

Exploitation of ICT for Delivery of Inclusive Higher Education A case of the Open University of Tanzania

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Abstract: *This study investigated the use of ICT for the delivery of inclusive higher education, employing a qualitative approach and using observation and interview as data collection methods with 62 respondents: 15 students with visual impairment, 5 students with hearing impairment (deaf), 10 postgraduate students, 26 undergraduate students, and 6 academic staff. The choice of respondents was purposeful and snowballing, as the focus was on respondents who could give their views on the delivery of inclusive higher education, taking the Open University of Tanzania (OUT) as a case study. Findings include some success stories on the use of ICT at OUT and some challenges related to the delivery of inclusive higher education. Regardless of issues surrounding ICT usage, including ICT infrastructure, policy, human capital development, delivery of learning content, change management, learning strategies, leadership, accessibility, and affordability, the use of ICT has a greater impact on the delivery of inclusive higher education and has to be embraced.*

Keywords— Inclusive higher education, disability, ICT, accessibility, affordability

1. INTRODUCTION

Inclusive Higher education is a pillar of knowledge creation, storage, and dissemination through teaching, research, and consulting services for all. Higher education enrolment has increased as a result of implementing inclusive education strategies that have increased completion rates in primary and secondary education for students with and without disabilities. High completion rates have increased demand for inclusive higher education, posing delivery challenges. Many people can learn at their own pace and in different locations thanks to ICT and online learning content. The question is: do lecturers have the ability to integrate ICT into their teaching in terms of practical ICT knowledge that supports the learning of all students, including those with disabilities? The advancement of ICT has resulted in changes in social, economic, and cultural aspects that necessitate more research on how to cope with emerging socioeconomic situations through research and dissemination of research findings. Through ICT, people who were thought to be neglected can access higher education and learn new skills that will enable a change in their socio-economic status. The objectives of this paper were therefore to explore the role of ICT in delivering higher education in terms of its importance, impacts, inclusion, and factors that enhance or inhibit its use.

Education has been identified as a key tool for promoting change toward sustainable development models as centres of knowledge and innovation for social, economic, and human development [1][2][41]. The role of higher education centres on innovating, creating, storing, and transmitting knowledge through research, teaching, and consulting to contribute to economic and social development. With the use of information and communication technologies (ICT), the demand for a

skilled labour force has increased to meet the demands of globalization, in which higher education is part of the solution but also presents challenges. Some things that affect economic growth and development are the need for workers who are skilled in information and communications technology (ICT), access to good higher education, and the ability for everyone to learn new skills.

Increasing access to quality higher education requires developing infrastructures and systems to deliver open and distance learning in order to allow people from workplaces and remote areas to access learning and develop the needed skill sets [3][4][5]. It is the desire to open access to higher education to all that has resulted in the development and use of ICT in higher education systems. The use of ICT has been regarded as a sure means of catering for life-long learning with high flexibility, accessibility, and at affordable costs. The challenge has always been how to make higher education systems more flexible and dynamic so as to integrate technology in the management and delivery of learning programs. In this paper, the authors explore the role of information and communication technologies in delivering higher education, citing an example from a developing country, the Open University of Tanzania in Tanzania.

2. HIGHER EDUCATION

Higher education as knowledge creation and dissemination has a role to play in bringing hope to a society that is characterized by a series of internal crises in the welfare state that include social, environmental, and democratic crises caused by globalization and unsustainable practices [6][7][8]. With globalization, the need for a knowledge economy has

increased with innovations in ICT, an orientation to the market economy, and growth in national and international governance. The knowledge industry resulting from globalization has a greater contribution to an accelerated flow of people, ideas, culture, technology, goods, and services. In that case, a globalization impact affects countries, cultures, and systems. Higher education is no exception. The impact of globalization has resulted in social and economic inequality, new forms of management, and a loss of confidence in democratic systems. In the case of uncertainty, higher education becomes fluid as identities are continuously built and modified, new jobs are created, new skills are needed to make people work independently, and new ways to gain knowledge are invented [9][10][11].

Expansion of higher education is one of the strategies for improving the quality of education in terms of increasing numeracy and literacy levels, student enrollment and completion rates, access to pre-service and in-service training for professionals, motivation of teachers, teaching methods, access, quality, and relevancy of teaching materials, and inadequate skills related to educational administration and management. Though higher education needs to address challenges to improve quality, it is faced with many challenges. The demand for education in developing countries has increased as education is regarded as an important bridge for social, economic, and political mobility [12]. The expansion of higher education is faced with challenges related to infrastructure, socio-economics, lack of funding to support the purchase of the technology, lack of training among established teaching practitioners, lack of motivation, a need among teachers to adopt ICT as teaching tools, students' late exposure to ICT technology, the curriculum design, and linguistic and physical barriers for people who wish to access education [13][14][15][16]. On the infrastructure front, Matyokurehwa [14] argues that there is a considerable disparity in terms of urban and rural access to ICT services. The high cost of computers, the lack of electricity in many rural areas, and the high cost of the Internet are all things that make it hard to use ICT to provide higher education to everyone.

ICT can be used as a tool to overcome the issues of cost, social equity, sustainable development, a low number of teachers, poor quality education, as well as time and distance barriers [17][18][40]. With the use of ICT, learners become active participants in the learning process as they produce and share knowledge, and at different times they participate as experts, making the learning process more collaborative. As a result of using ICT to make sure that learners own their learning, teachers and lecturers become learning facilitators, collaborators, coaches, mentors, knowledge navigators, and co-learners, and the teaching and learning process gives students more options and responsibilities for their own learning [19].

According to Clarke [20], higher education is under pressure to change in order to catch up with the changes in the rest of the world. Clarke [20] further believes that there are

both political and social drivers of change in higher education resulting from globalization, increased student mobility, increased or changing student expectations, the need for increased flexibility, private sector involvement, and funding pressure. Changes in higher education caused by globalization include a rise in both local and international demand for higher education, an increase in the number and types of courses to be taught, new funding models, new ways of designing and delivering services, and more cross-border knowledge [20]. These changes require universities to be more flexible in order to accommodate the needs of all students, including those with special needs and disabilities. The questions then become: What ingredients are required to ensure that higher education produces the desired results? What are the factors that might make universities more effective in a globalized world? In most cases, researchers [21][22][23][24] indicate that though ICT implementation is costly, it is likely to support universities in becoming more effective in delivering inclusive higher education services.

3. THE OPEN UNIVERSITY OF TANZANIA: ICT DEVELOPMENT

The Open University of Tanzania began practicing inclusive higher education delivery by implementing ICT technologies in 1997, when audio-visual materials were first used as a means of content delivery by visually impaired people. The use of multimedia at OUT was supported by the non-profit organization David-Anderson African Trust (DAAT), based in the UK. In Tanzania, The Open University of Tanzania started delivering services to individuals with visual impairment in 1997, when 12 students with visual impairment were registered [25]. Like other developing countries, in Tanzania, developments and use of ICT in delivering affordable quality education for all face challenges that include: lack of funding to support the purchase of the technology; lack of training among established teaching practitioners; lack of motivation and need among teachers to adopt ICT as teaching tools; ICT literacy; learning styles; degree of support; and relevance of course content to career interests; understanding and addressing learners' needs; and affordances in bandwidth and meeting learner needs [26]. The challenge is determining how OUT will be prepared to ensure that ICT development supports all individuals, including those with special needs and disabilities, and allows the country to implement its ICT policy objectives, which include "special attention to providing new learning and ICT access opportunities for women and youth, the disabled, and the disadvantaged, particularly disenfranchised and illiterate people, in order to address social inequities" (URT, 2003). According to Toro and Joshi (2012), the enthusiastic nature of teachers towards the usage of ICT, ICT policies, budget, educational management, and skill training plays an important role in the integration process of ICT.

Taking into account the national ICT policy, which states that "Tanzania will become a hub of ICT infrastructure and ICT solutions that will enhance sustainable socioeconomic development and accelerate poverty reduction both nationally

and globally," the ICT policy mission is to "encourage beneficial ICT activities in all sectors by providing a conducive framework for investments in capacity building and promoting multi-layered cooperation and knowledge sharing both locally and globally." [27]. The question is how OUT is facilitating the implementation of the national ICT policy in its functioning and how the university can create a learning environment that considers the needs of all individuals. Development is a political project that is discussed through the lens of critical modernism [28]. It is important to note that development is all about power and the ability to meet basic needs. The question then is: how can ICT support individuals in meeting their basic needs? Basic needs are also complex, but they might refer to those that make people survive and those that are stipulated in the human rights agenda, including the right to education and the right to information. The objectives of this paper were therefore to explore the role of ICT in delivering inclusive higher education in terms of its importance, impacts, inclusion, and factors that enhance or inhibit its use. This paper provides answers to questions about the role of ICT in providing inclusive higher education. How does ICT fulfil its role of enhancing inclusive practices in higher education? In what ways does ICT assist in the delivery of inclusive higher education? What are the policies that govern its role? And what factors influence the use of ICT in higher education? In answering these questions, OUT is taken as a case study.

4. METHODOLOGY

In exploring the role of ICT in delivering higher education, the authors employed a qualitative approach, using observation, empirical literature reviews, and interviews as data collection methods. The empirical study consisted of 62 respondents: 15 students with a visual impairment, 5 students with a hearing impairment (deaf), 10 postgraduate students, 26 undergraduate students, and 6 academic staff. The choice of respondents was purposeful and snowballing, as the focus was on respondents who could give their views on implementing ICT at OUT as a support strategy in delivering inclusive higher education through open and distance learning. The transcript was analyzed using content analysis and later reviewed by an expert in inclusive education. Respondents had experiences as lecturers, students and persons with visual impairment. In conducting the literature review, it was noted that none of the literature focused on access to ICT services for persons with disabilities. This was expected, as it is only OUT that provides such services. Snowballing for respondents was also more possible as respondents, especially those with disabilities, got their training at OUT and thus had contact information.

5. FINDINGS

In this section, I present results from the study in terms of success stories, ICT delivery for inclusive higher education and the challenges. All the respondents had at least 2 years of experiences in higher education that included ICT skills

training for persons with disabilities. On the whole, all respondents had positive attitude and were willing to share their experiences. More interesting was to the students with visual impairment who said ICT is becoming their new eye to see things in a different way as can collaborate with anyone in the teaching and learning and in the social media

To me ICT has become my new eye, now I can learn. I can communicate. I can work online like anybody. For example, during online application for my course, I just did it myself. I can now read and get informed. During my education before here, I used Braille and I left it at the school, as such had very less opportunity to read. But now I read and learn whatever I want. Thanks to OUT for establishing ICT skills training for visually impaired people (Fattii, visually impaired).

On the whole one can note that ICT skills training for persons with disabilities is becoming a tool for lifelong learning and a tool professional development and socialization.

5.1 ICT services at out: success stories

Inclusive higher education requires availability of services in this case online services that require all students to access and use as their learning and administrative platforms. In this case I present what is available as online services at OUT for students use. The Open University of Tanzania since 2004 has created a number of application software that supports its functions including: the students' academic register information system (SARIS), Learning Management system (LMS), Electronic File Management Information System (EFMS), Library Management Information System (LIBMIS), Financial Management Information System (FINMIS), Human Resource Management Information System (HRMIS), and Examination Databank Management Information System (EDMIS). The SARIS allows students in any place to view academic status. It is in this system where student results are posted to be viewed by the student. SARIS for OUT has enabled students studying at OUT from different parts of the world to access their academic records and plan for their studies. The EFMIS has enabled OUT management to work electronically, ensuring that decisions are not delayed for a reason that staff responsible is out of the office. The HRMIS supports University in human resource planning and budgeting (www.out.ac.tz).

As many students joining at OUT had little skills in ICT since 2011, the University made a major decision that every student had to take a course in Communication and ICT skills as many OUT services started being offered through ICT platforms. The question then was how OUT services can be accessed by students with special needs and disabilities. Since 2011 OUT through partnership with international and local organisations started ICT training for persons with visual impairment. The first training of trainers' course was hosted at

OUT in 2011 where 15 persons with visual impairment got training. Two out of 15 persons with visual impairment participated in the ICT training were employed at OUT as ICT technologists in the Assistive Special Technology Unit (ASTU). In 2014 OUT launched a special ICT laboratory for persons with special needs and disabilities. The laboratory is meant to support persons with disabilities in accessing ICT training for the purpose of improving their access to education and skills training that would enhance their quality of life. One of the beneficiaries from first ICT training for visually impaired persons, said:

Here is a story on how I came to learn ICT and its associated benefits. I became visually impaired at the age of 50 years. I was a chemical Engineer graduated in 1980s at the University of Dar Es Salaam. I joined the OUT in early January 2011 as a Technologist II, with the sole aim of assisting visually impaired students studying at OUT. I was one of the first beneficiaries of ICT training for two weeks in April 2011, the training was organized by the OUT, Sight Savers, TLB and TEA under a trainer from Kenya. Among the benefits I enjoy to date include that: I can teach other visually impaired persons on how to use ICT, I can compose, read, send, reply and forward e-mails; I can visit different web sites to get information; I did my post graduate diploma in social work during the academic year 2012/13 through ICT, i.e., all tests and examinations were done by using computer software. I am currently pursuing Master's degree in social work where my learning is managed through the use of ICT. I study by using ELMS. Through ICT my job has been more secured than before as an ICT instructor for the visually impaired persons, I am conducting ICT classes to my fellow visually impaired persons. I really see ICT as a liberating tool for persons with disabilities [Sobi, VI]

According to Clement, ICT has a potential to create social inclusion that supports delivery of inclusive higher education. The question is how many persons with disabilities can access ICT training sessions? Can all benefit through ICT like the way Clement has benefitted? Answering these questions require more than one way of thinking. It can just be simply said that it is not possible. Because access to higher education has a number of criteria that one has to meet. However, with ICT skills training one can use the skills to obtain the needed criteria as one says

I did not do well in my studies during my secondary education. After ICT training at OUT I decided to do the qualifying test so that I re-seat Certificate of Secondary Education Examination. I did it. I passed. I got the required qualification and now I am registered as a Certificate student in Higher Education, my ambition is to continue until I become a degree holder (Fatii, visually impaired).

Not many persons with disabilities benefit in their early years of learning. Not many teachers are trained in supporting students with disabilities in their early years of learning as teachers are unable to meet their learning needs [30]. In such cases, ICT supports learning and improves quality of life as one receives information that facilitate formal, informal and non-formal learning opportunities to everyone.

I am visually impaired who joined OUT in 2011 as a student in foundation course. I am now pursuing B.Ed at OUT. One of the improvements that I feel and enjoy is the ICT training that I got and the laptop to use for my studies. This enabled me to complete my foundation course in exactly one year. Previously, I had bad experiences in my education. During my secondary education, I did not perform well because in one of the subjects, I did not write anything as the invigilator did not take care of me as a result the typewriter ribbon was misplaced and did not type anything. As a result, I failed. In secondary education we have only 7 subjects, thus failing one subject affects a lot. When I joined OUT, I found there were a lot of flexibility including writing using Braille print, or a typewriter or a computer. This is good and will liberate many visually impaired students joining OUT in Tanzania and beyond [Agnes, VI]

While visually impaired persons enjoy ICT services at OUT, it is not the case for the deaf. As one of the deaf students narrated:

I feel good to study at OUT because I get a lot of support, including fee payment arrangements and being paid transport costs during attending examinations. But I am not happy for not being trained in ICT. I feel I would be happier if I trained in ICT [Haji, Deaf]

It is true that in Tanzania there are no ICT training facilities for deaf persons. OUT is planning to start such training by 2015 after signing Memorandum of Understanding with DEAF AID an international organisation that supports education for the deaf. Lack of ICT skills facility leaves a room for persons with disabilities to be excluded in learning, workplaces, and personal professional development through online learning. According to Peeraer and Van Petegem [29] important factors for successful implementation of ICT in teaching-learning are ICT skills, confidence to use computer, infrastructure and availability in hardware and software. It is this view that OUT feels responsible for creating opportunities for persons with disabilities to have possibilities to learn some ICT skills so that they develop confidence in using and learning ICT skills.

OUT ICT has necessitated a number of things to happen that make it different from other higher education institutions

in the country including massification, diversification, internationalization, accountability and responsiveness. OUT created opportunities for increasing access to higher education as a response to increasing demand of higher education brought about by population growth, and increasing completion rates in basic and secondary education and the view of parents and students attached to higher education as a route for social mobility. Through OUT programs many students and individuals who otherwise would not have the opportunity to take up initial or further studies and pursue professional development got possibilities to join. OUT has a number of non-degree courses including: the foundation course, certificate course in Distance Education; Commonwealth Youth Programme Diploma (CYP-Diploma), Diploma in Distance Education and Open Learning, Diploma in primary Teacher Education, ICT short courses, Certificate in Poultry Production and Health, Diploma in Poultry Production and Health, Certificate in Early Childhood Education, ICT skills for persons with special needs and disabilities, Diploma in Early Childhood Education, Postgraduate Diploma in Education, and Postgraduate Diploma in Law. In ensuring that massification does not erode quality of education, OUT has a dedicated directorate responsible for quality assurance. The question is how to make these courses available to all students within and beyond Tanzania.

At OUT there are number of options which students can take. Within the course, students can take pure distance courses, courses with intensive face-to-face sessions, evening courses, weekend courses, online courses and executive course programmes. Such diversifications, has created opportunities for students to choose the mode that fits them well. For students with disabilities, especially the visually impaired students can do their examinations using both Braille print, typewriter and or a computer. OUT offers its courses in other countries as well, taking a view of internationalization.

OUT in maintaining its role as higher education institution has to be accountable and responsible to the community. As such OUT has a Consultancy Bureau that takes on-board all consultancy activities making it responsible for creating solutions that are directly applicable to the society. At the same time OUT has a research unit responsible for research activities. In responding to late attainment of ICT skills among students and staff, OUT has on-going short course training. Staff have orientation to the use of new developed software and students do receive such trainings during face-to-face sessions and in regions where OUT has ICT laboratories students receive such training at a subsidized cost. At OUT staff who would want to study are supported by being given permission to attend classes and do not pay full cost of the course. For making use of ICT in higher education, lecturers are the focal persons. According to Toro ad Josh [34] teachers have to be ready to make use of the possibilities that ICT offer, such as different learning contexts, focused on the

students, presenting them with several types of interaction, offering different degrees of control of their own learning, adapting to their personal interests, promoting collaborative tasks and developing autonomy in their work and study.

5.2 ICT for inclusion services delivery

According to Khan and Markauskaite [31], ICT can be considered as a tool for delivery. ICT can be a source of subject information to support individuals to become independent self-paced learners; and can also provide opportunity for group analysis/ interaction, decision-making and dialogue. With use of ICT through web-based learning, individuals do access learning materials and information, and do have opportunities to conduct individual assessment. With ICT there are also possibilities for creating learning-related communication and also ICT can be a medium for networked learning [31][32][39]. Bliuc et al. [33] found blended learning had more influence in terms of empowering students for lifelong learning; meeting learners needs and learning goals; improves students access to learning and meet their practical needs; as an aggregation of face-to-face, online and other types of technologically driven delivery; and learning as use of technological tools for teaching. One of the respondents at said:

After completing my introduction to Computer course, I can now use the online learning materials available at OUT website, I can register online for examinations, I can view my academic progress results online and can use library materials. Where internet is not available, I use the CDs and DVDs. OUT has prepared almost all learning contents available in the learning management system are also available in CDs and DVDs as offline materials. I feel so independent and well supported. My problem is only when there is no electricity. [Pati]

ICT has made my teaching so easy. I can create, store, update and share my notes with my students and my fellow lecturers electronically. In distance teaching Universities, ICT is so important and thus Universities need to have a plan to update both students and the academic staff as new ICT technology emerges [Hapahapa, OUTLecturer]

At the Open university of Tanzania ICT has been used so much in delivering higher education through creation of a learning platform MOODLE (www.elms.out.ac.tz), because of having unreliable internet at OUT all course materials available in the e-learning platform are also available in CDs and DVDs. OUT delivers learning resources online in order to allow access to students and the public. Has an online library access (<http://www.out.ac.tz/library/>) where students can access learning materials? Other services available include online application system (APIS), examination registration system, students' academic records information system (SARIS), OUT journals, HIV and AIDS awareness,

and a blog for social networking. At OUT ICT has become an important tool to meet external expectations, gain access to information and resources, and as a media for active learning. External expectations at OUT include that lecturer and the students are obliged to use ICT. For students have to pass an introduction to ICT course and a course in communication skills. Since 2014 OUT has started testing use of Tablets in delivering learning content to students after has been successful in introducing ICT by starting with low-cost Laptops for students between 2012 and 2013.

5.3 Challenges

In making sure that ICT plays its role in delivering higher education, there are a number of challenges that include infrastructure, inadequate connectivity, human resources, the availability of content, organizational challenges, and the availability of ICT training facilities. According to Nihuka and Peter [35], there are challenges in learning ICT in the early years in Tanzania related to the unwillingness of some teachers to teach ICT, a lack of interest to teach ICT, a lack of ICT literacy among teachers and pupils, a lack of pedagogical knowledge, and limited access to ICT facilities by most teachers and pupils. This indicates that challenges in implementing ICT in teaching need a concerted effort among different partners and should be addressed at all levels. There are barriers to learning and using ICT related to a shortage of technical support, insufficient knowledge, the gender and age of the teacher, and a lack of motivation [34][36][37]. According to Toro and Joshi (2012), ICT necessitates the collaboration of many actors in order to address aspects of policy for ICT in education such as content and digital resources, capacity building, monitoring and evaluation frameworks, ICT for education management, implementation plans, financial allocations, political and administrative support, community demand for ICT, adapting a change in learning processes, staff development, and training programs.

According to Kumar [38], there are four common mistakes in integrating ICT in teaching, which include: installing learning technology without reviewing student 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. Initially, ICT integration into teaching was done in stages. It first started by introducing ICT skills to the community through ICT computer laboratories, where students paid half the price. While students were learning, there were programs for staff to learn ICT. This process started in 2004, and in 2010, OUT made the decision that all students should take a computer course and a communication skills course. The process of having short courses for academic staff is an ongoing one.

Since 2009, ICT has had the potential to widen the digital divide, but steps toward closing the gap have been made. In

2009, OUT started looking for partners to support ICT training for the visually impaired, which was implemented in 2011. In 2013, OUT started to find partners to introduce ICT for the deaf, which started being implemented in 2015 with a partnership with Deaf Aid. Skills learning has been added to the process to make learning better, and while ICT is being used more and more, face-to-face sessions are still held to help academic staff and students get to know each other better. For academic staff at OUT, there is a team dedicated to supporting teachers in updating and uploading course materials. At OUT, both students and academic and administrative staff have regular opportunities to learn and use ICT. Students can find online materials that are relevant to their course outlines with the help of ICT, and staff can improve the quality of services they give to OUT clients with the help of ICT.

5.4 Conclusion

Though ICT faces many challenges related to physical, fiscal, and human factors, it has greater contributions to higher education delivery in research, teaching, and consulting in both developed and developing countries. Its contribution lies in aspects of creating solutions for students, staff, and clients. Through the use of ICT, a number of students with and without special needs and disabilities enrol in and graduate from universities.

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