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Learning Management: A Review on Emerging Technologies for Distance Education

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Abstract

Education and the teaching and learning process has greatly and widely evolved throughout the years. Distance education, a stream of this evolution, is implemented with the use of various automation derived from many advancements in computer and information technology. This research paper reviewed studies encompassing software and applications which have been proven to be highly effective and valuable in mediating synchronous and asynchronous instruction during remote learning. This paper reviewed the use of 2010s educational technologies such as audioconference, multimedia, online, print, telecast/datacast, videoconference, webcast and webconference technologies. The paper also discussed emerging distance education software including Moodle, Google classrooms, Schoology, Edmodo, Canvas, D2L, Showbie and Blackboard with description and instructional procedures. General findings suggest that although instructional and learning procedures vary depending on context and educational factors, it is an undeniable fact that utilization of these technologies and learning management software, has been proven effective in providing a virtual venue of instructional delivery and successful learning.

Keywords: distance education, learning management system, remote learning technologies.

1. Introduction

The world has been experiencing rapid changes that is affecting the educational system. With the emerging trend in distance education, learning and teaching has become possible and accessible with the use of technology (Rosenberg, 2001). Societies have now recognized the need for learners to act swiftly, think independently and critically, and collaborate with others to make sense of their changing environment. For this reason, synchronous and asynchronous instruction are widely implemented to address the needs of the students who are geographically remote and can access education on their own time and space (Watts 2016; Kamal, 2020). Schools and communities rely on internet connectivity while learning management systems (LMS) function to support distance education. The lack of knowledge in these technologies and LMSs as aid for distance education could be a big drawback for the educational process. Arising technologies with their use in communication and different undertakings of educational proceedings are undoubtedly vital in thinking skills cultivation and instruction implementation. Hence, new methods have emerged from general knowledge, to pave way for the delivery and carrying out distance education - not as a new concept but as new knowledge and experience (Mohamedbhai, 2011; Zunboyly, 2011; Keles & Özel, 2016).

Adapting educational technologies to assist teaching and learning significantly overlays traditional face to face communication. Technology has a very wide influence over the entire nation's schools and communities in assisting and directing the access to learning continuity by providing resources and services for distance education. (Johnson, 2003; Muhammad & Uzma, 2012). In addition, even before the worldwide shifting of face-to-face classes to remote and self-assisted learning caused by the recent COVID-19 pandemic, Coleman (2011) & Luth (2010) already identified technologies such as audioconference, multimedia, online, print, Telecourse/datacast, videoconference, webcast, webconference as some of the educationally effective 2010s version of technologies which have been used for teaching and advance learning by means of distance education.

These technologies, although still effective today, have even further evolved to a more modern and cloud-based distance learning technologies. Reed (2020) discussed that the must-have most recent technologies were learning management systems, collaborative and productivity tools, digital simulation and assistive technologies. Among these, learning management system (LMS) is undoubtedly the most vital. LMS functions as an interactive platform to guide the learning process of the students and have them acquire experience and new knowledge, as concepts divers to new implementation of different software in various delivery of teaching and learning (Turnbull et al., 2019). The LMS is a platform that can provide convenient access in any level of education and which satisfies primary needs of the teachers and students to efficiently proceed with the learning process and achieve educational competencies of the educational system and the curricula. All these may be done both synchronous and asynchronously (Cavus, 2015).

2. Methods

This research has employed a systematic review design (Siddeway et al., 2019). The study reviewed 43 journals,

including articles and documents pertaining various technologies for distance education and learning management systems. The reviewed scholarly outputs and academic articles were used to identify the different technologies and how they are utilized in the context of distance education.

3. Results And Discussion

The reviewed academic papers on technologies which are found useful in the delivery of instruction for all stakeholders of education with the goal of successfully carrying out the teaching and learning process, provided discussion on how it enabled the access to education with the use of digital media, allowing the occurrence of learning anytime and anywhere. Ample number these software which provide collaborative and interactive form of instruction and mediate learning are free of charge and allow both teachers and students convenient access.

Table 1: 2010s Distance Education Technologies.

Technology	Software / Application
Audioconference is an accessible and flexible well- established teaching technology that builds up a learning community made up of students in a wide range of background, and connect them with teachers and learner-teacher discussion in distance locations (Macmullen 2001; More 2009).	Audioconferencing software: Open voice, Facebook, Global meet, Intercall, Loop Up, Spike and Nextiva
Multimedia is a system which can be used for educational purposes. One in relaying relevant information and instruction in distance learning systems and online education including teaching and learning transmittal and other students' need which is quintessential part of the online learning environment (Mahmood, 2016).	Virtual reality, text, Animation and Graphics, video-audio processing, virtual reality and 3D Imaging
Online Access is used for academic communication such as instruction, follow ups, updates and consultations. It is used to mediate and assist distance learning with programs for online class setting. Real time synchronous and asynchronous online teaching and learning is made possible associated with various use of different platforms like social media, google meet, zoom and etc. The internet in distance education is widely used to mediate learning and provide venue for interaction as well (Motiwalla & Tello 2000).	Social media, Chats, Google meet, Zoom and Hyperlinks.
Prints are utilized to present content and concepts for learning via hard copy materials. Textbooks and printed modules are distributed for distance education and is considered a fundamental aspect learning in distance learning mode (Pessoa, 2011).	Printed Modules, Print outs, Workbooks, Textbooks and others
Telecourses or datacast delivers instruction and aids learning through text, graphics, video, audio and other media that are relevant in aiding learning through distance education to uplift learning competency acquisition. (Bates, 2006; Olakuhelin 2016).	Video files (TV based) and Audio Tapes (Radio).
Videoconference is a tool to connect teacher and student's virtual presence and communications. These applications can hold meetings and allows real time interactions (Rob and Nelson, 2012).	Messenger, Skype, Zoom, Google meet, Duo, Microsoft Teams, Slack, GoToMeeting and Viber.
Webcast is widely used especially in dealing with distance locations of participants involved. It is used in various organization in delivering guidelines and instructions. It delivers audio and video materials for presentations with detailed account of process which creates an interactive class discussion. (Ghalili et al., 2005; Giannakos & Vlamos, 2013;).	WebEx meetings, Zoom, Google Meet, Skype and Google Workspace.
Webconference allows students and teachers collaborate and communicate in real-time using web conference software, allowing students to interact virtually even in remote and distant locations for active learning involvement. In web conferences, students share documents and present slide presentations, received text and graphics (Klonoksi, 2009).	GoTomeeting, Dialpad, Zoom, Googlemeet, Google Hangout, Ring Central and Skype.

The utilization of numerous type of technologies with varying purpose and assisting capacity, play a very important role in distance education. This is because conventional education that supplement teaching was used

to make the content of the course more persuasive, and technologies have become both medium and means for learning in distance education (Bingham et al., 2006; Keegan 2008). Distance education have partly changed

along with the evolution of modern technologies (deleted phrase). These technologies are not limited to the use of machines but rather, the application of the knowledge and experience, seen through the development of learners and education itself amid its constant evolution throughout the years. Modern people have developed science and

technology, from wheels to computers, and the changes were significant with their relation among human beings and natural environment, overcoming the traditional learning and teaching process (Zunboylu et al., 2011; Haddad et al., 2014).

Table 2: LMSs utilized in Distance Education.

Software	Teaching and learning procedure
Moodle enables e-assessment and provides students with e-submission facility; supports students' assessments and activity with direct instruction. A free source that is open for educational purposes that connects teacher and student interaction in distance learning set up (Koneru, 2017; Falliero, 2013).	The teacher provides activities, assignments and learning tasks readily available for student viewing and downloading. Learners can submit assignments with teacher and student virtual interaction.
Google Classroom supports the creation of virtual classrooms. Sending and submitting of outputs given their scheduled due dates and even providing links for downloading files. In essence, it is designed to give online facilitators , content creators and educators the ability to go paperless and centralize their e-Learning materials in one cloud-based location (Pappas, 2015).	The teacher creates a virtual classroom where learners are given class codes for different courses. Classworks are also posted where students can attach their files for submission.
Schoology is a free access LMS software where it allows not only teachers and students to reinvent the way in which the technology is implemented inside the classroom, but involves other stakeholders of education like the school administrators and the parents. This LMS can be a medium for teaching and learning as web content management system or virtual learning environment, that provides tools to manage classrooms or blended learning (Gracia et al., 2018; Ferdianto, 2019).	Teachers create and manages academic courses within the platform that has 24/7 access for everyone. The teacher can also assign differentiated work for students, where learners can actively participate and respond.
Edmodo is an internet-based learning management system which acts as a network that provides creation course classrooms for interactive and collaborative class procedures. It also facilitates channel to connect with the students participate and creating new learning and share it to the class. it is useful to provides updates about academics and higher education system (Charoenwet & Christensen, 2016; Alqahtani 2019).	The teacher utilizes the platform and can use assessments to assess students learning, peer reviews and critiques. Provides update and create assignments then submit.
Canvas is one of the learning management systems which navigates remote learning environment that seem challenging on the surface use for distance education for integrating Microsoft, Google docs, and social media apps like, YouTube and twitter. Help to solve problem while making online fun engaging (Kissam, 2021).	Teacher can provide online access to grades and assessments and perform many other teaching/learning activities.
D2L or desire 2 learn is a learning management system where the teacher can create virtual rooms for different individual classes. It promotes easy collaboration for students with the teacher for a more interactive learning. It also allows students to access free resources for learning during distance learning. (Atlanta 2013; Patrick 2021).	Teacher creates learning modules, upload module files, post new announcement, set dates of submission, activities and examination.
Showbie is an LMS that facilitates teaching and learning with a technological alternative to support a tool for learning. This is another software which enables the teacher create a virtual classroom, and allows students complete there tasks and store them in the platform. Teacher can provide grades and submit related academic matters (Martin, 2020).	Teacher post activities, assignment, upload document, set date of submissions and post announcements.
Blackboard is web based virtual learning environment for course management with a number of online tools which are used for the flexible learning. This software help teachers have better interaction with students and easily upgrade along with the changes distance education interaction (Carvendale 2003; Bradford et al., 2007; Alokuk 2018; McKenzie, 2018).	Teacher creates and upload files for lesson discussion, provide instructions, set date of submissions, post video as reference and new announcement.

Learning management systems have contributed a lot not only for distance and flexible education but also with the other formats and approaches of teaching and learning. LMS is a powerful tool that support the teaching and learning procedures in academic proceedings. It is intertwined in the means of relevance in integrating the knowledge and experience which further create learner centered instruction (Snoussi, 2019; Turnbull et al., 2019). These technologies are designed to foster the learning experience and provide content and its mastery, for learners to develop the necessary academic competencies which are

generally adapted to the 21st century skills. The challenge to integrate the new experience and knowledge that would be acquired with the aid of these technologies is overcome for it support teachers in the implementation and delivery of instruction and communication. Likewise, students are updated to all relevant information and announcements in distance learning (Barreto et al., 2020; Kpolovie & Lale 2017).

Conclusion

This paper reviewed 8 recent educational technologies and

8 learning management software which can aid the teaching and learning process for distance education. The technologies are audioconference, multimedia, online access, print, telecourse/datacast, webcast, webconference and videoconference which are used deliver and mediate learning in distance learning modes. Although of recent years of adaptation, these technologies are still used today for varying extent of satisfactory effectivity and efficiency. Recently, educational technologies have further evolved to cloud-based classrooms.

Learning management system software such as Moodle, Google classroom, Schoology, Edmodo, Canvas, d2l, Showbie and Blackboard which have free access versions, allow convenience in the access of instructional and learning materials - valuable and useful in education and learning continuity, even at a distant locations of the teachers and learners. These software and applications have free and genuine or paid versions. However, free access versions are still competitive, effective and widely used.

Carrying out teaching and learning through distance education has been made possible and effective through the use of numerous technologies such as learning management software and virtual platforms. These tools have become very important for the continuity of learning from basic to higher level of education. The utilization of learning management system in combination with effective educational technologies that supports the delivery of teaching and learning in distance education will result to a significant alignment in adapting and conforming to educational standards.

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