

Information and Communication Technologies (ICT) and Teacher Education Preparation in South Africa: Implications for 21st Century Classroom-based Practice

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ABSTRACT Information communication and technologies (ICTs) have become the life wire of modern society. Therefore this paper investigates how teacher educators prepare students and use ICT for effective teaching and learning purposes. The question therefore is: Are there any effect of introducing technologies into classroom in South Africa? Other questions include: do educators in South Africa need skills for effective teaching and learning using ICT? What are the impacts of ICT on educator professional development? All these questions are addressed in this study by emphasizing the South African national policy documents on ICT for education. These national documents will be scrutinized against the backdrop of the reality of teacher education preparation in South Africa. In addition, this study discusses the role of teacher educators in the 21st century with the use of ICT. It, however, concludes that teacher training institutions, professional development in HEI's and school-based institutions should be functional in line with the new technology.

INTRODUCTION

Information Communication and Technologies (ICTs) have become the life wire of modern society. ICTs have played significant roles in the recent time. In line of education, Information Communication and Technologies (ICTs) have created more space for people to advance in their qualification and develop professionally. Many countries have become desolate without the use of ICTs while others who use it daily have become power block. ICTs have transformed many societies. In this modern age, information is power; hence, the management of such information is through the use of ICTs. The original intention of ICT is to enhance education process and the delivery of content knowledge (Curriculum) in the classrooms (Jones and Knezek 1993).

Furthermore, information communication and technologies have used in education for many purposes; such as, for memory retention, skills acquisition, understanding of the subject matter, independent study and motivation (Dede 1998). ICT can also be used to promote the use of modern methods of teaching (student-centered methods) which includes among others cooperative learning, peer group, dramatization, role play, problem solving to mention a few (Forcheri and Molfino 2000). Generally, ICT promotes cordial relationship and good working

rapport between the teachers and the students. Interaction between these two principal actors in a classroom brings about the desired outcome and helps in evaluating the curriculum during assessment. The introduction of ICT into teacher education has led to some fundamental question about the nature of content pedagogical knowledge (CPK). This implies that the nature of teacher education preparation requires teacher educators to change their teaching method from traditional to modern.

The question therefore is: Are there any effects of introducing technologies into classroom in South Africa? Other questions include; do educators in South Africa need skills for effective teaching and learning using ICT? What are the impacts of ICT on educator professional development? In order to adequately train teacher educators, the role modeling of teacher educators requires a paradigm shift in the way we present content, knowledge and pedagogy to students, bearing in mind that students are comfortable with the use of ICT gadgets, for example, cellphones, iPods and laptops. The question raised is, whether teacher educators are as proficient with the use of ICT as students are. The outcome of such a statement is clear; students are more proficient than teacher educators. This in turn, means that students have a knowledge base and skill that is more advanced than possi-

bly the teacher educators. Therefore high quality professional development is required.

Professional Development Perspective

This perspective contends that instead of emphasizing the provision of favorable learning environments for enhancing teacher learning, from professional development perspective, it stresses that lecturers have to learn how to teach for understanding where they ought to learn new conceptions of content and pedagogy and take on new roles (McLaughlin 1997). Hence, the working context is understood to be the best place for lecturers to acquire competencies that they need to fulfill their new roles through practice (Kwakman 2003). The working context for lecturers can be the daily teaching context, including classrooms, schools, school clusters, and other forms of communities such as partnership with universities, networks, etc. In other words, teacher learning occurs at the workplace in which their learning is situated and closely aligned with lecturers' work in classrooms and schools (Huffman et al. 2003).

The recent phenomenon in modern society is to ascertain what constitutes alternative approaches and models to professional development (Gulston 2010; Ono and Ferreira 2010; Pitsoe and Maila 2012; Steyn 2011). These authors are unanimous on professional development approaches that appear to positively impact on teacher educators must be the one that is aimed at bridging the achievement gaps amongst learners. The authors suggest that professional development must be constructivist-based; focus on teacher learning; ensure teacher active learning; aim at to produce self-reflective lecturers; must be teacher facilitated; and finally, professional development activities must reflect the actual needs of lecturers within specific school and local context, in other words, alternative approach supports a needs-based model. All the above mentioned characteristics of professional development showed how imperative and germane professional development is in teaching profession. That is why the researchers saw professional development as a must for all the lecturers in this age because professional development helps the teacher educators to be fulfilled as educators, it gives them motivation and reinforce them for better performance (Adu and Okeke 2014: 273).

Objective of the Study

The main objective of this study is examine the impact of information and communication technologies (ICT) on teacher education preparation in South Africa so as to understand the implications for 21st century classroom-based practice.

ICT AND TEACHER EDUCATORS' PROFESSIONAL DEVELOPMENT

Adequate and sufficient training on the job are some of the variables that can promote teacher educators' job satisfaction. Recently such training must be on ICT. Apart from lesson delivery information and communication technology provides solution to many problems that teacher educators may encounter in class. That is why inadequate training can mar the professional growth of the teacher educators. Teacher educators should have sufficient training so that it will have positive implications for good quality teacher preparation during pre-service student preparation.

The researchers therefore contend that the teacher's sense of professional development (PD) is very essential because this is relevance to his/her everyday practices in and out of the school context could be a crucial factor that resonates in the teacher's readiness towards particular professional development activities. The use of technology has made it less cumbersome for educators to participate in professional development. It is quite obvious that teacher educators must have value for professional development activities so as to be able to determine when such activities are specifically addressing their specific needs. Quite rightly so, de Witt and Lessing (2007) argue that a rationale for engaging in professional development activities must be understood this will serve as booster for attending the activities or else, a situation may arise when educators will completely turn their backs against professional development activities. Thus, the use of technologies may give the educators sense of worth and their understanding of activities effectiveness towards their personal and career development appear to be imperative towards their willingness to participate in professional development activities (Adu and Okeke 2014: 275)

Justification of Study

Teaching in the 21st century has taking a new dimension. Teacher educators have to update their computer skills in order to be in charge during the dissemination of their professional duties in class. Educators need to be able to accommodate modern technologies with intervention of content pedagogical knowledge while interacting with the learners. The dynamism of technology requires new method of teaching, assessment, evaluation and student tracking. Therefore teacher educators must be aware of the roles played by ICT on their preparation so as to understand the implications for 21st century classroom-based practice.

ICT POLICIES AND REPORTS: SOUTH AFRICA CONTEXT

A national educational imperative to align teaching at all levels in South Africa schools was initiated through a draft e-learning White paper in 2003, transforming learning and teaching through ICT. Government through its vision for education articulated some strategies to transform education in a long term through the help of ICT. In addition, infrastructural amenities are now made available for the enhancement of effective teaching and learning in schools.

South African Educational Policy

A government policy and white paper on e-learning in education was released in 2003. These national documents highlighted the need for varieties of ICTs and accessibility. This white paper encourages public-private collaboration in developing and maintaining ICT because of huge investment it involves. Hence government's response to the digital divide identified three focus areas for developing ICT: education, health, and small, medium and micro enterprises (SMMEs). In addition the policy reviews the current profile and distribution of ICT in schools, ICT professional development, infrastructure and connectivity, the significance of e-education.

The e-Education policy goal states, "every South African learner in the general and further education and training bands will be ICT capable (that is, use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community) by 2013" (White Paper 2003). Furthermore, emphasis in

the policy addresses the use of ICT in Education (e-learning through the use of ICT), evaluation as well as increasing the competence and productivity of educational management and administration. All the above-mentioned is framed by important rudiments of the policy to address – equality, rules and values, strategic objectives, electronic content resource development and distribution, access to information and communication technology infrastructure, connectivity, community engagement, research and development, funding and the execution approaches of a system-wide approach of co-ordination and teamwork, checking and assessment, designing cycles to improve a system-wide and institutional readiness to use ICT for learning, teaching and administration.

For teacher educators this policy document (2003) requires of us to align with innovative ways of teaching and learning. This in turn requires teacher educators to manifest two approaches: 1) the way we lecture using ICT, and 2) the way we prepare students in the methodology of e-learning. These two approaches will be discussed in the next section. Bialobrzaska and Cohen (2005: 53) developed a document titled: "Managing ICTs in South African Schools: A guide for School Principals". This document provides a guide to the proper and efficient utilization of ICT and how to maintain as well as manage it. The content of the document addresses issues of the need for a specialist IT teacher and dedicated technical ICT support (Bialobrzaska and Cohen 2005: 53).

In 2005 an e-learning Business Plan for the Eastern Cape was documented with reference to the agenda. The aims of the province are in three phases which as aligned to the 2006 e-Education Implementation Strategy Proposal for the Eastern Cape as follows:

Phase 1: Planning and Piloting (2005-2007)

Phase 2: Strengthening Institutions (2008-2010)

Phase 3: Mass roll-out (2011-2013)

Table 1: South Africa's ICT infrastructure

<i>Indicators</i>	
Fixed-line subscribers	4.7 million
Mobile subscribers	23.1 million
Dial-up subscribers	1.08 million
Broadband subscribers	165,290
Internet users	3.6 million
Television broadcast stations	556
Radio stations	AM 14; FM 347

Table 1 shows how computer has penetrated South African Schools; these statistics reveal that only 7.8 percent of schools in the Eastern Cape have computers, which indicates the lowest penetration figure compared to all other provinces. Isaac (2007) alludes to the number of ICT projects of which the Shuttleworth Foundation, established in 2001 (Isaacs 2007:9).

The national education policy titled addresses ICT issues of responsibilities of schools, teacher educators, learners, parents and guardians as well as the strategies for managing ICT access in schools through school software security, antivirus software, monitoring software and document security. Reference to social networking such as Face Book, Lined In, Twitter, Buzz and many others ought to be available to all.

Mdlongwa (2012) presents a policy which encourages the education stakeholders on the utilization of ICT. Information and communication technology must be used for education purpose in South Africa. The result is that South African schools are lagging behind with regards ICT implementation and educational development (Mdlongwa 2012: 3). This raises a huge concern for teacher education and teacher training. In other words, what Mdlongwa (2012) is alluding to, is that South Africa has developed national policies that support ICT in theory but in practice the reality of implementation is not happening, hence South African schools are not abreast with the rapid implementation of ICT in schools.

ICT AND CLASSROOM ACTIVITIES

Information and communication technology is not only for skills acquisition but is used to prepare students on the methodology of using ICT in the pedagogy of school-based teaching in preparation for school experience (teaching practice). The usefulness of ICT in classroom according to Adu et al. (2013) is as follows:

Networking Resources

The use of ICT for networking cannot be over-emphasized in this 21st century. ICT has brought to classroom video presentation, power point presentation, video conferencing which many people adopt. This helps to reduce paper work, risk of travelling and promote more expo-

sure to the recipient across the globe. Many meetings at the schools are done via video conferencing. Students receive their lecture note and assignment through the help of ICT with V-drive and blackboard. It is obvious that teacher educators should be spot-on in the use of these modern technologies. Information is shared with the help of ICT. Delegates to conferences present their papers through this medium; questions pertaining to the paper presented via video conferences are facilitated by monitors. Hence, answers are provided timeously.

Creation of Learning Spaces

The use of ICT creates spaces for students. Students are able to share valuable information among themselves. The teacher educators as well use these resources to communicate vital information to students. The use of internet has really widened the horizon of both the students and the teacher educators. Internet resources promote learning and reduce stress. E-mails are used efficiently to teach some modules in schools. Students are familiar with the topics to be taught before the time, email also increases the communication skills of the users. Even though it is being used for some bad things like internet scam, but the good aspect of internet is far better than the shortcomings.

The Promotion of Collaborative Learning

Collaboration is a student centered method of teaching that gives the students more understanding of the content knowledge. Students interact among themselves. The use of ICT for collaborative learning has been found to be useful in this 21st century. It develops students' intellectual capability. Collaborative learning with the help of ICT enhances curriculum development and implementation. Hence, ICT plays a central role in bringing together learning tasks and group assignments with methods and steps to follow by the students to solve the tasks collectively.

Autonomy in Learning

ICT gives teacher educators varieties of choices in term of methods to use for any given tasks. The use of ICT reduces the influence of

the teacher educators. In this world of ICT students are not passive but active. Teacher educators become the facilitators. Students study to a greater extent independently. In this 21st century, each student has a tablet or smart phone even i-pad to use for academic work. Hence, teacher educators feel more fulfilled and not stressful while discharging their professional duties (Adu et al. 2014).

At the same time teacher educators need to have the understanding of the use of these resources so as to guide the students and moderate properly learning activities. For example learners in schools are in habit of using their break time judiciously to form notes and solve academic tasks using their phones, tablets, i-pad etc. this in itself promotes creativity among the learners. The management of school is less cumbersome with the use of ICT. Minimal school-heads and teacher educators' effort are needed to maintain discipline in school (Adelabu and Adu 2015).

Teachers' Role in 21st Century

The role of teachers in the 21st century must definitely change if dynamism of ICT is anything to go by. Activities in the classroom have changed from what it used to be. Modern gadgets are now being installed in the classroom. Teacher educators have to be familiar with these changes if they want to be relevant in this century. Take for example, the use of overhead projector as against chalk board; teacher educators must be able to prepare a power point note for presentation. The power point must not be verbose and must be succinctly relevant to the content knowledge to address the expected learning outcomes and to meet the aspiration of the learners. The sitting arrangement must change so that all the students will benefit from the power point presentation. Recently in South Africa, some cities like Pretoria, Johannesburg, Cape Town, students are using tablets in place of notebooks or scribblers. You can imagine if the teacher educators are with shallow knowledge of ICT, how will they facilitate or guide the students during the lesson.

As alluded to in this paper, ICT reduces the paper work and change the obsolete method of assessment and the way teacher educators conduct test or class work. The assessment questions and instructions are placed on the v-drive

or blackboard for the students to see and the date of submitting any assignment or project given are also stated. These have really changed the traditional way of conducting test in class. Answers to test and assignment are exchanges using sent on-line facilities by the students and teacher educators, teacher educators use these facilities to enter the students' marks, in fact marking is also done electronically and learners can access their marks or scores on-line.

Teacher educators must change their method of teaching to modern way in impacting knowledge in class. The choice of method is very important. Methods to be chosen by the teacher educators must be able to promote critical and communication skills in learners. Such method should allow the learners to claim the ownership of the topics/subject matter. ICT helps the learners to be inquisitive and willing to learn new things. Hence, teacher educators must be current and conversant with different technologies. One cannot give what he or she doesn't have. The use of ICT to promote effective learning must be through the partnership and flexibility of the teacher and the students; this will remove some barriers that militate against effective teaching and learning in school.

From the aforementioned points, it is very imperative for teacher educators to update their knowledge so as to meet the test of time. This can be done through professional development activities like; in-service training, on-the-job training, attending workshops, seminars, symposia and conferences. These will definitely give the teachers exposure and make them fit to impact knowledge in this 21st century.

CONCLUSION

It is not an understatement if one says that ICT has become life wire for modern development. ICT influences the delivery of lesson to students in class. This process is students driven and not teachers. A nation can be developed based on the quality of her teachers. Teacher educators are important personnel to be reckoned with. Today ICT has brought so many changes not to only education sector but all other sectors.

RECOMMENDATIONS

To prepare teacher educators for classroom based practice in the 21st century; ICT policy needs to be user friendly and properly aligned

to the societal factors. Teacher educators need to have different orientation and be more committed to adjust to these changes. Accessibility and availability of these facilities is very essential as well. Therefore, the management of the schools or the Department of Education must see to this if they want the teacher educators to be functional. Periodic training must be given to the teacher educators on the utilization of these resources in schools by some experts.

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