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Context-based blended learning models and implementation in Sub-Saharan Africa: A literature review

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Abstract

Technological innovations such as learning management system (LMS), content management system (CMS) and Internet use in higher education have changed the previous teaching and learning pedagogies. In Sub-Saharan Africa (SSA), such innovative pedagogies have opened a new era as such LMS and CMS are used to support blended learning. Though innovative pedagogy has opened significant queries among researchers on how well student acquires knowledge and skills, how student-centered learning and cognitive beliefs are merged and how the use of instructional technologies engages students in active learning and how collaborative learning via LMS has benefited student learning. Moreover, recent educational policies and blended learning novelties are refocusing on teaching and learning models, implementation, practices and more specific knowledge delivery and accessibility. The article surmises that the innovative pedagogies in higher education like mobile learning, e-learning and smart classrooms stimulate adoption, deployment and implementation of blended learning beyond expectations in SSA higher education.

Keywords: Blended learning, e-learning, face-to-face learning, higher education, Sub-Saharan Africa

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1. Introduction

In higher education with resourceful instructional technology and innovative digital pedagogies, learners get intended knowledge and skills for personal and societal growth and transfer the knowledge acquired to practical use within the society. However, the quality of higher education in Sub-Saharan Africa (SSA) depends on diverse aspects including different learning approaches, communication strategies, teaching models, teaching and learning styles and instructional systems used to assist individual student learning (Unwin et al., 2010; URT, 2013; UTI, 2009). Practically, the learning process has two categories of instructional systems: traditional face-to-face and distributed learning (cf. self-training, distance learning, e-learning and online learning). The two paradigms have been deployed in policy and practices of higher education for several centuries as distinct learning systems (Stewart, 2002; Tyler & Gopal, 2010). The increased comprehensive adoption of information and communication technologies (ICTs) in developing countries has brought blended learning in higher education (Roblyer, 2006). Blended learning had caught the interest of the stakeholders such as researchers, academicians, curriculum designers, educationists, instructional designers, human resources practitioners, parents and students (Kenya, 2006; Ngonyani, 2014). As a result, most of the innovative initiatives led by ICTs in education among others include blended learning, cloud computing, e-learning and mobile learning. This article focuses on blended learning as an innovative teaching and learning approach adopted in the higher education teaching and learning.

2. Conceptualising blended learning

In the year 2003, there was a booming interest in a bid to get a standard definition of blended learning; models of blending; analysed blended learning environments; and approaches of blending as well as dimensions of blending (Driscol, 2003; Osguthorpe & Graham, 2003; Singh, 2003). Studies show that almost all published papers and articles were defining the term blended learning (Caraivan, 2013; Guzer & Caner, 2014). For example, Osguthorpe and Graham (2003) defined blended learning as a combination of the face-to-face method of learning implemented using distance delivery systems. In the same year, scholars provided models (Osguthorpe & Graham, 2003) and dimensions (Singh, 2003) for blended learning. There were also issues to do with the dimensions of blending: off-line and online learning; learning communities (Brook & Oliver, 2003). Together with self-paced and collaborative learning, structured and unstructured learning, and custom content with off-the-shelf content, learning, practice and performance support which attracted the interest of a number of researchers.

In 2004, Garrison and Kanuka maintained that "…blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences…" their study brought about different challenges of implementing blended learning in higher education as well as issues of policy, institutional arrangement, pedagogical redesigns and influential environments, related to blending of learning strategies. Nevertheless, from the year 2006 to recent, researchers have defined blended as a combination of traditional face-to-face learning and computer-mediated instruction (Ellis, Steed & Applebee, 2006; Francis & Shannon, 2013; Graham, 2006; Halverson, Graham, Spring, Drysdale & Henrie, 2014; Mtebe & Raphael, 2013; Nsofor, Umeh, Ahmed & Sani, 2014). In fact, blended learning combines the positive aspects of the two learning environments, classroom-based learning and e-learning community (Bonk & Graham, 2006). However, blended learning combines various models of teaching and learning styles, approaches and innovative technologies. That is, the combination encourages students to engage themselves in active learning and collaborative learning.

3. Blended learning models in higher education context

In 2006, scholars proposed advanced models of blended learning. For example, Graham (2006) introduced three models: enabling blends, enhancing blends and transforming blends (cf. Figure 2; Nsofor et al., 2014, p. 22). Rossett and Frazee (2006) developed three-tier models: anchored blend

(i.e., online instruction is provided after classroom instruction), bookend blend (i.e., pre-class online activities that prepare learners for face-to-face sessions) and field blend (i.e., online resources are provided for learners to make use of whenever they wish). Based on Graham models and Rosset and Frazee's three-tier modes, most of the empirical and theoretical rationale for the proposed blended learning models in higher education are as follow: promoting cognitive explanation, enhancing critical thinking, appreciating learning diversity and aid on problem-based learning, flexibilities, accessibilities of learning resources which encourage collaborative learning and constructivist learning.

However, in 2010, two blended learning models evolved: alternative model (superficial model) and transformational model (Robertson, 2010). Blended learning models developed by Robertson (2010): alternative (superficial) and transformational blended models are discussed in detail since the two agree to convergence and permit strategic similarities therein with other blended learning models such of those by Valiathan (2002), Bonk and Graham (2006), Littlejohn and Pegler (2007) and Garrison and Vaughan (2008). Ian Robertson's blended learning models are presented as forms of video lectures (online recorded lecture). These models are related to most current developments in blended learning and have attracted significant interests leading to many citations and have as well attracted many viewers than other models being deployed.

3.1. Alternative blended learning model (superficial model)

Typically, blended learning models should address a combination of traditional face-to-face classes with some elements of e-learning in the course, programme, activity or institutional levels; and be integrated together with platforms used to implement the selected models. Superficial model is based on four elements: location, media, separation and synchronicity (Bonk & Graham, 2006; Robertson, 2010) and involves different delivery strategy with the due consideration of the need for the power and control relationships between students, parents, teachers and learning environment remaining unchanged. Kuzmina & Golechkova (2012) maintain that a course that blends both the online and face-to-face delivery strategy, its substantial proportion of the content is delivered online, uses online discussions and typically has some face-to-face meetings would be the best to adapt.

Though, location elements take a form of various learning settings including a combination of campus-based and off-campus-based activity; home-based and virtual places to determine learning process and ensure that no change of relations is influenced, leaving blended learning to the discretion of locational needs. Synchronicity aspect is based on situations in which student study by blending either traditional face-to-face with audiovisual or online forums that entail three subcategories: *synchronous, asynchronous and both synchronous and asynchronous* (the hybrid of the two).

In the case of synchronous subcategory, blending could be between traditional face-to-face supported with audio plus or audiovisual materials. The asynchronous blending allows the integration between email, blogs and or wikis aimed at enhancing the teaching and learning outcomes and experiences over the time. Also, a combination of synchronous plus asynchronous subcategory combines traditional face-to-face and e-learning. However, a single unified, coherent model has been identified by Robertson (2010) to address alternative (superficial) model, and its components are provided hereunder:

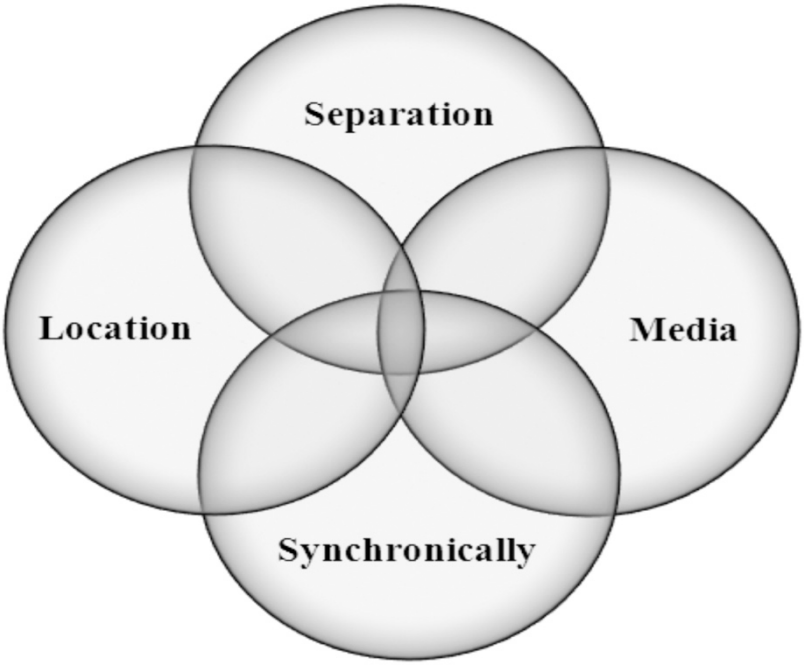

Figure 1. Alternative (superficial) delivery model modified from Robertson (2010)

From Figure 1, we noted that the success of blended learning is not only a result of simple integration e-learning and traditional face-to-face approach but rather a combination of four important dimensions. The four circles present diverse levels of blending dimensions. The thick arrow signifies that the primary goal is to have a clear delivery approach that provides unification of dimensions to yield successful learning outcomes and experiences with the provision of great opportunities for learners and teachers for understanding and extension of knowledge and skills acquired. In this view, the context has been a great challenge in the developing countries where alternative blended learning models can be undertaken. In some context only, because there are still a significant number of students who do not have access to ICTs devices and technology (cf. laptop computers, smartphones and Internet) and the attendant opportunities. This challenge led to the formulation of transformational model based on power and control relationships.

3.2. Graham blended learning model

The model is based on the work of Charles R. Graham (2006, 2007), and well-articulated on a classic co-edited book: *'The handbook of blended learning: Global perspectives, local designs'*. The model is illustrated in Figure 2, presenting blended learning systems model analysed to address implementation of blended learning in higher education depending on needs, requirements and foci:

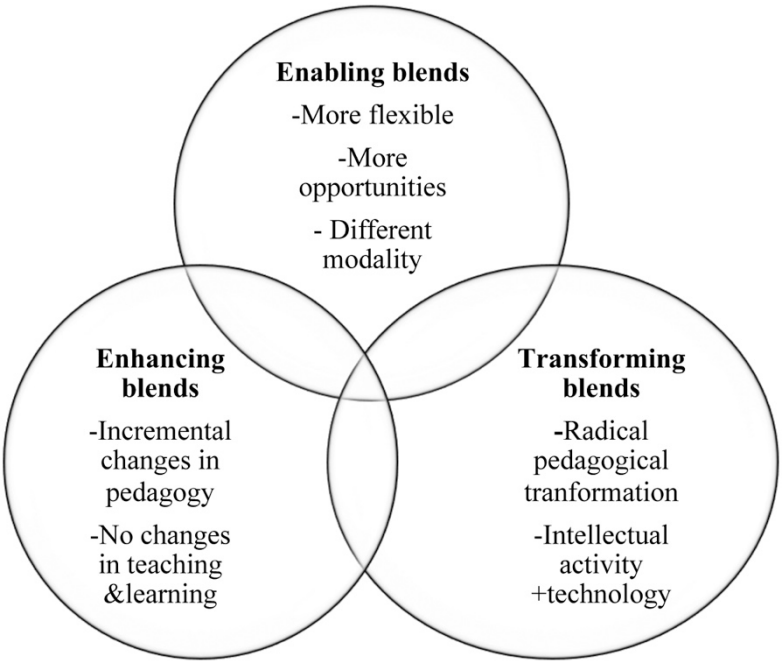

Figure 2. Blended learning system model (modified from Graham, 2006, 2007)

Three categories including enabling blends, enhancing blends and transforming blends are illustrated with additional information in Figure 2. Off these, each category blends different learning environments and has different foci which are generated from Graham's extensive analysis on different blended learning models espoused by different researchers. Findings have shown that the enabling blends focus mainly on addressing issues of access and convenience, offering different opportunities for students to select blending mode that suit them regarding their time and cost constraints (Graham, 2006; Naaj, Nachouki & Ankit, 2012; Ololube, Umunadi & Kpolovie, 2014). Similarly, Lindquist (2006) advocates that online instruction and face-to-face residential programmes 'are decided on a case-by-case basis taking consideration of time and cost constraints' to students (Young & Voci, 2001). Teachers expect to take advantage of the different modalities (face-to-face residential programmes, entirely online programmes and blended learning programmes) to allow for flexibility and accessibility to programmes offered that are convenient to students. Thus, this category depends on the needs of both the students and programme's manifestation and requirements.

Furthermore, the enhancing blends category is based on the traditional educational institutional setting where most of the courses are designed to offer traditional face-to-face instructions. The blends attract variations from course to course based on teacher skills in pedagogical knowledge related to forms of blended learning and technological skills as well. As an example, in the traditional face-to-face learning environments, the technical skill of the lecturer is essential on fostering and enforces effective pedagogical practices for successful online learning strategy (Bekele & Menchaca, 2014; Ellis et al., 2006; Stewart, 2002). Unlike enhancing blends, the transforming blends allow a radical transformation of the pedagogy.

3.3. Transformational blended learning model

Like Graham (2006) blended learning model, Littlejohn and Pegler (2007) and Robertson (2010) both build up a working model based on educational technologies and learning environments. The transformational blended learning model is flexible and allows convergence of many ways regarding participants' experiences and the time available for live event-based learning to be organised. The

model also examines power and control relationship between teachers, students and curriculum (Robertson, 2010).

The model blends traditionally based classroom learning experience with e-learning (the synchronous webcast, asynchronous recorded lecture or online discussion), where the nature of the content and desired outcome necessitates the inclusion of collaborative learning strategies and technologies. The model builds on advantages gained from forming social relationships (enabled by the social media such as Tweeter, Facebook and WhatsApp) both online and traditional based classrooms to develop specific knowledge and skill sets. According to Valiathan (2002), the model combines the modern aspect of e-learning and traditional aspect including self-paced learning, performance support tool and knowledge management resources with instructor or mentor involvement and initiatives to develop an expected outcome and workplace competence.

4. Blended learning implementation in Sub-Saharan Africa

For the SSA, recently observed technological and policy changes demonstrate increasing investment in ICTs in higher education. Indeed, most governments in SSA have shown tremendous progress in the adoption and implementation of ICTs (cf. Rwanda, Kenya, Tanzania, Uganda and Burundi); these changes in ICTs have triggered remarkable advancement in teaching and learning as reported in (Boitshwarelo, 2009). In order to make strides in the provision of quality higher education in SSA, investment in ICTs is inescapable. The enablers and planners for implementation of blended learning envisage tremendous opportunities towards meeting present-day educational challenges of education access. The challenges can be solved by the complete and well-thought-out resource support, design and implementation of blended learning approach for teaching and learning.

The analysis of the blended learning implementation and initiatives in SSA reveals that traditional teaching and learning approach dominates in most of the higher education institutions due to a number of challenges such as clear preference and easy accessibility to print materials, the need to accommodate large numbers of students in classes. While this may have temporary benefits, traditional approach is not adequate to meet the current high demand for quality higher education as they lack the attributes of quality that tend to characterise the modern technologies. They are therefore not sustainable in the long run (Boitshwarelo, 2009; Mendez & Gonzalez, 2010; Ngonyani, 2014). In SSA where computer literacy is very low (0%–50%), but with increasing mobile phone subscribers compared to other parts of the world, digital technology is a pervasive element in implementing blended learning initiatives and accelerating advances in literacy among member states.

Although there is still no comprehensive research and attendant findings that bring out issues on technological advances and blended learning within these countries. A number of initiatives and discussions in the region are evident in the literature (Bekele & Menchaca, 2014; Boitshwarelo, 2009; Kemppainen, Tedre & Sutine, 2012; Mtebe & Raphael, 2013). Out of these, only a few of the initiatives (such as Ayoo & Lubega, 2008 in Uganda; TECH/NA! 2006 in Namibia; Zone-IT in Tanzania and South Africa) offer meaningful and comprehensive analysis of the ICTs infrastructures successful initiatives and instructional design process.

Nevertheless, successful blended learning initiatives need to be pedagogically grounded, and their design should consider not only learners and their immediate implementation environment but also systemic constraints and affordances. There is, therefore, an urgent need for more explicit accounts of the design, development and implementation of blended learning solutions and opportunities based on the context of SSA. For example, the use of websites, subscribing to academic journals, use of the intranet, social media and other e-learning tools have revolutionised the higher education sector in eastern part of SSA (Nganga, 2012). ICTs have become a strategic resource, a commodity and foundation upon which every activity for socio-economic development is anchored. Although, the rapid development of ICT has facilitated a convergence between distance education and technology-mediated learning environments (Naaj et al., 2012; Ngonyani, 2014), the emergence of the blended

learning approaches with the support of ICTs has remained at the centre of global socio-economic transformations. For the budding thirst for knowledge such as is the nature of SSA' higher education systems implementing blended learning remains a potential mid as a touch that can offer the needed solutions.

The newly adopted technologies will reduce or eliminate imbalance between the digital haves and have not, and between the powerful and marginalised (Kabanda, 2012). For example, various country economic policies were revised to accommodate the use of ICTs in government business and planning activities within the SSA as part of their economic reforms. The ICT national policies were made universal (e.g. for the East African countries) to accommodate those changes (Republic of Rwanda, 2010; URT, 2003). This was geared towards bringing equity to the SSA regarding educational resource uptakes and opportunities.

Also, most of blended learning initiatives are designated as a resounding signal of commitment to the development of students learning through equipping them with knowledge and skills which will enbale them to flourish in a globalised knowledge economy (Ayoo & Lubega, 2008; Carr, 2013). According to Unwin et al. (2010) and Kabanda (2012), the growing impetus for blended learning in East African HEIs will not automatically translate into transformed pedagogical practices, and as such, they advise to sustain the status of blended learning implementation in HEIs holistically. An approach they declare will contribute to the information economy and which provides information skills, communication skills, technical support and assistance with improved literate- and intermediate technology-based systems as well as the more obvious ICT-focused areas (Kabanda, 2012). Blended learning relies solely on availability ICT infrastructure and connectivity, and this is not unique in East Africa even though it has been a critical challenge in the region. Despite these challenges, various strategies have been adopted to accommodate advantages of blended learning approach and its form (i.e., e-learning, traditional face-to-face learning and distance learning) in higher education (Lwonga, 2014; Sanga et al., 2013).

According to UNESCO (2003, 2012), a number of initiatives have also emerged in higher education in Africa such as the Dunia Moja project which has been implemented in South Africa, Tanzania and Uganda. Dunia Moja, which means 'One World' in Swahili, launched in 2009, as an international collaboration project among faculty and students at Stanford University in the United States and three universities in Africa, namely Makerere University in Uganda and Mweka College of Africa Wildlife Management in Tanzania. Stanford University (2009) reports that the project deploys mobile technologies to provide access to course materials; enable field research and assignments, and facilitate communication, interaction and knowledge sharing between students and faculty in different countries.

In the review of the blended learning implementation strategies in East African countries, Ngonyani (2014) revealed that all the East African countries adopted and passed ICT policy documents in their Parliaments as they restructured their social and economic policies. Rwanda is leading the other states by having a clear policy and promoting the use of ICTs and implementation strategies on blended learning in all formal and informal education (Republic of Rwanda, 2010). Indeed, Rwanda was an early riser in this regard, their troubled past notwithstanding. According to Carr (2013) and Unwin et al. (2010), there is a limited knowledge in the use of integrated information systems, and lack of teachers' competency.The others include a limited understanding of the learning management system deployment and other obstacles in the forms of inadequate infrastructure, frequent power outage and unmet training needs of educators. Despite many blended learning initiatives being invented, these factors tend to affect the implementation of homegrown blended systems not only in other parts of the world but also within the East African region.

5. Conclusion

As it can be seen from the discourse, blended learning is not only a combination of face-to-face and e-learning, it involves an initiative to create attractive teaching and learning environments, access to course resources anywhere and shared collaborative learning environments that enable students to solve the educational and societal problem. Most SSA countries, East Africa countries and Tanzania as a case are trying to implement new technology innovated teaching and learning approach despite the challenges. Currently, one of the major priorities in higher education in the developing countries is in designing, planning and deploying blended learning approach in teaching and learning. It is hoped that the effective implementation of blended learning will speed up education delivery and enhances economic development via well-informed human capital. However, the major goal of efficient utilisation of ICTs is hindered by a myriad of challenges as adduced in this work. We recommend that for easy and smooth implementation of blended learning approach in SSA, one option would be to enable harmonised and coordinated implementation and deployment of all ICTs intervention at the institutional level aimed at the effective access and provision of higher education anywhere at any place within the countries.

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