaching practices.

By year of study, there were first, second and third year students. Figure Two below shows the results.



Source: Field data, 2019

Figure Two: The characteristics of the Respondents by Year of Study (N=96)

Figure Two above indicates that first year students were 26 (27%), second year 40(42%) and third year 30(31%). Thus, all respondents were learned enough to adopt and apply ICTs in the learning processes. The higher the level of education of an individual the better decision making ability to choose better options and strategies which are useful in utilizing ICTs infrastructure in the learning and teaching practices in study area. Maro (1995) and Kamwenda (1999) argue that the level of education is considered an important factor at personal level, because, the higher the literacy rate of the individual, the higher the probability an individual is able to make sensible innovative decisions and utilize the ICT infrastructure in the learning and teaching processes. The respondents' education level was envisaged to be a useful determinant of the level of understanding of the merits and demerits of adopting and utilizing ICTs infrastructure in the learning processes in the study area.

The available ICT infrastructures for learning in the study area.

The study sought to identify and determine if the ICT facilities were adequate for learning in the study area. The results indicate that ICT tools in the study area include networked computers, headphones and Internet, through which students were able to access electronic databases, You tube and blogs. Other facilities such as laptops and smart phones used to access learning resources in the library are owned by students themselves. Respondents were asked to indicate if the available facilities are adequate for their use. Their responses are summarized in Table One below:

Table 1: Adequacy of the ICTs Facilities and Electronic Resources at the UDSM Library (N=96)

Category	**To a great extent**	**Moderately**	**To a small extent**	**Not At all**	**Don't Know**
Computers	78(81%)	18(19%)	0(0%)	0(0%)	0(0%)
Headphones	76(79%)	20(21%)	0(0%)	0(0%)	0(0%)
Electronic Resources/Databases	76(79%)	20(21%)	0(0%)	0(0%)	0(0%)
Internet	75(78%)	21(22%)	0(0%)	0(0%)	0(0%)
Network Bandwidth	64(67%)	32(33%)	0(0%)	0(0%)	0(0%)

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You Tube	0(0%)	67(70%)	29(30%)	0(0%)	0(0%)
Printers	0(0%)	0(0%)	0(0%)	62(65%)	34(35%)

Source: Field Data (2019)

Table 1 above shows that respondents were of the opinion that ICT infrastructure and electronic resources available at the University of Dar es salaam Library are adequate for example, 78(81%) of the respondents indicated that computers are available to a large extent. This finding was confirmed through observations. For example, reference section alone had two hundred (200) computers each with headphones for users and Sixty (60) of these were then being occupied by the users while other computers were not. Furthermore, 76(79%) of the respondents indicated that headphones and electronic resources are available to a large extent while 75(78%) indicated that Internet is available to a large extent. However, none of the respondents said You Tube was available to great extent and all of the respondents indicated that printers are not available at all. The findings further show that unlike in the past, The University of Dar es Salaam Library has moved away from the tradition of having inadequate ICT facilities, except printers which are not available for use by the students. This can be due to Chinese government support which funded construction of a new huge Library building which is well equipped with modern ICT facilities. However, even in this new building printers are still rare even though they are still in high demand for use by all students. In view of this, it is recommended that some printers should be made available even if for a fee.

The use of ICT facilities in Learning among the Respondents

The study also sought to find out the extent to which respondents use ICT facilities in learning. Table 2 below summarizes their responses.

Table 2: The Extent to which Respondents use ICTs in Learning

Category	**To a large extent**	**Moderately**	**To a small extent**	**Not At all**
Smartphones	75(78%)	21(13%)	0(0%)	0(0%)
Laptops	53(55%)	0(0%)	0(0%)	43(45%)
Micro-computers	44(46%)	36(38%)	13(14%)	3(03%)

Headphones	27(28%)	36(38%)	9(09%)	15(16%)
Printers	15(16%)	36(38%)	18(19%)	24(25%)

Source: Field Data (2019)

Table 2 above indicate that 75(78%) of the respondents indicated that they use smart phones for academic purposes to a large extent while 53(55%) said they use Laptops to a large extent followed by 44(46%) who said they use Micro-computers, 27(28%) headphones and 15(16%) printers. The top two, smart phones and laptops which are highly used for academic purposes are owned by the respondents and are not available in the Library. Whereas it may not be feasible for UDSM Library to have smart phones for students, it is possible for the library to acquire laptops which could be borrowed for a week or so by students who do not possess laptops. These facilities have taken lead because they do not limit students in terms of access time. Observation showed that all users use computers and headphones. It was ascertained later, that few 27(28%) of the respondents indicated that they use them to access You Tube to a large extent due to low broadband at the library. Printers are least used for academic purposes perhaps because they are not available in the library, and where printing services are available they are provided at a cost. Thus, there should be printing services at the library provided for a reasonable fee. Other studies on the use of ICT such as Msagati (2014), Lwoga *et al*. (2007) and Manda (2005) also revealed that ICT facilities are of great use in teaching and learning in the Country.

One respondent had this to comment on printers:

> *"Library website indicates that printing services are provided at Tshs, 100/- per page. So one would think that printers are provided but surprisingly there is none at all in this library"*

Other studies on the use of ICT such as Msagati (2014), Lwoga *et al*.,(2007) and Manda (2005) also reveal that ICT facilities are of great usefulness for teaching and learning in the Country.

Another research question sought to establish the extent to which respondents use e-resources in learning. A majority 75(78%) of the respondents use Internet Search engines for learning to a great extent. This was followed by You Tube, Power point presentation slides and electronic books which garnered 51(53%) and 45(47%) of the respondents respectively. Resources that are least used in learning include e-mails according to 18(19%) of the respondents who said they use emails to a large extent, 11(11%) said they use electronic journal data bases to a large extent and only 3(03%) said they use social media. However a majority 84 (88%) said Data analysis programs

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ISSN: 0856-1818

are not used by a majority of the respondents because such programs have not been installed on the UDSM reference computers. These programs are important to third year students because research is an important component in their curriculum. Regarding Internet use, the findings slightly concur with those of Dadzie (2005) who investigated the use of electronic resources by students and faculty of Asheshi University in Ghana and found that 85 percent of respondents use the Internet to access information. The findings also indicate You Tube, electronic books and power point presentations are used by the respondents to complement classroom lectures on complex topics that are may not have been thoroughly covered in lectures. Students find them more effective compared to e-journals since they are tailor made. Therefore, it is high time lecturers incorporated You Tube and power point presentation slides into teaching and learning. Similarly, the results suggest that undergraduate students would prefer that more funds be devoted to subscription of e-books rather than e-journals.

Table 3: **ICTs Usage Competence by the Respondents**

Category	**Very Competent**	**Competent**	**Moderately Competent**	**Not Competent**
Reading and texting messages on Social media	33(34%)	32(33%)	31(32%)	0(0%)
Internet Searching	29(30%)	33(34%)	34(35%)	0(0%)
Using OPAC	29(30%)	33(34%)	30(31%)	4(04%)
Using Word processing program	24(25%)	39(41%)	33(34%)	0(0%)
Databases' Advanced Searching	21(22%)	25(26%)	35(36%)	15(16%)
Using You tube for Learning/instructions	27(28%)	15(16%)	30(31%)	18(19%)

Retrieving power point presentations	9(09%)	23(24%)	34(35%)	30(31%)
Setting Projectors for Teaching or learning	13(14%)	15(16%)	33(34%)	35(36%)
Using Data Analysis Programs	3(03%)	5(05%)	19(20%)	69(72%)

Source: Field Data (2019)

Table 3 above shows that 65(68%) of the respondents indicated that they are competent in accessing and texting messages, 63(65%) mentioned Advanced Word processing features, 62(64%) mentioned iinternet searching and OPAC, 46(48%) mentioned advanced databases searching, 42(44%) indicated competence in using You tube for Learning, 32(33%) mentioned retrieving power point presentations, 28(30%) indicated competence in setting projectors and only 8(08%) of the respondents indicated that they are v competent in using data analysis programs. The findings indicates that students do not possess competencies in skills that would enable them to use resources that are useful to their learning such as e-databases, You tubes, power point presentations, projectors and data analysis programs. However, these findings differ from Majid and Okello-obura (1999) who explored the use of electronic information sources relevant to computer literacy among the International Islamic University, community in Malaysia. Their findings revealed that nearly all respondents believe they have good computer skills and that electronic resources are widely used in universities and finally concluded that there is a direct relationship between computer literacy and use of ICT resources

The Challenges in using and Aapplying ICTs in Learning at UDSM

The students revealed some stumbling blocks to effective application of ICTs in learning in the UDSM Library. Lack of skills was mentioned by 50% of the respondents, low bandwidth was mentioned by 48% of the respondents, power cuts was mentioned by 40%, and lack of some programs and facilities by 35%. Bandwidth complains arose out of power cuts experienced by respondents when using You Tube. Power cuts were experienced by users particularly in the old UDSM Library building whose electric generator has become dysfunctional. Some of these findings are in line with Joel and Mungwabi (2016) who observed that unreliable connectivity, power interruptions and lack of facilities and skills are major factors constraining application of ICTs at Teachers Training Colleges in Tanzania. Agaba et al. (2004) also observed that low bandwidth constrains uutilization of the e-resources at Makerere University. Another observation by the researcher was lack of discovery tools. Discovery tools could integrate local and

subscribed resources into one user interface in such a way that users could be able to access information resources easily.

Strategies for enhancing the usage of ICTs in learning at UDSM

This study also sought to identify strategies that ought to be in place for effective use of ICTs in learning. A checklist that was used to identify strategies for effective application of ICTs in Teachers Training Colleges in a study by Joel and Mungwabi (2016) was adopted. The findings show that 96(100%) of the respondents suggested training of users in information search skills and increasing bandwidth, 88(92%) of the respondents proposed extending Reference (e-resources) Section's Opening hours, 76(79%) of the respondents proposed providing printers and laptops, 48(50%) proposed providing reliable power supply and recruiting ICT laboratory Technicians and only 9(09%) proposed preparation/translation of electronic contents into local language ("Kiswahili"). The findings seem to suggest that training users, increasing bandwidth and extending reference section opening hours need immediate consideration by the library management. Translating e-contents into Swahili did not garner high support. Enhancing students' information search competences will have a bigger impact on effective use of ICT resources. According to Katundu (2002) information literacy in the curriculum has not received much attention due to the fact that only librarians are engaged in the teaching the library discipline. Other authors such as Heseltine (2000) agree that a successful information literacy programme can be well delivered when it is integrated within the curriculum. Librarians and other information professionals should possess multiple skills to be able serve mixed types of users. Employment of librarians for instance, should be based on skills in technology applications. This strategy would improve ICT resource utilization, as library staff would be expected to provide leadership in computer applications such as Internet and CD-ROM technologies among others.

Conclusions and recommendations

The study was designed to determine the extent to which undergraduate students use ICTs in learning at the UDSM Library. The study findings conclude that most ICT facilities available at the UDSM Library are adequate and are used to a great extent by the undergraduate students in learning. However, there are some issues on part of the library and undergraduate students that need to be addressed to enhance ICTs application in learning. As a result, the study recommends immediate increase of the network bandwidth, capacity building of undergraduate students to enable them to effectively utilise ICTs and other related resources. Printers, laptops and data analysis program which for now are not provided by the UDSM Library to students should be provided. Again, higher learning institutions including The University of Dare es Salaam in Tanzania, should try as much as possible to incorporate ICT training in the curriculum so that every students gets the opportunity to be taught the basics of ICTs just like Development studies (DS) course which is taken by all first year students regardless of

their courses. Meanwhile, the library should consider resumption of the information literacy programmes which had been being conducted in the past for both undergraduate and post-graduate students, support and teaching staff.

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