

Chapter 15

Conceptual Model of Generic Learning Design to Teach Cultural Artifacts in Computing Education: An Analysis Based on Akan Culture in Ghana

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ABSTRACT

Cultural heritage can provide interesting aspects to computing education. For instance, conceptual understanding of learners can be supported by exemplifying computing concepts with cultural practices. If we are, however, to adapt an indigenously relevant curriculum, then we need to model a learning space that aligns with learners' background in underrepresented communities. In this article, the authors explored indigenously relevant learning space for computing studies in the context of Ghana. Altogether forty-one (41) computing educators completed a questionnaire and twenty-two (22) educators were interviewed using a semi-structured interview method. The authors also propose a conceptual model for designing culturally enriched learning environments. The main components of the model are indigenous learning resources, scaffolds and learning activities. Finally, they discuss what should be taken into consideration when cultural artifacts are used in computing education.

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INTRODUCTION

The dwindling enrolment numbers in computing education necessitates contextualized approaches for teaching and learning, as for example assimilation of abstract computing concepts. As such, there is a need to develop novel ways of engaging learners in computing education (Margolis et al., 2012). Particularly, contextual differences should be emphasized in computing education (Apiola & Tedre, 2012). Contextualization refers to connecting teaching of a particular topic to another meaningful subject and makes the topic less abstract (Plate, 2015). According to Knobelsdof and Schutle (2005), contextual approaches are relevant for increasing participation in computing studies. The intersection of different cultural practices and computing studies can provide interesting possibilities for learners to go beyond memorization of computing concepts in order to enhance conceptual understanding. Such a pedagogical stance promotes the novel idea of culturally sustaining pedagogy in computing studies. The culturally sustaining pedagogy ensures that learning is more connected to the cultural experiences of students (Paris, 2012). In other words, culturally enriched learning environment explicitly supports multilingualism and multiculturalism. Since cultural practices are based on local knowledge unique to geographic location (Botha, 2010), it's highly plausible that indigenous knowledge systems can be used to make curriculum more familiar with underrepresented learners in developing countries. Moving beyond these conversations, we still need to address the important issue of identifying requirements for using cultural artifacts in computing education. Thus, there is a need to develop design guidelines on how to implement culturally enriched learning environments. Our study exemplifies the connections between culture and fundamental computing concepts such as flow controls, conditionals, looping, arrays and variables. The study contributes to the existing body of literature by discussing how culturally enriched learning environments can be designed in computing education. We adopted a participatory design approach to articulate nature of a learning design that can be applied to variety of cultural artifacts using online or offline resources in computing studies. We argue that describing generic learning activities will support computing educators to develop and implement culturally enriched learning environments.

BACKGROUND

According to Kim (2000) and Chahine (2013), culture and indigenous knowledge systems are formed based on cultural products (e.g. art, music, dance, dress, symbols and customs) and psychological constructs (e.g. attitudes, values, beliefs, and norms). The indigenous knowledge systems and cultural practices are used to represent and communicate the thought, beliefs, values, and rich culture of native people (Botha, 2010; Omatseye & Emeriewen, 2013). There are two types of indigenous cultural constructs, tangible and intangible, which can have completely different connotations in different parts of the world (Opoku, 2011). The tangible cultural constructs are architecture, indigenous games, bead work, weaving, natural habitats, and other cultural artifacts, which have a physical presence. The intangible cultural constructs are traditions norms, values, customs, beliefs and inheritance, which are nonphysical in nature. Both indigenous cultural constructs can be conceptually modeled in a learning environment (Rodil & Winschiers -Theophilus, 2015).

Earlier studies use different terminologies to advocate stances on effective teaching and learning in cultural contexts (Lee, 2003; Scott, Sheridan & Clark, 2015). According to Lee (2003), a culturally sensitive learning environment should take into account cultural practices of target group, analogies

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