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Information and communication technology integration: Where to start, infrastructure or capacity building?

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Abstract

The e-Education policy in South Africa highlights the importance of information and communication technology literacy and demanded that every schoolgoing learner be ICT-savvy by 2013. However, the policy does not present implementation strategies; the challenge is that most schools still lack technology equipment for teaching and learning, and teachers are not yet fully equipped with the knowledge and skills to integrate technology into the curriculum. Using qualitative case study design, this study explores the challenges facing and successes relating to technology education with respect to the conditions essential to a technology integration framework. The findings revealed the availability of infrastructure as well teachers who lack relevant computer technology knowledge and skills. The study recommends capacity building as of major priority.

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1. Introduction

The increasing popularity and accessibility of the internet and internet-based technologies, along with the need for a diverse group of students to have alternative means to learn effectively, pose a formidable challenge for schools to teach and learn using technology. This challenge also applies to developing countries like South Africa. One of the policies in South Africa, “the e-Education policy”, poses some remarkable challenges with regard to teaching and learning using technologies. The policy highlights the importance of information and communication technology literacy and therefore demanded that every learner in the General Education Training (GET) and Further Education Training (FET) bands be information and communication technology-savvy by 2013. However, the policy made a demand – but it failed to arrive at the implementation strategies that will drive this demand. Despite the availability of the ICT policy in South Africa, it is assumed that the majority of educators in South African schools have not been sufficiently prepared during their college years to integrate technology into their teaching. Therefore, buying computers and software for schools and connecting them to the internet does not automatically imply effective uses for technology. Based on the current situation at school levels, many students lack sufficient information and communication technology knowledge to work on their own, to surf the web and to gain valuable information.

The challenges to technology integration in teaching and learning in South Africa are well documented (Assan & Thomas, 2012; Ramorola, 2010; Wilson-Strydom & Thomson, 2005). However, limited research has been conducted on the successes of integrating technology into teaching and learning. This study attempted to explore both the challenges facing and successes relating to integrating technology into the curriculum as perceived by a

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sample of two secondary schools in the Gauteng province of South Africa. The question that was asked was “Where is our starting point, infrastructure or capacity building?” To answer this question the following objectives were designed within the framework of ISTE (2009) and Roblyer (2006):

- to determine if teachers have access to technology equipment
- to investigate if teachers are trained to use technology for teaching and learning activities
- to find out if there are ICT policies to support the curriculum

The rationale behind this question was to provide data to develop a heuristic that would provide guidelines to government, schools, non-government organisations (NGOs), and other ICT facilitators when implementing ICT within a similar context.

2. Conceptualising the integration of technology into the curriculum

The use of information and communication technology (ICT) in implementing a standards-based school curriculum is being articulated in the wider context of educational reform as the acquisition of 21st century skills, i.e. information and communication technology skills and lifelong learning abilities (Law, Lee & Chow, 2002). The rapid growth in ICTs has brought about remarkable changes in the 21st century and affected demands by the modern society. ICT is becoming increasingly important in our daily lives as well as in educational systems (Demirci, 2009). Educational reform involving technology integration is often directed at changing the teaching methods of educators or modifying the delivery of the product to students. According to Demirci (2009), teacher, textbook, and blackboard were the three most significant components of teaching and learning in the classroom not more than a few decades ago. These components compelled teachers to teach the way they were taught (Mehlinger & Powers, 2002; Wachira & Keengwe, 2010) and the infusion of technological tools into instruction poses unique challenges to instructors who are not ready and willing to change to modern constructivist teaching styles.

Today’s classrooms are often equipped with computers, access to the internet and projectors that allow the role of teachers to move from a traditional one to that of facilitator in the classroom (Paraskeva, Bouta & Papagianna, 2008). Teaching no longer centres around the transfer of knowledge from teacher to student; learning comes from student inquiry, critical thinking, and problemsolving based on information accessed from a variety of sources. Increased demand is therefore being placed on educational institutions to use ICT to teach the skills and knowledge that students need for the 21st century.

Historically the concept of information and communication technology integration as an approach evolved as a reaction to early computer-in-schools programmes where the emphasis lay on developing computer literacy or technical knowledge of computers and the use of various computer applications (Wilson-Strydom & Thomson, 2005). More recently information and communication technology integration has been recognised as using computers to learn, rather than learning to use computers (UNESCO/COL, 2004). Technology integration is a complex phenomenon that involves understanding teachers’ motivations, perceptions, and beliefs about learning and technology (Woodbridge, 2004). It is recognised that there is a lack of computer technology integration throughout the education system (NCES, 2007). Integrating technology into the curriculum requires knowledge of the subject area, an understanding of how students learn and a level of technical expertise (Morgan, 1996). This implies that teachers need to be comfortable with computers in order to use or integrate them in their courses (Milone, 1999; Wang, 2000). According to Wachira and Keengwe (2010), technology integration means incorporating technology and technology-based practices into all aspects of teaching and learning specifically, incorporating appropriate technology in objectives, lessons, and assessment of learning outcomes. Technology in the context of teaching and learning involves the use of computers with appropriate educational software.

Integration of technology can be achieved when students learn with computers in ways that include using computers efficiently and effectively in the general content areas which allows them to learn how to apply computer

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