South African rural students’ adoption and use of learning management systems

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ABSTRACT

This discursive study examined the use of the learning management system (LMS) Moodle in rural South African universities. Moodle, a popular online programme, can be used to deliver learning activities, as well as online learning evaluations. The authors discuss LMS usage and adoption in higher education. LMS is a global online platform used in higher education institutions in developed countries across the globe, for decades. It has improved the education system in these developed countries by providing diverse students with learning opportunities, in their comfort zones. Despite the COVID-19 pandemic lockdown, most developed nations adopted online methods, like LMS, for teaching and learning. Unfortunately, the pandemic lockdown in many developing nations, like South Africa, severely disrupted curriculum and educational activities for months. The South African Department of Higher Education and Training reviewed curriculum delivery approaches, to save academic activities due to COVID-19. Thus, it deemed online learning a higher education alternative in face-to-face curriculum instruction, during the lockdown to salvage the academic calendar, with LMS used as ideal online learning for student engagement.

Introduction

Technology has become a vital part of education since it helps students learn better and work more efficiently in this modern age. Technology is changing how academics serve students in the classroom. Academics will aim to give students more technology when higher education institutions add it to classrooms. During the COVID-19 epidemic, Learning management systems (LMS) became innovatively accepted for curriculum delivery and as a global teaching and learning instrument. The emergence of COVID-19 in December 2019, in Wuhan, China, forced many countries into lockdown to contain the pandemic (Jansen, 2020; Huang, 2020; Gamede, Ajani, & Afolabi, 2022). The WHO advised the world to prevent the spread of the deadly COVID-19 pandemic by wearing masks, socially isolating, frequently washing hands, or using alcohol-based hand sanitizer, as some of the safety measures employed (Ellis, 2020; Huang, 2020). Lockdown legislation required South African schools to close to prevent massive crowds and invariably led to the adoption of LMS by universities (DHET, 2020; Jansen, 2020).

Mlitwa and Belle (2011) claim South African students must completely adopt LMS to access learning activities. In many South African universities, students underutilize LMSs, according to the Council on Higher Education (CHE, 2020). QS (2020) reports that many academics from developing countries, use LMS for curriculum delivery differently from those in developed countries. Most African universities’ LMS adoption prevents students from exploring academic activities via online learning tools. The South African government wants students to access learning resources on various online learning platforms, according to its policies on ICT, for higher education (Cloete, 2017; CHE, 2020; DHET, 2019, 2020), Gurstein (2011), and Coleman and Mshazi (2017) urge university...
academics to use LMS for learning. Sackstein, Coleman, and Ndobe (2019) report in a longitudinal study that academic staff's perceptions of LMS adoption and integration for curriculum delivery, in historically disadvantaged South African higher institutions, affect LMS efficiency as online learning. Evans and Mutula (2015) advise academics to completely adopt and integrate LMS for all module content delivery, to improve teaching and learning. This suggests that adopting and integrating the LMS allows students to engage and receive learning resources at their convenience.

**Literature Review**

A literature review, or review article, "identifies, challenges, and advances the building pieces of a theory through an assessment of a body (or several bodies) of past work" (Post et al. 2020, p. 352). Literature reviews as single pieces of work may help scholars better comprehend earlier work in their subject and identify gaps and future research opportunities. More crucially, review papers can question field conventions, identify critical issues and factual inaccuracies, and spark future scientific discussions. Book reviews forms and purposes vary:

i. Some review articles critique the literature, while others describe it.

ii. Some reviews investigate frameworks, themes, and ideas, while others evaluate data, methodology, and findings.

iii. Some reviews synthesise all research on a topic, while others evaluate related and multidisciplinary work.

Independent review articles are rising. Reviews (document type) were first published in journals (source type) as independent studies in 1945, and they appeared in three digits yearly from the late 1980s to the late 1990s, four digits from the early 2000s to the late 2010s, and five digits in 2021, according to Scopus.

The purpose of this study was to explore the adoption and use of LMS as an online learning approach in South African rural universities. The authors explored various studies on the phenomenon to establish rich and in-depth information on it. Itasamni, Oni, Ekpenyong, Ajani, and Omorinkoba (2022), in their study on academic staff’s motivation for online teaching in Nigerian universities, assert that the use of online learning has a significant impact on teaching and learning in higher education. In tandem with the progression of technology, a wide variety of learning management systems incorporating a unique set of characteristics into the classroom setting have emerged (Alodiab et al., 2019) FirstClass was the first learning management system programme that was developed by SoftArc in 1990. It was client-server software that incorporated functions such as web-based presentations, electronic mail, and a discussion platform, and it was compatible with operating systems such as Windows, Linux, and macOS (Gamede, Ajani & Afolabi, 2022). Other learning management systems, such as Blackboard, Moodle, Canvas, and D2L, soon followed (Alodiab et al., 2019). According to Alkhaldi, Ali, Mahmoud, Alrefai, and Bahou (2021), employing learning management systems (LMSs) at universities makes it possible for teaching and learning, of various online activities. Blackboard is one of the learning management systems (LMSs) that is used at higher education institutions all around the world. The widespread adoption and use of learning management systems (LMSs) in educational settings have expanded in tandem with advances in information and communications technology (ICT) (Alodiab et al., 2019).

Although, all universities in South Africa have already adopted teaching methods, via learning management systems to supplement and extend their teaching and learning systems in modern classrooms. There has been a significant difference in the adoption of different LMSs in South Africa and other parts of Africa. However, urban universities use Moodle more effectively than rural universities. LMS, a platform-based learning management system, is designed purposefully for interactive teaching and learning activities in academia. Many studies have used the UTAUT technique to predict behavioural intentions, validate and use new technology. Almaiah et al. (2019) created a seven-factor UTAUT model after assessing studies. Performance, effort, and supportive environments improve student application and learning system use. However, external influences were statistically relevant in university students' adoption of digital learning technologies, but peer conditioning was not. At Hashemite University in Jordan, Abbad (2021) employed UTAUT to investigate student Moodle usage intentions. His study asserts that all elements at varied frequencies supported Moodle usage behaviour except social influence and performance expectancy, which were the most important determinants. Alharbi et al. (2021) studied the key factors affecting high school digital learning acceptance and usability at King Abdulaziz University in Saudi Arabia. PE, EE, SI, and FC are the main predictors of college students' acceptance of web-based learning, according to the study. Performance expectations, perceived functionality, conducive conditions, and social impact all affect university teachers' use of LMS.

Alsaaid and Abdrazak (2020) found that effort expectancy does not affect behavioural intention. Alshehri et al. (2019) further studied why individuals tend to be motivated to accept Blackboard using UTAUT. All major UTAUT features were found to strongly influence instructors' future use of digital learning platforms. PE, SI, and FC affected BI, according to the report. Raza et al. (2021) explored UTAUT and found that PE, EE, SI, and social isolation all significantly affect LMS behaviour intention by increasing the conceptual framework. Thus, LMS and user behavioural intentions will soon be linked.

**Theoretical Background**

Any study needs a theoretical framework to help explain the phenomenon. Thus, an adequate theoretical framework for this investigation increases discursive understanding. Learning technologies are being used worldwide to improve efficiency and
production, although academics in developing countries are resistant. Scholars employ technology acceptance theories in online learning and learning technology studies to promote technology in education. (Mutsvunguma, 2019). The work bases LMS online learning on UTAUT and DOI theories. These theories describe why academics should use LMS to teach in higher education.

**The Unified Theory of Acceptance and Use of Technology (UTAUT)**

Venkatesh, Morris, Michael, and Davis created this technology-driven paradigm in 2003. The Unified Theory of Acceptance and Use of Technology (UTAUT) clearly outlines how to improve technology use in any organization. Bhatiasevi (2016) claims that UTAUT helps employees grasp technology adoption and integration. Bhatiasevi (2016) posits that the theory clarifies technology adoption better than other similar theories, making it suitable for this investigation. According to Venkatesh et al. (2003: 428), “various previous technology acceptance models have described an intention to use technology at 40% among the technology users, while UTAUT describes the intention to use technology at 70%”. Thus, the UTAUT model enriches any study with its systematic combination of eight core theories, making it an acceptable theory that thoroughly characterizes the usage of varied technology in every organization (Quigfei, Shaobo & Gang 2008; Gamede, Ajani & Afolabi, 2022).

![UTAUT Model](image)

**Figure 1:** UTAUT Model (Venkatesh et al. 2003)

Venkatesh and colleagues (2003: 429) proposed a model consisting of four constructs that were adapted to clarify the diverse factors influencing the behavioural intention of scholars to adopt Moodle in their research. The constructs that have been previously mentioned are commonly acknowledged as performance expectancy (PE), effort expectancy (EE), facilitating condition (FC), and social influence (SI). Evans (2013) posits that the fundamental constituents of UUTAAT involve the regulation of variables such as age, gender, and technological proficiency. As per Venkatesh et al. (2003: 429), the constructs can be delineated in the following manner: The concept of performance expectancy (PE) refers to a user's conviction that the use of technology to carry out a task will result in an improvement in their performance. On the other hand, effort expectancy (EE) pertains to the level of ease with which a user can operate technology to execute a task. Venkatesh et al. (2003) defines social influence (SI) as the degree to which a user perceives that their ability to adopt a new approach is genuinely believed by others. Moreover, it encompasses the impact of social norms and external opinions. The development of these crucial components was founded on the principle that the behavioural inclination of the individual is greatly influenced by the perceptions of external parties concerning their scientific breakthrough. The term “facilitating condition” (FC) pertains to the degree to which a user's perception of an organization's amenities contributes to the adoption and acceptance of technology. Scholars widely recognise that the UTAUT model's attributes, namely suitability, appropriateness, richness, and reliability, play a significant role in the successful adoption and utilisation of technology in educational curricula (Evans, 2013; Owolabi, 2016; Quadri & Garaba, 2019), as per academic sources.

The existing body of literature indicates that the Unified Theory of Acceptance and Use of Technology (UTAUT) framework is a viable approach for impacting the technology adoption behaviours of scholars. According to Venkatesh et al. (2003:428), “Performance expectancy is the construct that relates to the conviction of academic personnel regarding the capacity of Moodle to improve the delivery of the curriculum. The construct of effort expectancy concerns the perception of academic personnel regarding the level of ease associated with imparting educational content via the Moodle Learning Management System. Finally, social
influence pertains to the perception of normative pressure among academic staff to utilise Moodle LMS within their professional circles.

**Diffusion of Innovation Theory (DOI Theory)**

The research utilised the DOI framework as a supplementary theory to enhance the acceptance of learning management systems (LMS) among academic personnel in higher education institutions. The utilisation of learning management systems can be effectively explained by the pertinent foundational principle of the diffusion of innovation. Everett Rogers, the developer of the DOI theory in 1962, posits that this diffusion model can be utilised to facilitate the adoption and integration of technology within any organisation. This text elucidates or delineates the conceptual basis for the adoption of a learning management system (LMS) innovation by a cohort of users. According to Rogers' (1962) account, the utilisation of technology is considered an innovation that encompasses technological advancements. According to Gikenye (2012:45), innovation can take the form of a technological technique or notion that a social group within a particular social system can accept. Thus, the theory offers a clear understanding of the adoption of innovative technologies, such as learning management systems (LMS), which are gaining traction and significance within a particular demographic. The ultimate aspect of diffusion theory pertains to its efficacy in persuading individuals to adopt and implement innovations. Thus, enabling academic professionals to efficiently adjust to the utilisation of learning management systems (LMS) for the facilitation of educational tasks. For academics to fully embrace the use of the LMS for curriculum delivery, they must recognise the significance of the innovation.

According to Rogers (2003), the successful diffusion of any innovation within an organisation is contingent upon five key constructs. The aforementioned constructs include compatibility, relative advantage, trialability, observability, and complexity. As per Rogers' (1962) assertion, the successful adoption of innovation among academics is contingent upon its ease of use and varied advantages that facilitate its efficient utilisation. This statement suggests that academic users in developing African countries may either choose to adopt or reject the use of LMS as a new technology for curriculum delivery. The adoption of an idea has the potential to impact the approach of academics toward the utilisation of learning management systems (LMS) or any other technology for teaching and learning, in contrast to those who decline such an idea. Gamede et al. (2022) argue that the delivery of course content or modules by academics can be improved by providing learning materials through a learning management system (LMS) to their students. Identifying the target population is crucial in promoting the utilisation and implementation of learning management systems (LMS) among academic staff. According to Rogers (1995) and Surry (1997), four major factors have a significant impact on the diffusion of innovation. The factors contend that it is imperative to provide essential information regarding the innovation to the intended users, while also taking into account the contextual nuances of the social system for which the innovation is intended. The diffusion of innovation theory proposed by Rogers categorises adopters of innovation into five distinct groups: innovators, early adopters, early majority, late majority, and laggards. This classification is depicted in Figure 2 below.

![Figure 2: Depicted classification; Source: http://blog.leanmonitor.com/early-adopters-allies-launching-product/](http://blog.leanmonitor.com/early-adopters-allies-launching-product/)

As depicted in the aforementioned diagram, the majority of technology adopters fall within the intermediate categories. Hence, diverse approaches are employed to persuade distinct categories of adopters to embrace innovation. According to Mkhize, Mtsweni, and Buthelezi (2016:298), the article provides a fundamental analysis of the constituent elements of technological innovations, including their adoption, diffusion, and communication. Numerous scholarly investigations have employed the DOI theory in diverse settings to validate its suitability in the acceptance and utilisation of technologies for educational purposes.

**Research and Methodology**

This study adopted a systematic review of literature sources (Cooper et al., 2018) to provide in-depth information on the adoption and use of LMS, known as Moodle, in South African higher education, with a focus on rural universities in South Africa. Various sources, such as EBSCO, Google Scholar, and the Web of Science, were consulted to retrieve various peer-reviewed publications on the subject (Morakanyane, Grace, & O'Reilly, 2017). The retrieved publications were systematically pruned to concentrate on the most relevant publications (Kraus et al., 2022). These publications were further analysed thematically, to generate useful information for the study (Cooper et al., 2018). This study used 115 Scopus and Web of Science studies after a systematic literature assessment. Quality assessment was adopted in the selection of these studies. Journals, techniques, theories, modelling, and research outputs were assessed in the sample literature (Post et al., 2020).
Findings and Discussions

Effective Learning Management System Moodle

According to Mpungose (2020), a learning management system (LMS) is a tool used by academics or instructors to create, oversee, structure, and deliver educational content for remote consumption by pupils or trainees. The Learning Management System (LMS) facilitates the delivery of educational materials, curriculum content, assessments, and interactive activities between instructors and students/learners. Moodle, an open-source learning management system (LMS) that is widely adopted by numerous higher education institutions, is under the administration of Moodle HQ, located in Australia. The platform’s efficacy in facilitating cross-border teaching and learning is the primary reason for its widespread adoption on a global scale. The Fourth Industrial Revolution had a positive impact on the education system. According to Mpungose (2017), Moodle is a significant tool for transformation in the current technological era and serves as an effective platform for optimising the teaching and learning (TAL) process. The integration of e-learning into the education system has the potential to enrich curriculum delivery by offering a wide range of learning materials that cater to the diverse learning needs of students, thereby reinforcing the effectiveness of face-to-face instruction (blended learning). According to Kent, Laslo, and Rafaeli’s (2016) research, e-learning is a computer-based educational method that improves the pedagogical practices of teachers to facilitate effective teaching and learning experiences between teachers and students and vice versa. According to Ohei and Brin (2019), the incorporation of electronic learning technologies into higher education is a novel concept that numerous higher education institutions are embracing.

The utilisation of e-learning has considerably improved pedagogical and learning practices on a global scale, with numerous developing nations fully adopting e-learning as a substitute for traditional in-person instruction in higher education institutions (Mwalumbwe & Mtebe, 2017; Ratheeswari, 2018; Zhou, Chen, & Chen, 2019). E-learning offers several advantages, including borderless classrooms, enhanced accessibility, the elimination of location barriers, efficient online learning, consistent student engagement, diverse self-paced learning, interactive online platforms, and prompt feedback. According to Mpungose’s (2017, 2020) assertion, e-learning offers sufficient assistance to academics in disseminating course materials, curriculum particulars, educational exercises, and evaluations to their students. According to Islam and Azad (2015), the implementation of e-learning platforms provides users with the opportunity to exercise time flexibility, while their geographical location does not pose a hindrance to accessing online learning and engaging with academic professionals. Naresh and Reddy (2015) assert that the incorporation and implementation of Moodle in tertiary education establishments in numerous developed nations have been ongoing for several decades. According to Martins and Nunes (2016), the proliferation of diverse technological approaches and platforms has led to an improvement in the accessibility of high-quality education in developed nations. According to Poon’s (2013) findings, certain academic institutions have implemented a blended learning strategy that combines online instruction with traditional face-to-face classroom instruction. This approach employs various information and communication technologies (ICT) to disseminate educational materials and facilitate learning experiences for students. Blended learning is an efficacious approach to imparting knowledge, information, and skills. Academics can employ diverse learning activities to engage students, ensuring that all learners are actively involved in the learning process. Academics who use Moodle as a means of delivering education in higher education institutions can offer students varied opportunities to access learning at their own pace and in various locations. According to Macfadyen and Dawson's (2010) perspective, Moodle has the potential to augment students’ learning outcomes and facilitate the supervision of online learning activities. According to Alghamdi and Bayaga’s (2016) findings, Moodle is a useful tool for facilitating the design, organisation, and delivery of educational content, which is consistent with the conclusions drawn by Murshitha and Wickramarachchi (2016).

The efficacy of Moodle’s utilisation by both instructors and learners is contingent upon the accessibility of all technological resources that can furnish users with the requisite technical assistance. Mtebe and Raisamo (2014) advocate for the enhancement of academic professionals’ competencies to proficiently implement and utilise Moodle within African higher education institutions. Emelyanova and Voronina (2014) concur that to enhance the implementation of Moodle in numerous developing African higher education institutions, it is imperative to provide training and support to the academic staff. Academics have a significant impact on the promotion and enhancement of Moodle as an electronic learning system among students. According to Goh (2013:89), the utilisation of Moodle for efficient curriculum delivery in higher education is heavily reliant on the involvement of academics. The incorporation of Moodle into pedagogy is a widespread and favourable phenomenon worldwide. Its objective is to advance the quality and efficacy of the teaching and learning process by providing academics with the requisite assistance for optimal utilisation (Rhode et al., 2017; Lin, Wang, Wu & Chen, 2019). According to Lansari et al. (2010), the integration of educational technologies into the academic system is advocated as a means of enhancing pedagogy and learning outcomes, as well as fostering a competitive edge. According to Duygu and Sevgi (2013), as cited in Maina and Nzuki (2015), the successful integration of Moodle into teaching and learning in many higher education institutions (HEIs) in Africa has encountered several challenges. This is a cause for concern in the current global context. According to Webbstock and Fisher’s (2016) findings, there is still a lack of exploration of diverse learning technologies in many South African institutions to improve technology-enhanced learning (TAL). This statement suggests that certain universities in South Africa are actively endeavouring to reform their approach to education, as noted by Heyde and Siebrits (2019).

Therefore, the current challenges posed by the pandemic necessitate the use of Moodle as a tool for academic instruction and educational engagement. Educational institutions must provide adequate support to academics to optimise the use of Moodle for curriculum delivery.
Webbstock and Fisher (2016) have identified several challenges that are impeding the successful adoption of Moodle. Bhalalusesa et al. (2013) concur with the notion that several higher education institutions across various regions of Africa are unable to effectively utilise Moodle as a means of delivering course curricula or content. The experiences of academics in Kenya, Nigeria, South Africa, Ghana, and Zimbabwe serve as evidence for this (Webbstock & Fisher, 2016). According to Bervell and Umar's (2017) findings, Moodle has been identified as a proficient instrument for delivering curricula in developed nations. According to Nair and Patil's (2012) research, the implementation approach of Moodle in African universities lacks the necessary strength to guarantee the adoption of academic staff. The utilisation of Moodle learning materials by students is contingent upon their behavioural intention to access them.

**Curriculum Delivery in Higher Education Using LMS for Online Learning**

According to Embi et al. (2011) and Alenezi (2018), Moodle is a platform that facilitates the provision of innovative learning environments to students via the Internet. Kasim and Khalid (2016) posit that the integration of technology in education enhances the advancement of pedagogy and learning and affords learners the flexibility to acquire knowledge at their own preferred pace and convenience. In 2012, Zaharias and Mehlenbacher conducted a study. Blended learning, an instructional strategy that integrates conventional in-person teaching with the utilisation of a learning management system (LMS), has been extensively adopted in numerous higher education institutions (HEIs) throughout Africa. Amidst the COVID-19 pandemic, this method was widely employed to enable the uninterrupted provision of educational instruction and acquisition. Govender and Mkhize (2015) assert that students are offered diverse learning approaches to engage, participate, and immerse themselves in online learning activities, at their convenience and preferred settings. The implementation of Moodle as a learning management system (LMS) offers significant benefits for technology-assisted language (TAL) activities. The provision of suitable technological infrastructure and continuous professional development opportunities is crucial for academics to improve their proficiency in utilising available resources. Kasim and Khalid (2016) posit that a range of learning management systems (LMS) can be employed within institutions of higher education. The learning management system (LMS) alternatives encompass Moodle, WebCT, MyGuru2, iLearn System, PutraLMS, MyLMS, and Blackboard. The Learning Management System (LMS) is a significant technological innovation that enables the distribution of educational resources, especially in the context of the global COVID-19 pandemic, which has restricted large gatherings. Numerous scholarly investigations have indicated that higher education institutions in developed countries have successfully maintained their pedagogical and instructional procedures amid the pandemic by employing learning management systems (LMS) to furnish educational activities and resources across various tiers of their higher education framework (Edutechnica, 2015). According to Sakai, Atuto, Kewl, and Blackboard (2011), reports indicate that some educational institutions in Africa have integrated learning management systems (LMS) into their teaching and learning methodologies to enhance the educational experience. Machado and Tao (2015) have classified learning management systems (LMS) into various categories according to their usability, availability, scalability, and interoperability. Ulker and Yilmaz (2016) argue that the effective integration of LMS in higher education institutions is dependent on its cost-effectiveness, utility, and appropriateness. These factors can contribute to the acceptance and utilisation of LMS by academics in universities. The statement posits that motivational factors are critical in the utilisation of learning management systems (LMS) by academics for instructional purposes and knowledge acquisition.

Dobre (2015) has categorised learning management systems (LMS) into three distinct categories: open-source, proprietary, and cloud-based. Open-source Learning Management System (LMS) software applications employ open-source codes and can be tailored and augmented to impart course content to students following the instructors' curriculum delivery. Moodle was developed in 2002 as an open-source software package designed to enhance the delivery of curriculum content, online learning materials, online assessments, and tasks. Subramanian, Zainuddin, and Alatawi (2014) have observed that the creation of interactive and efficient online platforms for educational purposes necessitates the implementation of widely accepted pedagogical principles. The software can be accessed by users free of charge through a public licence. However, the copyright for the software's access, recodification, and customization remains with the original owner. Moodle use can be facilitated through internet connectivity on a range of devices, including laptops, computers, smartphones, and tablets. Moodle is an online platform designed to support academic engagement for both academics and learners. The platform provides a diverse array of educational opportunities, including but not limited to the submission and organisation of assignments, administering quizzes, facilitating blog and forum discussions, and monitoring attendance. These features are accessible from multiple locations. The implementation of Moodle facilitates the creation of collaborative educational systems that empower academics and students to generate and retrieve educational resources, as well as to assess students' understanding and performance. Sumak, Polancic, and Hericko (2010) assert that Moodle provides students with the opportunity to self-enroll and access educational resources, interact with other users, and engage in forums via a messaging system integrated within the platform. According to studies by Mkhize et al. (2016), Gasaymeh (2017), and Mtebe & Raphael (2018), the widespread implementation of learning management systems (LMS) in various higher education institutions in developed countries suggests the widespread recognition of LMS in the academic domain. According to Edutechnica's 2016 report, a considerable percentage of universities in Australia and Canada, specifically exceeding 90%, incorporate a variety of learning management systems (LMS) in their curriculum delivery. According to Zawaidy's (2014) assertion, a notable proportion of Saudi Arabian academics exhibit adeptness in utilising learning management systems (LMS) to facilitate teaching and learning. It is worth mentioning that a growing number of higher education institutions (HEIs) in Africa are incorporating diverse LMS into their
pedagogical approaches for curriculum delivery. Mungutoshana et al. (2011) conducted a longitudinal study that revealed that a considerable percentage of Tanzanian institutions, specifically 80%, have implemented diverse learning management systems (LMS) to aid in the dissemination of educational resources. Conversely, some extant research studies suggest that global institutions such as the African Development Bank Group (AfDB), United Nations Development Programme (UNDP), and World Bank continue to advocate for the extensive adoption of learning management systems (LMS) across Africa as a means of enhancing curriculum dissemination. As Trucano, Farrell, and Isaacs (2007) have observed, providing guidance and support to both academics and learners on the Learning Management System (LMS) is a means of accomplishing this objective.

According to Adkins (2013), the African Development Bank facilitated the United States' award of a $15.6 million grant to the African Virtual University (AVU) in 2012. The primary objective of this grant was to improve e-learning for educational purposes in all universities throughout Africa. As per the findings of the Department of Higher Education and Training (DHET) in 2013, several educational institutions in South Africa have adopted a range of e-learning platforms to facilitate the dissemination of their academic curriculum. Bhalalusesa et al. (2013) and Elmubark et al. (2013) have reported that learning management systems (LMS) are being increasingly integrated into the educational process in various higher education institutions (HEIs) throughout Africa. Miebe and Raisamo (2014) discovered that only four educational institutions in Zimbabwe have integrated a learning management system (LMS) into their educational framework to support instructional and learning activities. Unwin and colleagues (2010) conducted a survey-based research study that involved 358 participants from 25 distinct higher education institutions (HEIs) located in various African countries. According to the research, a mere 49% of African universities have integrated learning management systems (LMS) into their pedagogical approaches. According to a study conducted in Nigeria by Ajadi et al. (2008) and Suleiman (2011), the National Open University of Nigeria (NOUN) uses diverse e-learning systems to disseminate learning content. The existing body of literature suggests that the implementation and usage of learning management systems (LMS) in various African regions are impacted by numerous factors, as evidenced by studies conducted by Sanchez and Hueros (2010), Sumak et al. (2011), Kumar and Samalia (2015), and Suradi and Yusoff (2018). Kunene (2020) asserts that system trust, perceived ease of use, and user satisfaction are essential factors that hold significant importance in the academic community. Therefore, the implementation of Moodle as an educational tool by scholars in various African countries is contingent upon a range of factors that may either facilitate or impede its use.

African Universities' Moodle Challenges

Numerous African higher education institutions encountered difficulties in implementing or utilising learning management systems (LMS) amidst the COVID-19 pandemic lockdown, as noted by Mlungose (2020), Maphosa, Jita, and Dube (2020), Kumar, Charan, and Venkatamuni (2020), and Mbaba (2020). Research has shown that students enrolled in rural universities encountered a range of obstacles when attempting to access or utilise learning management systems (LMS) as the sole substitute for traditional in-person classes or hybrid learning models, both before and during the period of lockdown. Gratzi and Looney (2020) assert that academics in developed nations such as the United States have insufficient time to create online learning materials. Moreover, students residing in African nations have encountered a significant digital divide, resulting in insufficient access to Learning Management System (LMS) resources such as internet connectivity, properly configured laptops, and a suitable academic environment. According to Verma et al. (2020), there is a need for adequate training of academic professionals to effectively deliver the curriculum through remote online platforms. The COVID-19 pandemic necessitated that academics facilitate remote teaching and learning activities with their students (Punit & Qz.com, 2020). According to Buabeng-Andoh's (2012) findings, the employment of learning management systems (LMS) for teaching and learning activities by academics is influenced by certain barriers that arise from academic structures, institutional cultures, and available resources. According to Lloyd et al. (2012), certain higher education institutions in the southeastern region of the United States face hindrances to successful online learning due to obstacles related to institutional, interpersonal, facilities, and computer literacy factors. According to Haber and Mills (2008), insufficient training represents an obstacle.

According to Al-Senaidi et al. (2009:577), there exist several obstacles to online teaching and learning in Oman, including insufficient equipment, inadequate institutional support, users' perceptions regarding the benefits of information and communications technology (ICT), lack of subject confidence, and insufficient time. Berge and Mrozowski (1999) have identified various factors that impede the utilisation of multiple online platforms for delivering the curriculum. These factors include technical resources, computer literacy of students, fiscal policy, geographical locations, governance, legal, labour management, cultural, and academic structures. Several factors may influence the adoption and usage of learning management systems (LMS) by academics, including negative attitudes, insufficient time, inadequate ICT competence, a lack of necessary technological support, and computer self-efficacy. These factors have been identified in previous studies (Peralta & Costata, 2007; Keengwe et al., 2008; Yuen & Ma, 2008; Chen, 2010; Prattas et al., 2016; Mthethwa-Kunene, & Maphosa, 2020). Taylor (2002) has established that a significant number of African institutions lack sufficient resources and support to enable their academics to optimise the quality of online learning for their students.

Conclusions

Academic institutions are adopting e-learning due to its global growth. Flexibility, accessibility, and course management stimulate enrollment. Academic institutions place tremendous importance on e-learning and are investing heavily in information technology infrastructure. Despite this expenditure, teachers and students don't always benefit from learning technologies and LMSs. Moodle is a learning management system (LMS) utilised within the educational sphere. The emergence of the COVID-19 pandemic has
demonstrated that Moodle constitutes a viable strategy for sustaining educational practices in the face of limitations on communal assemblies for diverse pursuits across various global regions. Nevertheless, a considerable number of African nations encounter obstacles in proficiently utilising Moodle as a tool for education. The provision of adequate support is crucial for academics in diverse higher education institutions across Africa to optimise the utilisation of Moodle as a platform for delivering their curricula. The COVID-19 pandemic imposed limitations on extensive interpersonal interactions, which were previously commonplace in traditional in-person educational settings. The implementation of Moodle has been instrumental in preserving the integrity of academic pursuits amidst the pandemic, thereby salvaging the education system. As a result, numerous studies have found that Moodle is a successful method for delivering curriculum to students without difficulty. The present study underscores the importance of employing Moodle as a tool for dispensing educational resources and exercises among academic circles within South African institutions of higher learning. The research concurs with existing scholarly works that Moodle, as a proficient learning management system (LMS) platform, can be advantageous for academics in creating and delivering diverse module/course materials, as well as evaluations to their pupils. The research affirms that there are several obstacles hindering the successful implementation of Moodle in numerous universities in South Africa, as well as other universities across Africa. Notwithstanding, universities must tackle these challenges to optimise the utilisation of Moodle by academic personnel.

**Recommendations**

This study is discursive in nature and aims to analyse previous research on the implementation and utilisation of learning management systems (LMS). The works of Elmahadi and Osman (2013), Mtebe and Raisamo (2014), Mpungose (2017, 2018), Kumar et al. (2020), Mpungose and Khoza (2020), and Maphose, Jita, and Dube (2020) are reviewed to suggest improvements to Moodle that can benefit numerous institutions of higher education in South Africa. There exist multiple methodologies that can be employed to enhance the utilisation of Moodle within the South African academic community, as evidenced by the works of Tagoe (2012), Bhalalusesa et al. (2013), and Chioma et al. (2018). It is recommended that academics promote the utilisation of Moodle as a means to provide educational content in the aftermath of the COVID-19 pandemic. It is recommended that the Department of Higher Education and Training in South Africa allocate sufficient financial resources to Higher Education Institutions (HEIs) to facilitate the provision of Moodle resources. It is recommended that the current policy frameworks about online learning be revised to incorporate comprehensive technical support for academic professionals engaged in e-learning. The updated policy aims to facilitate the utilisation of Moodle to its fullest potential for both educational instruction and evaluation. According to Ajani (2019), continuous professional development is a crucial requirement for academics to proficiently integrate technology in the field of education and facilitate the advancement of the Fourth Industrial Revolution (4IR). Higher education institutions (HEIs) and academic professionals in South Africa encounter challenges with technical resources and internet connectivity. Collaboration between the public and private sectors has the potential to be beneficial. Higher education institutions (HEIs) ought to ensure that their curricula are effectively designed to incorporate online educational materials and evaluations, to advance sustainable development objectives.

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**References**


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