

Contemporary Development in E-Learning Education, Cloud Computing Technology & Internet of Things

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Abstract

The enterprise educational environment will involve big data technology, cloud computing, Internet of Things (IoT) and artificial intelligence (AI), which will characterize the current society extreme automation and enterprise productivity through reinventing the new world educational reform. This current paper captured the manageability issues in electronic learning environments and explored ways through which the managerial performances could be improved in the perspective of electronic learning investments through incorporation of context-awareness and self-reconfiguration adaptive systems. The aim is to allow the open source electronic learning system to provide educators, administrators, and learners with a single robust and integrated system for creating a personalized and autonomous learning accomplishments. The paper reviewed the contemporary development in electronic learning system in internet of things and cloud computing and established the prospect for the continued educational investment. A survey of four tertiary institution in the south eastern Nigeria provided a justification for the adoption of cloud computing technology as the best alternative approach for organizational data warehousing in the ongoing society automation. The result of the paper indicated that technology implementation in schools are fundamental to students' academic accomplishment, which made it obviously imperative that teachers in the 21st century should adjust digitally and technologically and prepare students for the opportunities in the emerging digital new world. The paper concluded that the successful curriculum implementation in the twenty first century will require a blend of technology innovation and enterprise platform adaptability as potential leverages in achieving the global educational sustainability.

Keywords: e-learning education, cloud computing, Internet of Things (IoT), internet security, multimedia, data mining, pervasive learning, ubiquitous learning, mobile learning and data warehouse.

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1. Introduction

The computer technologies have been deployed in education to improve the quality and learning outcomes in the twenty first century electronic learning environment in internet of things (IoT) computing. The educators (professors, lecturers, instructors and teachers) can use audio, video, graphics aids and text resources through computer to prepare lesson and deliver interactive lectures

in a digital platform without physical classroom engagement. Under the interactive educational pedagogy, multimedia presentations can be delivered by the teachers and university lecturers in an interactive participatory and in ubiquitous synchronous digital environment [16]. With synchronous presentations, a lot of efforts and time are saved while ensuring increased productivity in the overall digital classroom management. Moreover, multimedia presentations are interesting to view, hear and analyzed especially the audio, video components, 3-D simulation environment in addition to the visual effects that make

areas to proceed with education and learning to keep up with the prerequisites knowledge required for the job satisfactions. The electronic learning environment and distance education management are the ultimate approaches for all-time educational performances in the twenty century digital extreme automation [61].

However, the e-learning education infrastructures are principally delivered into two platforms according to the learning objectives which include:

- (i) **Scheduled delivery platform synchronism** – The scheduled delivery platform synchronism occurs when e-learning activities happened in real-time with participants dynamically communicating with each other within a time frame[22]. Such synchronous e-learning transmission can be conducted by way of Webinar, Tele-video conferencing, Zoom tele-presence broadcast or skype over the computer network with live Chat, live web based classes and digital collaboration. In the scheduled delivery platform synchronism mode of e-learning education , there exist effective interactions between the presenter and learner as the communication can flow in cyclic model, allowing each participant to take turn in discussion but the major drawback is over reliance on high internet network connection for unbroken transmission and information flow.
- (ii) **On demand delivery platform asynchronous:** On this account, information is provided around the fixed schedule from any geographic location but does not occur in real time. This form of e-learning activities include web-based training classes, online resources, blog, e-mails services and interactive CD-ROM/DVD-ROM electronic contents accessible by the learner at the most preferable convenience[60]. While the information is available at the learners' demand, it potentially offers the participants the enormous control over the manageability and learning process.



Figure 2. Electronic interactivity in a collaborative digital learning environment [62]

With **Figure 2**, the e-learning education depend on ICT infrastructures in delivering it's key potentials in higher education and learning environment , while concentrating attention on information and knowledge sharing which is the sole objective of education, especially in the formal educational setting. Web based instruction (WBI) can be developed and delivered through the help of ICT and deployed through the computer cloud network [77]. The WBI is an innovative approach to distance learning in which computer based training (CBT) is transformed by the technologies and methodologies of the World Wide Web (W3), the internet and intranets [83]. The WBI present content in a structured format that allows self-directed and self-paced instruction on any meaningful context. The web based test (WBT) is actually in the form of CBT that uses the internet framework or intranet as the delivery medium instead of disks or compact disk read only memories. Altogether, the CBT and WBT are part of a larger e-content categorization considered as electronic performance support system (EPSS) that relied on ICT for its value chain [60]. The fundamental objectives of ICT in e-learning education proposed that:

- (i) ICT fashions approaches required for knowledge synthesis and application of novel concepts.
- (ii) ICT evolves pedagogical approaches required for information society engagement.
- (iii) ICT models students' academic performances such as greater scores in the key subject areas in addition to learning new expertise that are indispensable for building and sustaining the digital and knowledge economy.
- (iv) ICT develops teachers' knowledge base, digital skills and technology expertise for new pedagogic methodologies together with value-added services in the perspectives of interactive teaching.
- (v) ICT evolves communicative power in the course of computation and digital automation.
- (vi) ICT provides the foundation for digital adjustment, intellectual capacity building, promptness, digital inquisitiveness and accuracy of information processing.
- (vii) ICT Intensifies innovativeness in the disciplines and access to the community of users in the manner that enforces mass education, information and media literacy.
- (viii) ICT reinforces knowledge, promotes interaction and collaboration between

