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Adoption of Learning Management Systems in Higher Education: A Qualitative Analysis of Enabling Factors

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Abstract
The widespread and affordability of multimedia devices such as computers, smartphones and iPads among others has now facilitated teaching and learning to take place in formal as well as informal settings. The teaching and learning process can now be encaged at any time from any part of the globe and open to all through the use of hardware and software, converging teacher and students in an online platform. This study has as objective to examine factors that amplify the adoption of Learning Management Systems, especially after the outbreak of COVID -19 which called for social distancing that left many schools on the global plat form in a state of pandemonium. The sudden shutdown of schools and the need to ensure continuity in schooling left no option for institutions at all levels to adopt the new technology of learning online. The changing trends in education have enabled the development of ubiquitous Learning Management System(LMS) to resolve the challenge of continuous schooling in the face of crisis. LMS is a virtual environment designed to connect teachers and students in an online platform. This study which used qualitative descriptive method with an emphasis on thematic content analysis seeks to investigate enabling factors for the integration of LMS in the 21st century classroom. Informants consisted of 8 teachers drawn from two private universities. The findings of the study revealed that critical factors, classified as technology factors, social influence factors and human factors will influence the integration of LMS in the school. This paper there fore provides insight of enabling factors and hence learning effectiveness.

Keywords: Learning management system, adoption, enabling factors, teaching-learning effectiveness.

Introduction

Learning technology infrastructure is now becoming increasingly widespread in our society, and more and more schools are putting in place equipment to meet up with the global trends of the information and communication technologies. It makes no news to say today's education is becoming more open; closer to the people; more easily accessible; and does not set limits to national or regional boundaries. The changing trends in education have received global response. Many schools in Cameroon are dramatically increasing their investments on technological resources to facilitate technology mediated teaching and learning. Alemnge (2018) asserts that in the past two decades, higher education in Cameroon has undergone many changes in an effort to respond to a number of major challenges to meet up with global trends. Learning management systems (LMS) have existed for many decades but their integration in education had not received global attention until the outbreak of COVID-19 (Raza, et al., 2021; Ebner et al., 2020). Learning management system provides the platform for web-based learning environment by enabling the management, delivery, and tracking of learning. It is often viewed as being the starting point of any web-based learning program. It is an online portal that connects lecturers and students. It provides an avenue for classroom materials or activities to be shared easily. It is also a portal that enables lecturers and students to interact out of the classroom, having discussions through forums that could otherwise take up too much of the time supposed to be spent learning in the classroom. The LMS is commonly known as virtual learning environment or course management system. (Carvus et al, 2006; Adzharuddin & Ling, 2013). Adzharuddin & Ling (2013) state that there are four types of e-learning systems: The Learning Management System (LMS), Learning Content Management System (LCMS), Learning Design System (LDS), and Learning

Support System (LSS). The learning management system; which forms the tools commonly used in e-learning describes what Alemnge (2018) call extended classroom.

Literature Review

Motivating and demotivating factors for the use of LMS

Many attempts have been made to assess the factors that influence an individual's urge to use a particular technology to facilitate the attainment of a specific objective. This has prompted the development of several research models and theories: The Technology Acceptance Model (TAM) of Davis, seen as an extension of the Theory of Reasoned Action (TRA) suggests that "Perceived Usefulness" and "Perceived Ease-of-Use" are key factors that will influence an individual decision on the use of a new technology (Akwene and Fouda, 2022). Using the TRA, Alsadoon (2018) established that faculty knowledge and experience of web applications and faculty perception of the usefulness of such applications were significant predictors of faculty intention to use web applications in teaching. In the application of TAM and UTAUT, Hamdani (2019) found that there is a significant relationship between technology and generations, and concludes that each generation has its tendency to use the technologies of its age because that generation is more dominant over the technology of that age. Rogers' 1995 Diffusion of Innovation Theory (DOI) examines how individuals and groups make decision on the adoption of an innovation. Diffusion of innovation is a process of spreading an innovation over a social system using certain communication channels (İşman & Dagdeviren 2018). In their Multimedia-Influence-Achievement Model (MIAM): Proposed New Model as Predictive Determinant of Academic Achievement, Akwene & Fouda (2022) identify self-efficacy in using a technology, attitude toward the technology, exposure to the technology and learning motivation as enabling factors to attract students' use of a technology to boost academic achievement.

In their extensive literature review on "The adoption and use of moodle learning management system in higher institutions of learning: A systematic literature review", Ziraba et al (2020) exposed the factors which determine the adoption and use of learning management systems in the developed and developing country contexts. The LMS plays a pivotal role in the teaching and learning process: enhance communication between the teacher and students, improved learning and organized learning content.

As well as they are motivating factors to the use of LMS, they are also demotivating factors (Ziraba et al, 2020): note that lack of technological skills, poor internet connectivity and limited internet access, lack of incentives and attitude were revealed by the previous studies as major concerns affecting the adoption and use of learning management platforms in the developing countries.

Factors influencing the adoption and use of LMS in the 21st century classroom

Several factors determine the effective integration and use of LMS in education. These factors are grouped under three major categories discussed below.

Technology factors

According to Fearnley & Amora (2020) both system quality and perceived self-efficacy strongly influence perceived usefulness which indirectly affects attitude of users toward the technology and behavioral intention. Therefore, system quality should be a prioritized consideration by policy makers in making decision for the procurement of educational technologies for their institutions. Abdullah (2017) considers technical readiness and technical support as other factors which influence attitude and behavioral intentions to use LMS. Mtani & Mbelwa (2022) observe that poor ICT infrastructure, poor training, unreliable network or internet access and lack of knowledge affect instructors use decision of the use of LMS. Abdallah et al (2019) opine that system quality, information quality, service quality and instructors' quality can determine e-learning management system adoption with regards to their beliefs. Asamoah & Oheneba-Sakyi (2023) observe that functionality of the learning management system, its ease of use and the user's prior knowledge of ICT are some of the factors influencing the adoption and use of the LMS. In addition, the nature of the course, technical and infrastructural deficiencies and the difficulty of use of the LMS justify for the failure to use it.

Social influence factors

Social influence factors are those factors that resonate from social influence. Venkatesh et al (2003) note that this is the degree to which an individual perceive that important others believe he or she should use the new system. Abdullah, 2017; Ansong et al., 2017) consider social influence factor to include environmental factors, cultural factors, and encouragement from people who matter to them. Mpungose (2020) notes that social divide (poor socio-economic background) has been a hindering factor to students' valuable access to modern physical resources like laptops, smartphones, Wi-Fi routers and others in order to enhance e-learning. Raza, et al. (2021) claim that the COVID-19 pandemic which forced countries to go into a lockdown, and drastically reducing social gatherings, by encouraging social distancing stimulated the integration of LMS in schools to ensure continuity. Ebner et al (2020) attribute the rapid integration of LMS in many institutions to the outbreak of COVID 19. Learning management systems have existed for over the past 30 years, but only a few universities used them. The outbreak of the COVID 19 influenced universities worldwide, with online teaching receiving an involuntary boost.

Human factors

Human factors include those things that can be controlled by human endeavor to determine the intention to use a particular technology. Such factors include: time, perceived usefulness, self-efficacy, attitude toward the use of technology, exposure, perceived ease of use and competence to use the technology (Akwene & Fouda, 2022; Abdullah, 2017; Coleman & Mtshazi, 2017; Ansong et al,.2017). Examining factors that will determine individual acceptance of a new system, Coleman & Mtshazi (2017) identify available time, effort expectancy, performance expectancy, teaching style, competency, personal innovativeness, fear and anxiety, intension to use and former usage and practice as personal factors that will influence an individual use of MLS. In the exploration of factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT Model, Chao (2019) notes that perceived enjoyment, satisfaction, mobile self-efficacy, trust and perceived risk moderators are determining factors to use mobile learning. The results of the study revealed that (1) satisfaction, trust, performance expectancy, and effort expectancy have significance and positive influence on behavioral intension; (2) perceived enjoyment, performance expectancy, and effort expectancy positively correlate with behavioral intention. Mtani & Mbelwa (2022) indicate that the perceived usefulness of the LMS, instructors' self-efficacy and intrinsic motivation have positive effect on LMS usage. Examining the factors affecting the acceptance and use of the VADANA learning management system, Haseli Songhor et al (2024) report that performance expectancy, facilitating conditions, and effort expectancy had positive significant relationship with behavioral intention and use behavior of students in using the VADANA learning management system.

Materials and Methods

This study consisted of 8 lecturers from two private university institutions in Yaoundé, Cameroon that were chosen based on their willingness to participate in the study. In addition, the institution has put in place an enabling environment for online classes. A structured interview and open-ended questionnaire were administered to participants who were contacted in advance. This study which used qualitative descriptive method with an emphasis on thematic content analysis was realized by collecting data from lecturers who have used a learning management system. The collected data was transcribed and classified. Analysis was done through coding, presentation of the data on tables and charts. Categories and themes were then developed from the data to explain the underlining themes.

Results and discussion

The following sections present a comprehensive thematic content analysis of the qualitative data that was gathered in the field. Tables and charts are used to describe the data behavior. Eight participants took part in this study, represented by the letters A to H. The original transcript was reduced to codes, abbreviations (abbr.) and categories. This gave rise to the themes that form the focus of the qualitative analysis. A detail presentation of the results is as follows:

Theme One: Type of LMS and video conferencing tools used by teachers, frequency and experience

Question: What type of LMS or video conferencing tool do you use and how often?

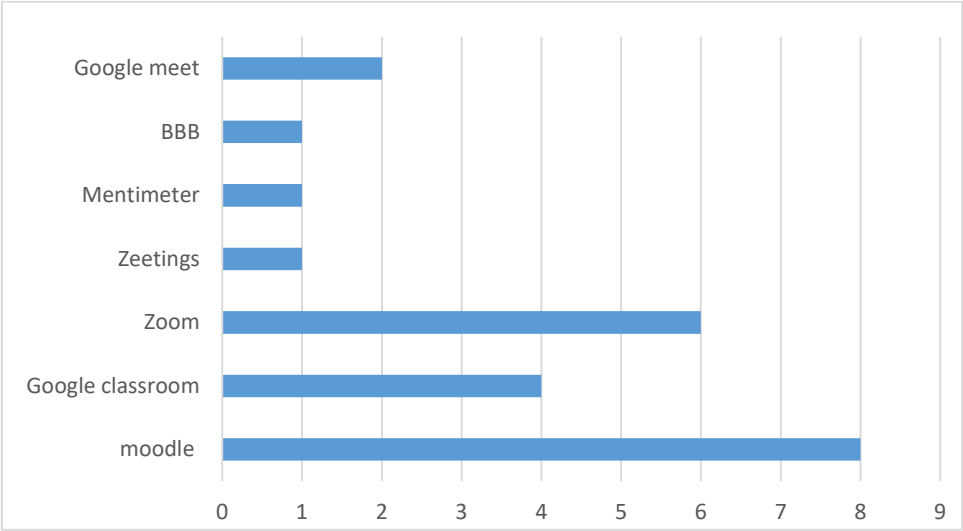
The informants were first asked to state how often they use LMS and other tools for teaching and learning, indicating the type(s) of LMS or video conferencing tool they often use. Table 2 below presents their responses.

Table 1: Trends and type of LMS used by teachers

Participant	Type of LMS or video conferencing tool they use	How often they use the LMS
A	Moodle, Zoom, Google classroom	Always
B	Moodle	Always
C	Moodle, Zoom, BBB	Always
D	Google classroom, Moodle, Zoom, Google meet	Always
E	Zoom, Google classroom	Sometimes
F	Zoom, Zeetings, Mentimeter, Moodle, Google classroom	Always
G	Moodle, Google meet, Zoom	Sometimes
H	Moodle, Zoom	Sometimes

From the table above, (Table 1) we can identify the type of LMS and video conferencing tool commonly used by the lecturers of the two institutions contacted and their frequency of use. It is observed that majority of these lecturers will always use a LMS or video conferencing tool for the teaching and learning process. Figure 1 below gives a clearer picture of the use of LMS or video conferencing tool.

Figure 1: Type of LMS used by teachers



The figure above (Figure 1) presents the frequency of respondents in using a particular LMS or video conferencing tool to carry out teaching. Out of the 8 research participants, it is observed that the most used LMS is Moodle, followed by Google classroom, while the most used video conferencing tool is Zoom followed by Google Meet. Only a few lecturers use Zeetings, BBB and Mentimeter. The choice of the LMS or video conferencing tool could dependent on the institutional policy, cost, training of the teachers, accessibility and exposure to the platform.

Table 2: First experience in using online platform to teach

Participant	First experience
A	Challenging
B	Good
C	It was a good experience; it permits me to gain time
D	Needs more time to learn and practice
E	Difficult
F	It was quite difficult due to network problems and unfamiliarity
G	Challenging and difficult
H	Challenging

When asked to express their first-time experience in using an online platform to teach, Table 3 presents varying opinion of teachers on what the experience was. According to a few of the teachers, it was not challenging. However, to majority of the teachers it was very challenging. Some authors have noted that ease of use, time, exposure, network challenges among others are prominent factors that could determine the decision to use a LMS (Coleman & Mtshazi, 2017; Akwene & Fouda, 2022; Asamoah & Oheneba-Sakyi 2023).

Theme Two: Enabling factors to the use of LMS
Question: LMS are said to succeed or fail due to certain factors. Describe the enabling factors to the use of LMS

Table 3: Open coding process: Enabling factors to use LMS

Participants	**Categories**	**Abbr.**	**Narrative / Descriptions / Codes**
A	Technology	TEC	*[.....] Expensive for poor people to afford, ease the teaching and learning process, relies on electricity which makes it difficult to operate everywhere, sometimes bad sound and audio quality, internet connection problems.*
B	Human	HUM	*[....] It is distracting in some cases; attitude of some people may be a hindrance.*
C	Social	SOC	*[....] Social factors include usage and shareability. The more LMS are valuable and use in the teacher's communities, the more they are recommended. It promotes networking, social relationship will be limited; people will not care about others.*
D **E**	Social Environment	SOC ENV	*[....] Isolation of both the teacher and the student.* *[....] Noise may disturb lessons; place of study may not be good.*
F	Technology	TEC	*[....] poor network and internet connection, complexity of features in LMS not aligned with teachers' needs.*
G	Social	SOC	*[....] Networking of people.*
H	Human	HUM	*[....] Lack of knowledge on how to use the technology, phobia for the use of technology, training on effective use.*

The table above represents the open coding process, also known as condensed meaning units and categories drawn from the transcripts. The axial coding process again gives a summary of the open coding process as shown on table 4 below.

Table 4: Axial Coding Process: Enabling factors to use LMS

Question	Categories	Abbr.	Narratives /Descriptions/ Codes
Enabling factors	Technology	TEC	*[.....]Expensive for poor people to afford, ease the teaching and learning process, poor network and internet connection, complexity of features in LMS not aligned with teachers' needs, relies on electricity which makes difficult to operate everywhere, sometimes bad sound and audio quality, internet connection problems*
	Social	SOC	*[….] It promotes networking, social relationship will be limited, and people will not care about others, Isolation of both the teacher and the student, Networking of people.*
	Human	HUM	*[….]It is distracting in some cases, attitude of some people may be a hindrance, the more LMS are valuable and use in the teachers communities, Noise may disturb lessons, place of study may not be good, Lack of knowledge on how to use the technology, phobia for the use of technology, training on effective use.*

From the table above we can identify different categories of enabling factors to the use of LMS. A brief description of each category is as followings:

I. **Technology (TEC):** This is the hardware and software that facilitate communication and the transfer of data in the teaching and learning process**.** Technological factors either hinder or enhance the smooth running of online lessons. Other problems arise from the complexity of the system and connectivity as indicated by the participants in this study.

II. **Social (SOC):** Our social environment comprises various interaction with other people and things that we are exposed to. Networking is a social factor that promotes interaction between students and teachers in different geographical locations.

III. **Human (HUM):** Human is an individual that influence the actions of others. Human factors in an online learning environment include noise, fear, competency, time, distraction and knowledge of a particular technology.

The above findings are aligned with findings reported in the literature. In the literature as well as in this study, it is observed that several technology factors, social influence factors and human factors are great determinants of the use and adoption of learning management systems.

Table 6: Comparing the teacher and the learner in a technology mediated environment

Learner	**Teacher**
Adaptive	Adaptive
Learning facilitated by technology	Teaching facilitated by technology
Creative and innovative students	The teacher acts as a guide to trigger learners' creativity.
A learner is the central point of teaching and learning strategies. Learners learn at their own pace	Teacher is active and interactive and act as guide to students
They can learn everything easily but they don't have good social intelligent	Cannot promote social interactions
It breeds lazy learners who rely on copy and paste, recording or snapping with their phones	It requires smart teachers

Teaching- Learning Effectiveness

On the question on how effective is the teaching and learning process in a technology mediated environment, the participants noted that:

- Teaching learning effectiveness in LMS is not a guarantee since the materials and strategies provided to learner doesn't fit with different learner profile;
- It is not as effective as face to face learning process;
- Still needs to be revamped due to the various factors like attitude, poor network and electricity failure;
- It is convenient for learners to learn at their own pace;
- It is not as lively as the face to face class since teacher has limited control of learners;
- It presents a more advanced environment, which needs time to get adapted;
- Improves learning process and leads to new techniques in teaching;
- It is sometimes not effective because of noise, distraction, knowledge of technology and needs more time or time is wasted setting up the virtual environment;
- The teaching and learning activities are challenging to novice teachers and students;
- LMS actually are content providers courses, quiz for student and facilitate administrative work for teachers and faculty. But they can't explain how student learn and their difficulties.

Lesson from the COVID-19 experience?

The participants were asked to express their opinion on what lesson we can draw from the COVID-19 experience. Below are their responses to the question:

- COVID-19 has just enhanced and promoted online learning. And all schools should be aware to have resilient mechanisms as online learning environment to overcome similar global crisis;
- We have to upgrade our technological knowledge to meet the global trends;
- LMS system can now be very helpful in Distance learning programs;
- The COVID-19 experience tells us that we should switch to the use of technology, learn how to use technology for teaching;
- Learning environments are becoming more and more accessible and opened and adaptation to our context should be encourage.

Conclusion

Learning management systems and video conferencing tools have come to stay in education and more and more institutions of higher learning are beginning to increase investment on virtual learning environment. It can be hypothesized that in the near future, almost all higher education institutions in the world will experience some kind of online or blended learning. The post COVID-19 has witnessed an increase in the number of students using technology for learning purpose. Teachers as well as students vying for advanced technology that will simplify their educational endeavors. Learning management systems have not received much attention probably because of the lack of awareness. Despite the numerous challenges ascribed to the use of e-learning, the perceived usefulness and ease of use remain factors that have facilitated their integration into the 21st century classroom. We now leave in an interconnected world where distant is not a barrier to interaction with people of other parts of the world at any time we choose to do so. This break in barrier is thanks to innovative technologies. The emergence of new technologies has redefined our way of life and this has eased operations and transactions in all sectors. The new technologies have redefined teachers and students' roles, enhancing teaching-learning effectiveness. Interactions between teachers and students in different geographical locations have been made easy. Similarly, collaboration between colleagues in other parts of the world have been facilitated by the new technologies. Even though LMS is has not gain much attention in Cameroonian universities, the COVID-19 crisis has served as a facilitating condition for the use of the technology in these universities.

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