

Chapter 9

Technology Integration in Digital Learning Environments

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ABSTRACT

Digital literacy indisputably plays a momentous role in our future lives (Allen, 2007). This chapter considers technology integration at various levels of school, ranging from primary to tertiary levels. It further shows results of a practical quasi experimental study done in Kenyan secondary schools showing how scores of students learning mathematics in a technology-based environment compared with those learning using conventional methods of teaching. The students' scores in examinations showed that the students learning using the selected application known as GeoGebra performed better and girls performed equally as well as boys when taught mathematics in a technology environment. The chapter underscores the importance of technology to improve teaching and learning process and it has promise to bridge the gap in performance between boys and girls in Science Technology Engineering and Mathematics (STEM).

BACKGROUND

Developments in Information Communication Technologies (ICT) have influenced economic and social development with education taking a new dimension with the ICT's paradigm. This is mostly so with post-secondary education due to the increased use of internet as a source of information. The internet and other ICT tools used in education in today's paradigm offer a new space in education, making it necessary to introduce new instructional methods (Rosenberg, 2001). Lately, the universities world over have started open and distance learning programs through which students are able to learn without necessarily sitting in a classroom. An annual survey done by Babson researchers finds that enrollments in online courses and programs grew at 9.3 percent rate, lowest level in a decade. The report elucidates that the massive open online courses have captured the imagination of the public and turbo-charged the

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discussion about digitally delivered instruction in many quarters. This study reports that although college enrollment was low in the period of the study, universities survived due to distance learning students. While the rate of growth fell to its lowest level in at least a decade, the survey shows that enrollment in distance courses and programs continued to be more than healthy (Lederman and Doug 8 January 2013).

Pelgrum and Plomp (2001) note that investment in information and communication technology (ICT) has increased in the recent years, with the perception that increased student use of computers and other electronic forms of media may have a positive impact on students' achievement. The entire world is moving towards ICT in all sectors ranging from the banking, industries, communication sectors, and also education. Ogwel (2008) notes that educators in Kenya like other countries has been concerned with students' performance, low motivation and negative attitudes towards mathematics and other science subjects. This problem is remedied by bringing in a technology rich environment to transform the classroom.

According to Organisation for Economic Co-operation and Development (OECD) report there are several key drivers pushing technology as a key component for educational system change, and these serve as central reasons that educators and education stakeholders should consider to the growing relevance and implications of technology and technology-based school innovations (OECD, 2010a) First, technology can perform several key functions in the change process, including opening up new opportunities that improve teaching and learning—particularly with the affordance of customisation of learning to individual learner needs, which is highly supported by the learning sciences. Secondly, the skills for an adult life include technological literacy, and people who do not acquire and master these competencies may suffer from a new form of the digital divide, which will impact their capacity to effectively operate and thrive in the new knowledge economy. Thirdly, technology is an integral part to accessing the higher-order competencies often referred to as 21st Century Skills, which are also necessary productivity in today's society. Dramatic advances in educational technology have inspired powerful new ways for learners to engage with all kinds of content and activities in their own self-direct learning experiences. The juxtaposition of these three events create a very interesting challenge and opportunity; space to reconsider, re-imagine, and re-invent learning environments so as to prepare and excel each individual for effective life-long learning.

Preparing all learners successfully with skills for the 21st century citizenship and global awareness is not a simple task. Teachers at all levels need to integrate technology in a way that enhances collaborative problem solving, creativity, self-directed learning and higher order thinking. Our traditional methods of teaching are inadequate for achieving such learning environments.

TECHNOLOGY INTEGRATION IN LEARNING ENVIRONMENTS

Classroom teaching is a demanding job but most people outside education probably think teachers spend most of their time teaching. They do not understand that teachers are responsible for many tasks that have little to do with classroom instruction. Beyond planning and implementing instruction, teachers are also expected to be managers, psychologists, counselors, custodians, and community ambassadors, not to mention entertainers. Gunga, (2006) argues that teaching sounds like an unreasonable and almost impossible job. According to Hooper & Rieber, (1995) "it is easy to understand how a teacher might become frustrated and disillusioned" in the process of trying to spark joy and excitement in the learning environment. Unfortunately, the other demands of the classroom are very distracting and consuming.

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