E-CHARACTERISING TEACHER EDUCATORS IN SUB-SAHARAN AFRICA

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ABSTRACT– In this paper, the importance of quality education as acknowledged as a primary enabler of wealth and prosperity in the developing world by international organisations like UNESCO, the World Bank and the Commonwealth of Learning, is described. Several educational interventions have been spearheaded by these organisations, with the singular aim to improve the educational endeavour in the developing world. Guided by the "Education for All" (EFA) call (1990), and the Millennium Development Goals (MDGs) (2000), a goal of improved education by 2015 was set. Subsequently, it became clear that the MDGs would not be achieved by developing countries by 2015, and "Sustainable Development Goals" (SDGs) were drafted, emphasising quality education as "foundation for improving people's lives" (SDG 4). There is broad consensus in the world that several benefits exist for using ICT in school and teacher education, like improved knowledge and communication, teaching and learning pedagogies, student performance, efficient management, and assessment practices. Using survey methodology, this paper reports on the readiness of teacher educators at 12 Sub-Saharan countries to integrate ICTs which would enable them to prepare their student teachers for ICT integration. Teacher educators at the majority of the institutions had insufficient knowledge and skills in this regard.

Keywords: Teacher Education; ICT Integration.

1. INTRODUCTION

This research is premised on the widely held belief that quality education is key to wealth and prosperity in the developing world, and that the quality of teachers will have a significant impact on establishing a skilled workforce in those countries. Such a workforce will advance economic and social growth, and will enable a more equitable world. A key strategy that is advanced by several of the educational interventions, is the improvement of the educational ICT capabilities of teacher educators and teachers, which includes not only skills in using ICT tools but also knowledge of the pedagogies that underpins ICT integration.

Therefore, the research questions that this paper addresses are "How ready are teacher educators for integrating ICTs in their teaching", and consequently "how ready are they to teach their students to integrate ICTs in their teaching"?

In this paper, firstly, an overview of the development of the international agenda for improving the educational imperative of the developing world, is given. Secondly, ICT integration in teacher education is described and problematised. Additionally, the development of the instrument that accounts for the complexity of ICT integration, considering the theoretical rationale for ICT integration, and the extent to which teacher educators comprehend that theoretical rationale, as well as establishing their baseline skills in using ICT tools and pedagogies, and the institutional support that they receive. Finally, the findings of a survey conducted at 12 Teacher Education Institutions (TEIs) in Sub-Saharan Africa are given.

2. TOWARDS QUALITY EDUCATION IN SUB-SAHARAN AFRICA

In this section, the work of international agencies, e.g. the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Commonwealth of Learning (COL) and The Open University's Teacher Education in Sub-Saharan Africa (TESSA) project, are briefly described. The primary purpose of this section is to identify the key milestones in developing that agenda and to isolate teacher education

and the inclusion of ICT integration in teacher education, as important constituent parts for improving education in the developing world, and particularly as it pertains to Sub-Saharan Africa (SSA).

2.1 The impetus for quality education

2.1.1 United Nations Agencies

In 1990, in Jomtien, Thailand during the *World Conference on Education for All*, delegates from 155 countries adopted the 'World Declaration on Education for All' (EFA). The declaration set six goals to achieve EFA. Goal six set 'Quality of Education' as a fundamental goal for the development of individuals and society (UNESCO, 2016). As it became increasingly clear 10 years later that the goals of EFA would not be achieved, delegates again met in Dakar, Senegal in the year 2000 and adopted the 'Dakar Framework for Action'. The right of children to have access to good quality education was affirmed. The Dakar Framework in particular recognised the importance of teachers in ensuring good quality education, and it emphasised that "policy-makers need to improve teacher education, deploy teachers more fairly, provide incentives in the form of appropriate salaries, and create attractive career paths" (UNESCO, 2000). The Dakar Framework also stated that, in order to achieve its goals, role players should "harness new information and communication technologies to help achieve EFA goals" (UNESCO, 2000:9).

In 2013, UNESCO took stock of the extent of attainment of the EFA goals in its 11th *Global Monitoring Report* (UNESCO, 2014). The report made it clear that the goals of EFA would not be attained. The report (p.35) in particular identified "*Innovation in the use of technology can help improve learning by enriching teachers' curriculum delivery and encouraging flexibility in pupil learning. Greater access to computers in schools can also help reduce the digital divide between low and high income groups"*. The report further stated that "*Teachers' ability to use ICT as an educational resource plays a critical role in improving learning".*

After the Dakar Framework was proclaimed, 189 world leaders met in September 2000 and adopted the eight Millennium Development Goals (MDGs). Only two MDGs relate specifically to education (Goal 2: Achieve Universal Primary Education and Goal 3: Eliminate gender disparity in Primary and Secondary Education) (Millennium Project, 2005). As was the case with EFA goals, the MDGs set 2015 as target date for the achievement of its goals, and similarly it became clear that the MDG's would not be attained by the target year. In September 2015, the UN adopted the Sustainable Development Goals (SDGs), which sets targets for 2030. SDG 4 specifically sets targets for 'Quality Education for All' (Griggs, 2013).

In the ELearning Africa 2015 report, Aida Opoku-Mensah of the UN Economic Commission for Africa argues that "*African governments, namely ministries of education, need to work hard on the integration approach to ICT in the education sector... An eLearning strategy would, for instance, assist countries to address the education deficit whilst honouring their commitments to their citizens*" (Elletson & Burgess, 2015:3). In closing this section, the United Nations International Children's Emergency Fund UNICEF (2015) spells out a vision for education beyond 2015:

> *"The post-2015 education agenda should be aspirational, transformative and holistic, and an integral part of the broader post-2015 development agenda. It should be of universal relevance and mobilize all stakeholders in all countries. Education must be a stand-alone goal in the broader post-2015 development agenda and should be framed by a comprehensive overarching goal, with measurable global targets and related indicators. In addition, education must be integrated into other development goals."*

2.1.2 The Commonwealth of Learning

Acknowledging the importance of Teacher Training (TE) in the achievement of quality education for all children, COL developed a teacher development framework that is guided by three strategic goals:

- Quality education for all Commonwealth citizens,
- Human resource development in the Commonwealth
- Harnessing ODL and technologies to achieve development goals (COL, 2015).

To this end, COL is assisting several Commonwealth countries in SSA guided by their three strategic goals. The development of ICT skills for teaching and learning are emphasised in these interventions.

2.1.3 Teacher Education in Sub-Saharan Africa (TESSA)

According to the TESSA website, the organisation "*is a network of teachers and teacher educators working alongside The Open University, UK, to improve the quality of classroom practice and access to teacher education resources across sub-Saharan Africa*" (TESSA, n.d.). TESSA offers a range of ICT-based Open Educational Resources (OER) in English, Swahili, Arabic and French using ICT formats like ePub, Kindle, XML, RSS, MS Word, PDF, SCORM or Moodle Export files. The TESSA resources also includes a guide for using new technologies for teaching and learning.

2.2. Teacher Education as key enabler of quality education

In the previous sections, it became clear that quality education has been on the agenda of international agencies for several decades. According to Dembélé and Oviawe (2007), the picture of Teacher Education is the gloomiest in SSA. Thakrar & Wolfenden (2009) describe the challenges as 'acute'. There is sufficient evidence that SSA has large numbers of unqualified or under-qualified teachers. For instance, the UNESCO Institute for Statistics (USIS), reported in Projecting the Global Demand for Teachers: Meeting the Goal of Universal Primary Education by 2015 that at least 2.4 million teachers will be needed in SSA if the goals of Universal Primary Education are to be met (United Nations Statistical Commission, 2013). Thakrar and Wolfenden (2009) put the number as high as 4 million additional teachers that are required if the goals of EFA were to be met by 2015.

The Global Campaign for Education (GCE) and Education International (EI) believe that a fundamental reason for the gap in quality education is the severe lack of well-trained, well-supported teachers (Global Campaign for Education and Education International, 2012). The Teacher Training Initiative for Sub-Saharan Africa (TTI) endeavours to address "teacher-related challenges over a period of ten years (2006-2015)" (UNESCO, The teacher training initiative for SSA, 2015). The TTI is premised on the notion that education is a fundamental human right, and an enabling right that assures a good livelihood, better health, and the kinds of transformation that leads to the wellbeing of communities and countries. There is therefore a strong imperative to invest in education, and specifically teacher education, to reduce inequality and build prosperity in SSA. This places the recruitment and training of teachers sharply under focus, and particularly the quality of education that student teachers receive in TEIs. Desai (2012) mentions that in SSA, many development programmes neglected the role of teacher educators to achieve aquality education.

In South Africa, teacher development (TD) continues to be the most important challenge where the improvement of South African schooling is concerned (De Clercq & Phiri, 2013). In a policy statement in 2007, the former Department of Education called for 'more teachers, **better** teachers" while the New Partnership for Africa's Development (NEPAD) expressed concern about the challenges that Africa face in Teacher Education, while expressing concerns about 'numbers and quality' (Mays, 2010).

2.3. ICTs as key enabler of quality Teacher Education

The role of ICTs as a key enabler for quality is widely recognized. There is no doubt that ICTs will continue to permeate all sectors of society and the economy and become increasingly indispensable – also in Teacher Education. Already, in 2002, UNESCO, recognised the pivotal role that ICTs will play in education and developed an ICT in Education curriculum for schools and for teacher development. In this 150 page document, UNESCO proposes that teacher development for ICT integration "*is best conceived as an ongoing process, with many professional development activities conducted in schools*" (p11).

The use of ICTs in education needs to be problematised, as the literature reveals conflicting reports about the efficacy of using ICTs for learning. Higgins (2003) reviewed 200 reports on the effectiveness of digital technologies to improve learning performance. He reported that digital technologies have a modest effect on learning, especially when compared to other pedagogical interventions like study skills development, or the development of metacognitive skills. Conversely, Bilbao-Osorio and Pedro (2009) and Voogt, Knezek, Cox, Knezek and Ten Brummelhuis (2013) found that student performance can be advanced by digital technologies (Higgins, 2003). Furthermore, issues of access to ICTs exist: according to the UNESCO: ICT in Education report (2011), more than 4 billion people worldwide — mostly those living in rural areas of developing countries — are not yet connected to the Internet (UNESCO, ICT in Education, 2011).

The UNESCO Planning Guide for ICT in teacher education gives three key principles relevant to Initial Teacher Education (ITE). These are also suggested by the Society for Information Technology and Teacher Education (SITE) (Harrison, 2010). These are:

- technology should be infused into the entire teacher education programme, not restricted to a single course;
- technology should be introduced in context, not taught as separate topics but rather as and when the need arises in all courses of the teacher education programme;
- students should experience innovative technology-supported learning environments in their teacher education programme. In addition, students should see their lecturers engaging in technology to present their subjects and have the opportunity to use such applications.

How to integrate ICT into teacher preparation programs needs careful consideration. Voogt et al. (2013) recognise that teaching ICT skills alone is not sufficient, because students learn how to use ICT-related tools without being able to use them effectively to promote students' learning. To be a teacher who effectively integrates ICTs, an understanding of the complex relationships between pedagogy, content and ICT must be developed. To this end, Mishra and Koehler (2006) introduced Technological Pedagogical Content Knowledge (TPACK) as a framework to understand and describe the kinds of knowledge needed by a teacher for effective ICT integration. The main bodies of knowledge in the TPACK framework are: Content knowledge (CK), Pedagogical knowledge (PK), and Technological knowledge (TK)

Fu (2013) identifies the following barriers to integrating ICTs in teacher education:

- Low teacher expectations and a lack of clear goals for ICT use in schools;
- A lack of teacher collaboration and pedagogical support, as well as a lack of experience among cooperating teachers;
- Insufficient time to learn new software or integrate ICT during a class period;

- Inadequate software competence and habitual ways of conceptualising what and how students should learn;
- Limited knowledge and experience of ICT in teaching contexts;
- A lack of specific knowledge about technology and how to combine it with the existing pedagogical content knowledge to support student;
- Excessive focus on teaching technical or operational;
- A lack of in-service training on the use of ICTs in education;
- Technical problems in the classroom;
- A lack of motivation, and technical and financial support; and

It is clear from the above that sufficient justification exists for using ICTs in Education, and therefore also for Teacher Education. However, the question remains to what extent are teacher educators in SSA ready to integrate ICTs in their own teaching.

3. METHODOLOGY

3.1 Research design

The research design of one of a typical survey design, using an online questionnaire to obtain the data. The questionnaires were developed using Google Forms. The questionnaire included a description of the purpose of the research, and assurance of anonymity and voluntary participation was stated. Respondents had to consent to participate before access was given to the questionnaire.

3.2 Sampling

Twelve Teacher Education Institutions were selected from 11 countries in SSA to participate in the study. These institutions were participants in a Teacher Educator development programme coordinated by COL. In total, 26 academic staff members from the 12 institutions completed the questionnaire.

3.3 Instrumentation

The questionnaire was developed after a literature review (summarised in preceding sections). The questionnaire comprised 17 items. Section A of the questionnaire collected biographical information from the respondents. Section B aimed to e-characterise each respondent in terms of the ICT devices used for teaching and learning, frequency of ICT devices used for teaching and learning, software tools used for teaching and learning, self-rated software skills, frequency of software tools used for teaching and learning, and knowledge of theoretical and pedagogical constructs associated with ICT integration

SPSS (V22) was used to analyse the data. Descriptive statistics were performed on the responses, and these are reported in paragraph 45 of this report. The fact that the number of responses for this questionnaire (n=26) does not really allow for the application of typical statistical validation techniques (for example exploratory factor analyses), the underlying theoretical constructs that were contained within the Likert-type items were not validated by applying such techniques. The only claim in terms of validity that is therefore made is one of 'face validity', as the questionnaire was subject to several rounds of scrutiny by experts and colleagues.

4. RESULTS

This section reports the results of the Lecturer Characterisation Questionnaire, which was completed by 26 individuals from the respective TEIs.

4.1 Biographic information

A small majority of the respondents were male (14). The average age of the lecturers was 48 years, ranging from 29 years to 65 years old. The professional appointment levels of the respondents are presented in Table 1.

Table 1: Professional appointment levels of the respondents

Lecturer	Snr Lecturer	Ass Professor	Professor	Dean	Other
11	4	1	0	5	5

There is a notable absence of respondents appointed at the level of Associate Professor and Professor. It is further noticeable that five respondents were appointed at the level of Dean, which is indicative of the practice that some Deans at the TEIs take on a teaching load. The category "Other" covered the positions of "Head Teacher Training, Accreditation and Curriculum Development", "Coordinator of Undergraduate Studies in the Faculty of Education, and "Assistant Lecturers". It was interesting to note that several individuals took on dual roles at their respective institutions, for example "Assistant Lecturer AND Coordinator of Undergraduate Studies in the Faculty of Education", or "Lecturer AND IT Service Support. The responses to the "Years' experience in developing ICT learning materials" showed that nearly one fifth of the respondents (19.2%) indicated that they had no experience in using ICTs to develop learning materials. Only 14 respondents indicated that they had more than 4 years' experience.

4.2 Types of Learning Materials used by lecturers

Respondents were asked to select from a list which types of materials they personally used for the delivery of their courses. Figure 1 illustrates the responses of the respondents. It shows a preponderance of "printed learning guides" used by 22 (88.4%) of the respondents. Further, 21 (80.7%) lecturers used "other printing materials" like printed journal articles, monographs, etc.

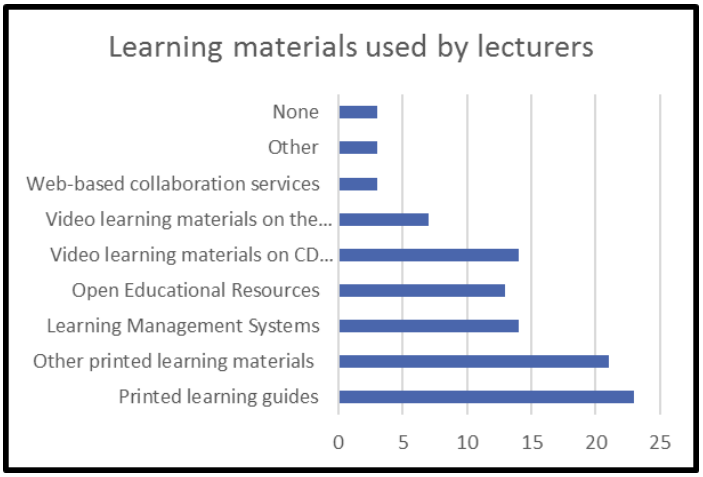

Figure 1: Learning materials used by lecturers

Other ICT-based learning materials that were used by more than half of the respondents are:

- Learning Management Systems: 14 (53.8%)
- Video learning materials: 14 (53.8%)
- Open Educational Resources: 13 (50%)

Only seven lecturers (27%) used web-based Video learning materials, and only three (11%) used web-based collaboration services in their courses. The "Other" category included the use of "Tablet-based applications", and "Recorded televised lessons".

The data show that web services, other than LMS systems, have not made many inroads into teaching in the Teacher Education programmes among the participating lecturers.

4.3 ICT Devices used by lecturers

Respondents selected the ICT devices from a list which they use in their courses. Figure 2 illustrates this data, and shows that the majority of lecturers use a personal computer for teaching and learning.

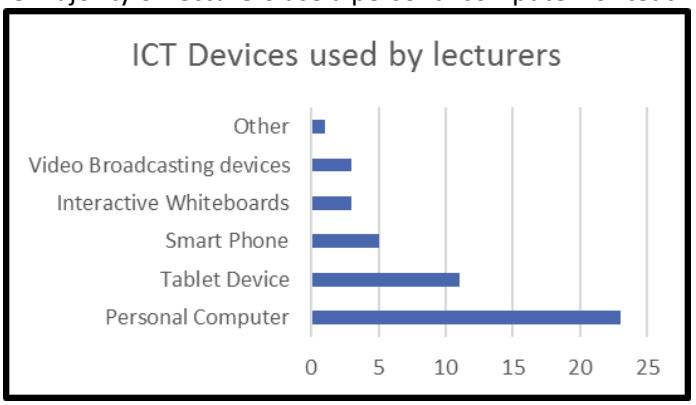

Figure 2: ICT devices used by lecturers

It is noticeable that more contemporary devices like tablet computers (42%) and smart phones (19.2%) have found limited application in the teaching in the teacher education programmes.

4.4 Lecturers' self-rated expertise in using ICT software tools

Respondents were asked to rate their level of expertise in 30 contemporary ICT tools and applications that are often used for educational purposes in modern societies. The response options were Likert-type scale options ranging from "No experience", "Beginner", "Average", "Advanced" and "Expert", coded to numerical values between 1 and 5 respectively. Table 2 presents the mode of responses to listed tool that where the mode was 'average' and above. above .

Table 2: Lecturers' self-rated expertise in using ICT software tools

Software tool	Mode
Word processing tools (e.g. MS Word)	4
Presentation tools (e.g. PowerPoint, Prezi)	4
Web social media tools (e.g. Facebook, YouTube, Twitter)	4
Instant messaging tools (e.g. WhatsApp, BBM)	3
PDF Tools	3

For the following tools, respondents indicated that they had 'no experience':

Desktop graphics creation/editing tools (e.g. Photoshop, Gimp, Corel Draw), Desktop publishing software (e.g. Adobe Pagemaker), Cloud services (e.g. Google Drive, One Drive), Interactive whiteboards, Video conferencing tools (e.g. Adobe Connect, Zoom), Online Web 2.0 teaching tools (e.g. EdModo), Blogging tools (e.g. Blogger), Wiki Tools (e.g. Wikispaces), Web page/web site development using online tools (e.g. Google Sites, Wix), Webinar Services (e.g. Onstream Webinars, Zoom), Social Bookmarking tools (e.g. Diigo, Delicious), Quiz tools e.g. ProProfs),E-Book creation tools (e.g. Flipbuilder), Citation Manager tools (e.g. Zotero, Mendeley), Video editing software (e.g. Windows Movie Maker, Camtasia), Online collaborative tools (e.g. Google Hangouts), Polling Tools (e.g. Naiku, Polldaddy), Word cloud tools (e.g. Wordle), Curation Tools (e.g. Scoop.it), Digital storytelling tools (e.g. Storybird), Mind-mapping tools (e.g. Popplet, MindMeister), Infographic tools (e.g. Piktochart), and Annotation tools (e.g. Diigo, Webnotes).

The data shows that it was only expertise in Word Processing tools (M= 3.69), Presentation Tools (M=3.50) and Instant Messaging tools (M=3.19) that lecturers rated themselves as having "Average skills" and above. Not a single response was recorded that indicated "expert level" for any of the tools.

The mode values of the responses are more illuminating. The mode for 23 of the 29 (79.3%) contemporary ICT tools and applications was "no experience in using this tool".

4.5 Individual lecturers' ICT tools expertise score

A score for individuals based on their self-rating of their expertise in each ICT tool was calculated by summing their individual responses. For the purposes of establishing a score for each individual, the responses were recoded. "I cannot respond to this item" and "No skills" were coded as 0. "Beginner skills" was coded as 1, "Average skills" as 2, "Advanced skills" as 3, and "Expert skills" as 4. Therefore, the maximum score that could be achieved by an individual is 116 (29 x 4). The highest self-reported expertise score by an individual was 49/116 (42.24%), and the lowest was 1/116 (.86%). This clearly indicates a distinct self-rated deficit in ICT tools expertise.

The low scores that were achieved can be attributed to lack of skills in nearly 80% of the tools that were presented.

4.6 Frequency of ICT use for teaching

Respondents were presented with a list of 29 contemporary ICT software tools that are considered to be useful for educational purposes and asked to respond to the item "How often do you use the following tools in your courses?" The response options were Likert-type scale responses ranging from "Almost never", "Occasionally", "Often", and "Almost all the time". The responses were to each tool were coded to numerical values between 1 and 4. The frequency of ICT software tool use mimics the expertise that lecturers had in the tools. The mode for 27 of the 29 software tools is "1", indicating an "almost never" response. The means of the responses indicate that only Word Processing (M= 3.04) is used either "often" or "almost all the time". The means for Presentation tools (M=2.84) places the frequency of its use between "occasionally" and "often", however, the mode for this tool is 3, and shows a tendency towards being used "often". The means of all other responses to the list of ICT tools are below 2, indicating a frequency of use for those tools between "occasionally" and "almost never".

4.7 Lecturer understanding of ICT integration pedagogies

Respondents were asked to rate their knowledge of ICT pedagogy and theories. The response options were Likert-type scale options ranging from "Limited understanding", "Some understanding", "Good understanding", "Advanced understanding" and "Expert understanding". The responses to this item were coded to numerical values ranging from "1" to "5", respectively. Non- responses and "I cannot respond to this item was code as "0". The responses of the lecturers to this item are summarised in Figure 3.

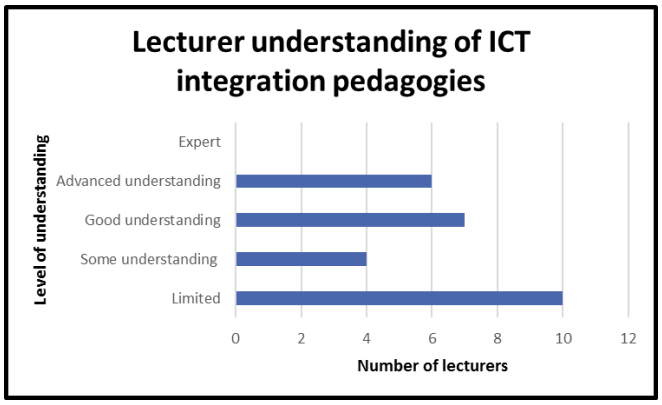

Figure 3: Lecturer understanding of ODL pedagogy

More than half (53.8%) of the respondents indicated that they had less than a "good understanding" of the pedagogies that underpin ICT integration. None of the respondents considered themselves as having "Expert understanding".

More specific items isolated some theoretical constructs. Respondents were asked to rate their knowledge of the theoretical constructs in Table 4 by using response options from 'No or almost no expertise (1) to 'Expert Knowledge (5): Table 4 reports the results of this analysis.

Table 3: Lecturers' self-rated knowledge of theoretical constructs

Software tool	Mean	Mode
Constructivism	4.12	4
Authentic learning	2.12	2
Formative assessment	3.10	3
Summative assessment	3.12	3
Interactive learning	2.36	2
TPACK	1.01	1

The data shows that lecturers rated their knowledge of TPACK very lowly, and of constructivism very highly.

4.8 How are ICTs used by Teacher Education Institutions?

Respondents were asked to indicate their level of agreement to several statements about how ICTs were used at the TEI. The items in this section of the questionnaire were representative of pedagogical underpinnings to the use of ICTs, or other uses of ICTs for teaching and learning at the TEI. The response type options ranged between 'Strongly Disagree' (1) and 'Strongly Agree' (5).

The responses to these items were aggregated and are tabulated in Table 4. Measures of central tendency were computed to summarise the data for each item.

Table 4: How are ICTs used by Teacher Education Institutions?

How are ICTs used by the TEIs?	Median	Mean
ICTs are used to present information in alternative ways to paper	4.00	3.40
ICTs are used to enable collaboration among students	4.00	3.43
ICTs are used to provide access to alternative learning resources	4.00	3.60
ICTs are used to create more real-life like learning experiences	3.00	2.93
ICTs are used to give students access to external experts	3.00	2.71
ICTs are used to create interactive learning experiences	4.00	3.15
ICTs are used for online assessment	2.00	2.50
ICTs are used for student observation during school practicum	2.00	2.21
Students are expected to use ICTS during school practicum	4.00	3.36
Students are expected to use ICTS for research purposes	4.00	3.20
Lecturers make use of institutional admin systems to manage students	2.00	2.55
Lecturers make use institutional database systems for research	4.00	3.47

Both measures of central tendency (mean and median) are suitable to assess the extent that the respondents agreed with each item presented. The mean and median for the items are close to each

other. It is apparent from the responses that for seven of the 12 items, respondents agreed that ICTs are used in the manner suggested by the respective items. It is however also evident that ICTs are not used for online assessment (M=2.5), or during lesson observations during school practicums (M=2.21), and that lecturers are not using institutional administration systems to manage student learning (M=2.55).

4.9 Obstacles to using ICTs for teaching and learning

Respondents were asked to indicate their level of agreement to six possible obstacles for ICT integration in teaching and learning. The responses were coded as in section 4.8. The results of the items are given in Table 5.

Table 5: Obstacles to using ICTs for teaching and learning

Item	Median	Mean
Lecturer ICT skills prevents them from using ICT for T&L	3.00	3.00
Student ICT skills prevents lecturers from using ICT for T&L	4.00	3.23
Lecturer access to ICT prevents them from using ICT for T&L	4.00	3.15
Student access to ICT in prevents them from using ICT for T&L	3.00	3.00
Access to ICTs in schools prevents students from using ICTs during practicums	4.00	3.42
Access to online ICT resources prevents staff from advancing their research	3.50	3.43

The responses to the items presented in Table 5 can be separated into 'lack of skills in ICT' and 'lack of access to ICT'. All items yielded a mean and median above 3, which leans towards agreement to the items. It is also apparent from the responses to the items relating to 'lack of access to ICTs that respondents agreed that lack of access to ICTs prevented its effective use by lecturers and students.

4.10 Personal Training needs of lecturers

Respondents were requested to list their personal training needs in an open-ended response type question. The text generated by the responses were thematically analysed, and then ranked by the preponderance of the training need. The themes that emerged from the analysis of the text related to personal training needs are tabulated in Table 6.

Table 6: The training needs of lecturers

Training need	Rank
The use of the WWW for teaching and learning in TE programmes	1
Practical use of a variety web-tools	2
The use of ODL in TE programmes	3
The use of online collaborative tools for teaching and learning in TE programmes	4
The creation and use of eBooks for TE	5
The use of interactive whiteboards in TE	6
The use of simulations for teaching and learning in TE programmes	7

A strong need that emerged from the submitted text had to do with practical, hands-on skills. Respondents were less interested in obtaining theoretical knowledge.

5. SUMMARY

In this paper, the belief that quality education is a key determinant of wealth and prosperity in the world was established. The work of several international agencies like the United Nations and the Commonwealth of Learning is in part aimed at improving the lives of the inhabitants of the developing world through educational interventions. These are often broadly inspired by declarations (e.g. the

Declaration of Human Rights, (1948) and Education for All (1990), and guided by frameworks (e.g. the Dakar Framework for Action), the setting of goals (e.g. EFA goals, Millennium Development Goals and the Sustainable Develop Goals). These set specific targets to be reached by certain dates. The 2013 EFA Global Monitoring Report showed that not a single country in SSA achieved any of the EFAs. The premise of the interventions by for example COL and TESSA is that progress towards quality education can be achieved by targeting Teacher Education Institutions.

Twelve Teacher Education Institutions in Sub-Saharan Africa were surveyed to establish the readiness of lecturers to integrate ICTs in teaching and learning. The research found that the participating TEIs used ICTs in teaching and learning, but that they did so in a limited way. This included the use of printed learning guides, and "other" printed learning materials e.g. articles. Just over half of the Teacher Educators used Learning Management Systems, Video Learning materials, and OERs. There was limited use of web-based video materials and web-based collaborative services. Web services, other than LMS systems, have not made much inroads into Teacher Education programmes. Only 42% of the lecturers used tablet devices in their teaching, 20% used Smart Phones, and less than 20% used Interactive White Boards and Video Broadcasting Services. Having to consider 29 contemporary ICT learning tools, most pronounced that they had no skills in those. Lecturers could not use ICT tools that support collaboration among students, or develop critical thinking skills, use curation tools, and other tools that promote learning at the "Create" level of Bloom's Revised taxonomy, therefore the frequency of use of these tools closely was low. At least 50% of the lecturers had less than 3 years' experience in using ICT learning materials, and more than half (53.8%) of the respondents had less than a "good understanding" of the pedagogy that underpins ICT-supported learning. The training needs of the lecturers were obtaining skills in ICT tools, without a doubt in the development of practical, hands-on skills in ICT tools. In addition, although not expressed explicitly by the lecturers, it is clear that lecturers need to develop their knowledge on modern views about education, as encapsulated by 21st century learning.

6. CONCLUSION

The research showed that Teacher Education Institutions face several challenges before the overall goal of Quality Education will be achieved. The teacher educators at the Teacher Education Institutions that participated in this project use ICTs only in a limited way. Their pedagogical approach in using ICTs is characterised by "transmission mode" when using ICT tools. They exhibited a distinct lack of ICT integration knowledge (TPACK), which is exacerbated by competence deficits in Web 2.0 tools. The imperative for further interventions in Teacher Educators development is therefore justified.

7. RECOMMENDATIONS FOR FURTHER ACTION

The following recommendations are made to regarding future interventions:

- International agencies should focus on the professional development of teacher educators for enhancing their Technological Pedagogical Content Knowledge.
- Interventions, when mediated by ICTs in the ODL mode, should model best ICT integrations practices.
- The 'hands-on' training in developing teacher educators should be advanced, and in particular the kinds of ICT tools associated Web 2.0 learning.
- International agencies should take note of the data relating to internet penetration in Sub-Saharan Africa. It is clear that access to the internet will be increasing mobile based, therefore mobile-friendly pedagogies, and mobile learning tools should be emphasised in future interventions.

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