Chapter 20
Applying UNESCO ICT Competency Framework to Evaluate Teachers' ICT Competence Levels in Tanzania

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ABSTRACT

This chapter adopted UNESCO ICT-Competency Framework for Teachers to investigate teachers' competence in applying ICT in the classroom environment. The study was conducted in 20 schools in Morogoro and Pwani (10 schools in each region) with a total of 91 teachers using both qualitative and quantitative research methodologies. The study found that teachers competence levels for using ICT facilities in day-to-day activities was high but had low competence levels in ICT integration in classroom environment as curriculum and assessment, and pedagogy had low mean score compared to other elements of the UNESCO ICT-CFT domains. These findings imply that while several initiatives have been focusing towards equipping schools with ICT facilities, improving Internet access, and developing digital content, the need to ensure teachers have required competence and skills to effectively integrate ICT into classroom should be given enough priority.

INTRODUCTION

The last few decades has witnessed information and communication technologies (ICT) producing significant transformations in industry, agriculture, medicine, business, engineering and other fields (UNESCO, 2003). In education, for instance, studies have shown that ICT can lead to significant educational and pedagogical outcomes in schools benefiting both students and teachers (Hennessy, Harrison, & Wamakote, 2010; Jimoyiannis, 2008; Jimoyiannis & Komis, 2007). More specifically, appropriate adoption and use of ICT can increase students' motivation and deepen understanding, promote active, collaborative and lifelong learning, and help students to think and communicate creatively (Webb, 2005).

Given these benefits, the government of Tanzania has been taking several efforts to ensure that teachers and students have access to ICT devices, reliable and affordable Internet, and availability of quality digital content for supporting teaching and learning at all levels of education. In secondary schools, for instance, the government through Ministry of Education, Science and Technology (MoEST) has equipped 31% of government secondary schools with computers; 20% of them being connected to the Internet (MoEST, 2017). Moreover, several firms have been equipping schools with computers and connecting schools with the Internet. For instance, Tigo and Halotel firms have connected 400 and 700 secondary schools respectively with Internet in several schools in Tanzania (Halotel, 2017; Kazoka, 2016).

In terms of digital content, the government and developing partners have developed local content and shared via various eLearning systems in order to ensure that teachers and students have access to them. Some of these initiatives include Christian Social Services Commission (CSSC, 2014), TansTel (Kalinga, Bagile, & Trojer, 2006), Retooling (Mtebe, Mbwilo, & Kissaka, 2016), Shuledirect (Mtebe & Kissaka, 2015), Halostudy, and Brainshare (Mwakisole, Kissaka, & Mtebe, 2018). The Halostudy has developed multimedia enhanced content of science and mathematics subjects and made available to 426 secondary schools connected with Halotel Internet in Tanzania while Shuledirect has developed 8 subjects benefiting more than 10,000 learners countrywide.

With increased access to computers in schools, and continued improvement of ICT infrastructure and Internet, teachers are faced with a challenge of how and when to integrate these technologies in a bid of enhancing teaching and learning (Niess, 2011). It should be noted that introduction of computers and ICT facilities in schools is not enough to ensure technology transforms teaching and learning into classroom environment (Koehler & Mishra, 2005). The crucial component in bringing ICT impact in education is teachers' competence and their pedagogical approaches in applying ICT in the classroom environment (Almerich, Orellana, Suárez-Rodríguez, & Díaz-García, 2016; Hennessy et al., 2010; Webb, 2005).

In recognizing the role of teachers in ICT integration in classroom environment, the government has been directing several initiatives towards preparing teachers to effectively use the ICT in their teaching practices. One of the notable efforts was equipping 34 teachers' colleges with computers connected to the Internet through the Swedish International Development Agency (Hooker, Mwiyeria, & Verma, 2011). Through this iniative, pre-service teachers were equioed with necessary skills to apply ICT in secondary schools once they graduate (Kafyulilo, Fisser, & Voogt, 2016). Moreover, the Mid-Sweden University provided training on pedagogy and subject specialized education to in-service teachers through ICT-based short courses. The project was also supported by the Open University of Tanzania and the University of Dar es Salaam (Hooker et al., 2011). Similarly, UNESCO conducted a training workshop to 22 tutors from 11 teachers colleges on mobile learning and ICT integration in enhancing teaching and learning (UNESCO-DSM, 2018).

Despite these efforts, the appropriate use of ICT in enhancing teaching and learning is still limited in the majority of schools and colleges in Tanzania (Kafyulilo, Fisser, Pieters, & Voogt, 2015; Kayombo & Mlyakado, 2016; Mwalongo, 2011; UNESCO, 2015). This is because many teachers and tutors graduate with insufficiently skills of applying ICT in the classroom environment (Kihoza, Zlotnikova, Bada, & Kalegele, 2016; Ndibalema, 2014) as universities and teachers' colleges tend to focus on equipping teachers and tutors with ICT technical skills with less emphasis on technological pedagogical knowledge (Almerich et al., 2016; Hennessy et al., 2010). Although ICT technical skills are important, they are not enough for preparing teachers to effectively apply ICT in classroom environment (Selinger, 2001). In order to address this, the government in collaboration with developing partners have been developing

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