

Chapter 9

The Integration of Information and Communication Technology in Pre–University Education in Ghana: A Principal Component Analysis

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ABSTRACT

Educationists throughout the world are attesting to the capabilities of ICT for innovations in teaching and learning. There are evidences that integrating ICT into education enhances the learners' creativity and opens up new ways of knowledge acquisition and sharing. ICT is also credited with the improvement of teaching and learning of new skills needed to fully function in the 21st century knowledge society. This research was undertaken to evaluate the current state of ICT integration into the pre-university education and identify the barriers through principal components analysis and make the necessary recommendations. The research utilized both primary and secondary data. The primary data was collected through questionnaires and interviews while secondary data was obtained from reviews of government policy documents and reports. The study found an already existing ICT literacy education in the pre-university educational system in Ghana. There is also increasing access to and knowledge of ICT hardware and services. However, inadequate infrastructure, inadequate technology skills, lack of technical support, and inappropriate content are the challenges militating against effective integration of ICT in schools' curricula. Restructuring the curriculum of the various subjects, in-service training for teachers, integration of ICT into teacher training, and provision of internet connectivity infrastructure and services are recommended.

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INTRODUCTION

There are vociferous calls for ICT integration into pre-university education in the developing countries giving the increasing access and advance in technology and the pervasive use of Information and Communication Technology in all aspects of human life in the advanced countries (Gyaase, Gyamfi, & Kuranchie, 2019). The success of individuals, societies and nations in the 21st century requires the acquisition of knowledge and skills in the use of ICT (Addison & Heshmati, 2003). Investments are also increasingly flowing in the direction of countries that are equipped in terms of ICT infrastructure and skilled manpower capable of using modern ICT to enhance productivity (Gyaase & Takyi, 2014). With computers and technology transforming how things are done, governments all over the world are investing heavily in ICT integration in education to increase the acquisition of knowledge and skills needed to satisfy modern societal demands (CitiNewsRoom, 2018).

In spite of the growing demand for accessibility and utilization of ICT skills to equip students to cope with global transformations, effective integration into teaching and learning still remains a mirage in many developing countries such as Ghana. This is in spite of the increasing availability and access to ICT tools and applications that support teaching and learning. For instance, in Ghana, access to mobile connectivity exceeds 100% and internet connectivity has also improved with about 70% access largely due to 3G and 4G GSM technologies (NCA, 2018). This study thus assesses the current state of ICT utilization in the teaching and learning in the pre-university educational system in Ghana and analyze the factors influencing effective integration of ICT in the pre-University educational system.

Integrating ICT Literacy Into Pre-University Education

Integrating ICT into education would involve the use of Information Communication Technologies for collecting, recording, reserving, processing, researching, transferring and receipt of information in the teaching and learning environment (Petko, Prasse, & Cantieni, 2018). This requires new literacies on the internet and other ICTs including the skills, strategies, and dispositions for successful use and adaptation to the rapid changes in technology-led developments globally. Integrating ICT in education thus refers to teaching and learning across a range of subjects and the subject matter that enables understanding of the functions and effective use of ICT to make a person more productive (Ghavifekr & Rosdy, 2015)

Although computers have always been present in education, the phenomenal transformation in processing, storage and communication capabilities of ICT facilitated by the internet has made ICT an entrenched useful tool for education. Incorporating ICT in education is credited with the improvement in students' critical thinking and analytical skills (Bai, et al., 2016).

The use of technology improves teaching and learning for educators and learners. To gain the full benefits from its use and be comfortable to use, they must be given the required training. The ICT skills and knowledge acquisition must be embedded fully into the school curriculum. Curriculum has varied conceptions and definitions that include content, learning experiences as behavioral objectives and a plan for instruction. Content or subject matter is what teachers teach to students for them to learn to be skillful, competent and knowledgeable (Valtonen, et al., 2015).

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