ADOPTION OF CLOUD BASED LEARNING IN INSTITUTES OF HIGHER LEARNING

OLAWALE KUKOYI and CLINTON AIGBAVBOA

Faculty of Engineering and the Built Environment, University of Johannesburg, Johannesburg, South Africa

Every developing nation is moving away from the typical classroom teaching to the evolution of the 21st century. Most developed countries and nations have progressed beyond traditional learning methods in classrooms to virtual environment means of learning, which includes cloud-based learning. However, the same cannot be said of the academic system in institutes of higher learning in Nigeria. Based on this knowledge, this study would aim to look at the challenges faced in the adoption of cloud-based learning and teaching service delivery in institutes of higher learning in Nigeria. It will also consider the benefits and drivers for cloud-based learning in the country. This study shall be conducted using systematic reviews from relevant literature published on cloud-based learning and indexed on top rated databases like Springer, Emerald insight and Scopus. Findings from this study would show the benefits and drivers for adopting cloud-based learning and its impact on those promoting academic productivity in the country, which includes the learners in institutes of higher learning in Nigeria. Further findings from this study will highlight ways to deal with challenges observed from the adoption of cloud-based learning in institutes of higher learning in the country and how governmental support can aid in using cloud-based learning to improve the quality of education delivered in institutes of higher learning in Nigeria as benefited by developed nations across the world.

Keywords: Benefits, Challenges, Teaching service delivery, Nigeria.

1 INTRODUCTION

In the advent of every nation moving away from typical classroom teaching to that of the 21st century, the use of diverse information technologies has become essential. Balasubramanian *et al.* (2009) observed that information technology strengthens a nation's higher education institutes, in the areas of teaching, research and service to the community. One of such information technology innovations is cloud computing, whose immense benefits have been noted in recent times in quality education delivery. According to Thomas (2011), the use of cloud computing will, to a large extent, enhance engagement by educators to better understand and improve teaching practice. This will increase quality of student learning outcome via advancing the scholarship of teaching and learning. Cloud computing is within the domain of recent evolution across the information technology world and academia. Gital and Zambuk (2011) defined cloud computing as a model for enabling on demand network access to a shared pool of resources or computing resources.

In 2010, a learning-based system called a cloud-based program that interfaces with all databases containing information from user courses and content was created for use Pina (2012).

This can be used as an educational means for students irrespective of their locations. Information and resources are available without searching for them manually via catalogued books, which may not be available physically. This saves both time and solves problems alluded to this feature (Kats 2013).

Recent trends in teaching and learning strategies shows that the presentation of information has changed, and this is evident in the way students interact with information using technological innovation. This innovation, such as cloud-based learning, demands educators to use new technologies in the delivery of teaching services (Chang and Guetl 2010). This has led to a better learning process and ease in teaching. Despite this innovations and obvious benefits inherent in the use of cloud base learning, developing countries around the world (Nigeria inclusive) is still lagging in its adoption. Eze *et al.* (2014) carried out an investigation on the adoption of cloud-based learning in Nigeria and observed that cloud-based learning has not been fully exploited due to poor regulatory policies and lack of governmental support. This is rather disheartening considering the poor education system within the country. Based on this knowledge, this study through the review of relevant literature assessed the possible ways of adopting cloud-based learning within institutes of higher learning in Nigeria. The study assessed the challenges of cloud-based learning, the factors that can drive its adoption and its inherent benefits to the education system in the country.

2 TEACHING SERVICE DELIVERY IN INSTITUTES OF HIGHER LEARNING IN NIGERIA

Teaching service delivery in institutions of higher learning in Nigeria requires a need to meet up with counterpart nations in the world. In 2010, Arong and Ogbadu realized that instructional materials needed in teaching and student learning process in the country need be enhanced in Nigeria due to its lack in the country (Arong and Ogbadu 2010). This led to a review by Oye *et al.* (2011) who advocated for the use and acceptance of information and communication technology for teachers and learners of higher education in Nigeria thereby adding substance to education in the country. Asiyai (2015) realized that for Nigeria to meet and make up for the deficiency in teaching service delivery, there was a need for more training on the latest method of teaching service enhancements used by developed nations. This would require teaching enhancement developments like cloud-based learning and e-learning methods in improving teaching effectiveness in the Nigerian teaching service curriculum and the country which will enable the country meet up in part with teaching service delivery in the 21st century. For Nigeria as a country to improve in service delivery in education, stakeholders both in the governmental control end, teachers, and learners would have to support each other and get trained in the use of digital and online resources to meet present trend from nations globally. This will increase quality teaching and learning service delivery in the nation (Asiyai 2013).

In Nigeria today, advancements in the use of educational technology tools and gadgets are required to bridge the gap of providing online resources for a central teacher/learner instructional environment. Students of the present generation in the country need a means to meet up with the social networked resources for training and educational delivery in the nation (Laleye 2015).

3 OVERVIEW OF CLOUD BASED LEARNING

Developed nations have moved away from the traditional need to be in classrooms only to access good means of education to online platforms as a means of additional education via using growing technologies to redirect learners to get educated from any location without being in a classroom and yet achieve set educational goals (Kotoua *et al.* 2015). The problem faced from

this is that most educators who are skilled in the art of imparting this online means of education are mostly in developed nations, as reiterated by (Adeyinka 1975, Kotoua *et al.* 2015). To enhance the study of this form of online education, online-learning tools to aid teaching and learning processes were created as a means of informal learning. Cloud technologies are being used for easy access of information and materials by both learners and institutions worldwide and its services include exchange of data and information using online social means to achieve the purpose of knowledge and information gathering by learners, institutions and workers (Garcia-Penalvo *et al.* 2014).

The use of social means of learning has overtaken the traditional means of information gathering, hence the reason why a social means of approach to bolster the educational learning system as advocated by Barrantes and Yagüe (2015), which considers the effectiveness and sustainability of a social approach to learning through cloud-based learning. Conclusions were reached after collating data for three years by Wannapiroon and Nookhong, that innovations based on a social means of learning are more effective and sustainable to the learning process. In 2015 social media and e-education, strategies used in a model developed in Thailand spoke on the basic skill for working and learning in the 21st century educational system as a means of survival, this model was used for solving problems on cloud-based technology literacy for effective educational management in the future. This result showed that the use of cloud-based learning helped learners in learning both fast and effectively (Nookhong and Wannapiroon 2015).

A systematic approach to the innovation of the traditional mode of teaching in classrooms and the use of virtual learning environment combined in a form called blended learning. This was done incorporating the principle behind being present in class and getting instructions note and data guidelines from an online source and social means of interaction in higher educating institutes as described by Graham, Woodfield and Harrison in 2012. The study adopted ways to implement blended learning of this type into higher institutes of learning using six institutes in the United States to achieve this as a case study (Porter *et al.* 2014).

To meet present global market excellence in developing economic countries, the government of these countries are involving their resources into polices to provide adequate internet and information technology to their countries. To safeguard this, there must be the creation of adequate policies and infrastructure that would make it possible for cloud-based learning in their country via provision of adequate funding for education with this form of learning (Ezenwoke *et al.* 2013). As a continual part of integration of cloud-based learning in developing countries especially in Nigeria, it is both efficient and cost saving for students of higher education irrespective of their certification to submit dissertations and research thesis. To access this for knowledge virtual access would be created for further study or access via databases in the cloud through their digitalization (Ifijeh 2014).

Cloud based learning cannot fully be accepted if we do not understand its advantages from the learner's perspective as said by Ashtari and Eydgahi (2017), who captured the learner's perspective in their research to the effectiveness of cloud-based learning. They termed it an attractive way in sharing, editing and storage of huge amount of information and wealth of knowledge for use yet, also described it as having ease of access with internet usage via using their own equipment's which are mobile devices or institution equipment's. Most times, even without leaving their location or taking on cost for excessive printing or time management to get resource and data (Ashtari and Eydgahi 2017). This method of data storage is used in Saudi Arabian universities already due to their amount of low-cost information technology resources in teaching and researching learning. They moved all this information together into a cloud-based database for access to everyone for use and continual upgrading. A downsize of this was noted to

be from security of data and lack of legal policy by the government for implementation (Alharthi *et al.* 2017).

The necessity of having a cloud-based system of learning increases every day due to reduction of learning cost by less purchase of hard copy materials and the use of stored materials in the cloud for continual education into the future which has aided learners in their academic growth using e-learning (Bouyer and Arasteh 2014).

4   CHALLENGES OF CLOUD BASED LEARNING ADOPTION

A study done by Akin *et al*. using south western public universities in Nigeria showed that cloud computing in Nigeria has a good impact on low environment, cost effectiveness, IT complexities being reduced, and reduced investment in physical assets. They spoke on the challenges facing adoption being security of data, non-regulatory compliance and privacy on cloud-based learning being a concern. The study showed a minute percentage of not yet adopting cloud-based learning compared to a larger amount adopting it due to its advantages and effectiveness in learning (Akin *et al.* 2014). A similar study was done in Malaysia where the major drawback in Africa is its vulnerability to hacking and data security plus the addition of who owns control (Wakunuma and Masika 2017). Further study by Olanrewaju *et al*. in their systematic review described the challenges facing cloud-based learning as poor network infrastructure, high cost of ICT, lack of cloud awareness, and unreliable internet, which is a major hindrance in Africa (Olanrewaju *et al*. 2017).

5   DRIVERS AND BENEFITS OF CLOUD-BASED LEARNING

Bora and Ahmed (2013) identified crucial benefits of cloud-based learning. These benefits include low cost to learners, wherein learners do not have to be looking for anything heavy, because the cloud can be accessed through their mobile devices, laptops, or PCs at any location via the cloud storage with no expense to them, instant software updates, where learners get updates immediately as soon as there is an upgrade, and improved document format capability where cloud based applications open directly in the cloud and does not require the use of other applications to format documents to different compatibility mode. Learners benefit from cloud-based learning by the abilities to make use of online feedback and courses, and sending of assignments and projects without physical presence, time or distance to location. Teacher's benefits include the abilities to make preparatory note available earlier, manage student and content reports via feedback immediately and send assignments online. It also aids in the keeping of each student record to be able to monitor them systematically on improvements or otherwise, and security of data, where data stored in the cloud rarely crashes and has security benefits of permanence due to an unexpected system or server crash. In Malaysia, Hew and Abdul Kadir (2016) discovered that the use of cloud-based learning via knowledge sharing; easy access to teaching resources over the same community and ability to retrieve information has scaled up the acceptance of cloud-based learning in a virtual environment. Cloud based learning has economic benefits in terms of cost effectiveness and reduction in hard copies or printing for learners. It aids scalability in terms of storage increase or reduction depending on space required. It also aids data security on stored material for future use and limited to crashing and disappearance of stored data. It allows for e-learning also called distance or online learning via easy access from any location and real time via devices. It also promotes shared knowledge of materials and resources at a click away which ensures equality in what learners have access to irrespective of which side of the country or Ivy-league school (Chung *et al.* 2013)

6   LESSONS LEARNT

Challenges related to the adoption of cloud-based learning in Nigeria, as observed by the literal reviews discussed above, can be dealt with by creating data encrypted clouds to reduce if not protect from hacking which would resolve issues on data security and vulnerability to hacking. Provision of cheaper and available internet network coverage across the country, especially in institutes of higher learning, plus continual upgrades and updates of the cloud servers would solve challenge on poor network infrastructure, high cost of ICT, and unreliable internet.   The government can control ownership by using a body or corporate organization to ensure central control access by institutions, thereby making it universal to all. Government policies need be created to monitor and protect cloud-based learning in institutions of higher learning in Nigeria, which would aid and put better protection on its management in the country.

7   CONCLUSIONS AND RECOMMENDATIONS

Cloud based learning is being adopted in the Nigerian educational system of higher learning, but it has not yet been optimized to its fullest extent due to the challenges of poor network and internet coverage, which is key in the utilization of cloud-based learning and its relative benefit. The Nigerian government so far is doing all it can to evolve and yet benefit from the technological advancement via knowledge sharing and ease of access by supporting institutions of higher learning to start use of this innovation. Due to the ongoing progress of cloud-based learning in Nigeria, further studies can be done to take statistical data on improvements in cloud-based learning in higher institutions in Nigeria including governmental support at secondary level education process as time goes. Simulations or models can as well be created to look at the compares between before cloud-based learning and after cloud-based learning.

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